Asphota Wasti

(513)-501-1520 LinkedIn|Github|Scholar|Website|Mail

Ph.D. Researcher with specialization in risk (climate and non-climate) analysis of water infrastructures. Lead author of "Climate Change and the Hydropower Sector: A Global Review". Contributor to the development of International Hydropower Association (IHA) Climate Resilience Guide (CRG), 2019, Independent consultant to the World Bank Group, and member of the technical committee on climate change for the International Commission Large Dams (ICOLD).

Education

Ph.D. Environmental Engineering, University of Cincinnati, Cincinnati, OH **May 2022**
Advisor: Dr. Patrick A. Ray

MS Environmental Engineering, University of Cincinnati, Cincinnati, OH **2019**
Advisor: Dr. Patrick A. Ray
GIS, Probability, Bayesian Statistics, Time Series, Hydrologic Modeling, Optimization, Systems Analysis, Physical Principles, Spatial-Temporal Data Mining, Ground Water

BE Civil Engineering, Tribhuvan University, Pulchowk, Nepal **2015**
Fluid Mechanics, Fluid Dynamics, Hydrology, Water Supply, Wastewater Engineering, Hydropower, Economics
Online Courses: Climate Change Forecasting Using Deep Learning, Climate Geospatial Analysis on Python with Xarray, Principal Component Analysis on Python with Numpy, Classification Trees in Python: From Start to Finish, Spatial Data Science: New Frontier in Analytics

Skillset

R: Downloading global gridded datasets (NetCDF files), data cleaning, statistical analysis, stochastic weather generator (MCMC), data visualization
Python: Downloading reanalysis datasets (NetCDF files), extracting data from XMLs, hydrologic modeling (SPHY), processing raster files, storm surge modeling (using GeoCLAW)
MATLAB: Hydrologic modeling (HBV, HYMOD), optimization (Genetic Algorithm), future climate projection
GIS: Geospatial analysis, watershed delineation, map generation, and visualization
Suite of HEC-products: Hydrologic modeling, hydraulic modeling, and reservoir routing

Language

I am **fluent in English**, Nepali, and Hindi, and conversational in **French (DELF A2 certified)**

Teaching Experience

Teaching Assistant at University of Cincinnati **2017-Present**
TA for Fluid Mechanics and Hydraulic Systems Laboratory: ENVE4093L
Performed and recorded experiments for the lab. Graded lab reports and assisted students

TA for Hydraulic Systems: ENVE4093

Graded papers, and held office hours to assist students

Work Experience

Graduate Research Assistant at University of Cincinnati **2017-Present**

Estimating the discharge in sub-basins of the Upper Arun Hydroelectric Project

The World Bank Group, University of Cincinnati, University of Massachusetts

Estimated the flow, evaporation, and infiltration at different locations in an ungauged glacierized catchment with a distributed hydrologic model, and global gridded datasets.

Climate Change Risk Assessment of the Upper Arun Project in Nepal

The World Bank Group, University of Cincinnati, CSPDR

Developed and employed the International Hydropower Association's CRG to assess the climate risks (changes in mean, extremes, and effect on daily operation) to a proposed hydropower

Climate Change Risk Analysis for projects in Kenya and Nepal

The World Bank Group, Deltares, Future Water, University of Cincinnati

Performed the risk assessment of a proposed hydropower project in Nepal following the World Bank Group Decision Tree Framework using rainfall-runoff models, and climate projections.

Visualization of Uncertainty of Forecast Component Parts

National Weather Service - NOAA and University of Cincinnati

Proposed techniques to improve real-time flood forecast by partitioning the uncertainties using Analysis of Variance Technique and visualizing the results using heatmaps and bar charts.

California Hydrologic Vulnerability Assessment and Adaptive Planning Project

University of Cincinnati, US Army Corps of Engineer

In collaboration developed an advancement to the stochastic weather generator using hourly global gridded datasets to prepare reservoirs in California to tackle future extreme events.

Multidimensional Risk Assessment on Riverine Contamination: Case Study of Cincinnati

Ohio Water Resources Center, University of Cincinnati

In collaboration developed a river contamination risk (RANK) framework to model plume exposure in Ohio River under climate and non-climate uncertainty by solving shallow water equations.

Research Trainee at the National Water Center **2021**

Understanding and visualization of the effect of topography on Storm Surge

National Water Center, University of Florida, Columbia University, University of Cincinnati

In collaboration developed a framework to assess the topographic sensitivity of a coastal flooding model for sites from the east coasts of the United States using models that solves shallow water equations.

Short Term Consultant to the World Bank **2019**

Independent Consulting Job

The World Bank Group

Compiled the data on suspended sediment, reservoir operation, and turbine abrasion with an on-site visit of five high-sediment operational hydropower projects in Nepal and India

Civil Engineering Roles **2016 -2017**

Civil Engineer

Department of Urban Development and Building Construction, Nepal

Prepared cost estimates and performed technical bid evaluation

Junior Civil Engineer

Environment Resources Management Consultant (ERMC), Nepal

Conducted hydrological analysis of Siwa Khola Hydropower Project (23MW) in the feasibility stage

Research Intern

Hydro Lab, Nepal

Assisted in the improvement of hydraulic flow and sediment trap structures for river simulations

Training and Certifications

Certified User of the Hydropower Sustainability Tools by the World Bank Group	**2020**
Certified User of the G-res Tool by the International Hydropower Association	**2020**
3-day Seminar by IPCC, International Conference on Understanding Climate Change and Enabling Climate Action	**2017**
5-day Training by World Bank, Addressing Uncertainties in Water Resources Projects with Decision Tree Framework	**2017**
6-month QGIS Training	**2015**

Awards and Scholarships

Graduate Assistantship, Graduate Studies, University of Cincinnati	**2017 - Present**
Undergraduate Studies, Tribhuvan University, IOE, Pulchowk Campus	**2011 – 2015**

Professional Licensure

FE, Engineering in Training, EIT, United States	**2019**
Nepal Engineering Council, NEC, Nepal	**2016**

Leadership Experience

Graduate Student Governance Association- Chemical and Environmental Engineering **2018-2019**

Vice-President (2018), Secretary (2019)

- *Managed and distributed the travel and conference awards to the students*
- *In collaboration with the GSGA or other graduate programs, won the pledge for inclusion of student mental health coverage without increases in premium or co-pay*

SKY@UC **2020-Present**

Treasurer (2020), Vice-President (2021)

- *Led weekly meditation and free yoga sessions for the campus community*
- *Organized over 20 events independent and in collaboration with other clubs serving over 400 students*
- *Won a proposal worth 55,000$ to promote meditation as a means to improve student mental health on campus and was awarded the CSI Impact Award 2021 by the Student Activities Board*

Publications

Peer-reviewed journal articles:

1. Wasti, A., Ray, P., Wi, S., Folch, C., Ubierna, M., & Karki, P. (2022). Climate change and the hydropower sector: A global review. Wiley Interdisciplinary Reviews: Climate Change, e757. https://doi. org/10.1002/wcc.757
2. Behzadi, F., Wasti, A., Steissberg, T. E., & Ray, P. A. (2022). Vulnerability assessment of drinking water supply under climate uncertainty using a river contamination risk (RANK) model. Environmental Modelling & Software, 105294.
3. Zhu, Z., Wasti, A., Schade, T., & Ray, P. A. (2021). Techniques to Evaluate the Modifier Process of National Weather Service Flood Forecasts. Journal of Hydrology X
4. Behzadi F, Wasti A, Rahat SH, Tracy JN, Ray PA (2020) Analysis of the climate change signal in Mexico City given disagreeing data sources and scattered projections 27:100662. doi: 0.1016/j.ejrh.2019.100662
5. Rahat, S., Steinschneider S., Kucharski, J., Arnold, W., Olzewski, J., Walker, W., Maendly, R., Wasti, A., & Ray, P. A. (2022). Characterizing Hydrologic Vulnerability under Non-Stationary Climate and Antecedent Conditions using a Process-Informed Stochastic Weather Generator. Journal of Water Resources Planning and Management. Journal of Water Resources Planning and Management (In Publication)

Professional Reports:

1. Wasti, A., Alrehaili, M., Carter, B., Mandli, K., (2021). "Framework for determining storm surge model sensitivity to topographic features and data resolution" University of Cincinnati, University of Florida, and Columbia University for the Summer Institute 2021 at the National Water Center-National Oceanic and Atmospheric Administration (NOAA).
2. Wasti, A. and Ray, P. (2021). "Climate Change Risk Assessment (CCRA) of the Upper Arun Hydropower Project in Nepal" University of Cincinnati for the World Bank. Contract #7193549
3. Wasti, A. and Ray, P. (2019). "Kabeli-A Run-of-River Hydroelectric Project, Climate Change Risk Analysis for projects in Kenya and Nepal". Deltares, FutureWater and University of Cincinnati for the World Bank. Contract #7187313.
4. Zhu, Z., Wasti, A., Schade, T., Ray, P. (2019). "Visualization of Uncertainty of Forecast Component Parts: Final Report". Final Report of the University of Cincinnati Department and the Ohio River Forecast Center to the University Corporation for Atmospheric Research. COMET Program Grant # SUBAWD000724.

MS Thesis:

Asphota Wasti, University of Cincinnati M.S. in Environmental Engineering. Thesis: "Climate Change Risk Assessment of Hydropower Projects: Towards a Holistic Approach," October 2019.

Conferences and Presentations:

1. Wasti, A., Carter, B., Alrehali, M., Mandli, K. (2021). "A Framework for Topographic Sensitivity Analysis of Storm Surge." AGU Fall Meeting 2021, New Orleans, LA, 15 December.
2. Rahat, S., Steissberg, T., Kucherski, J., Olzewski, J., Mandavya, G., Tracy J., Wasti, A., Buiyan, E., Ray, P. (2021) "Water Quality Assessment using Machine Learning Algorithms from Remote Sensed Data under Non-Stationary Climate Conditions." AGU Fall Meeting 2021, New Orleans, LA, 14 December.
3. Wasti, A., Ray, P. (2021) "Applying the Climate Change Resilience Guidelines in Nepal" Energy and Climate Clinic Series, World Bank Group, Invited Speaker in Webinar, 8 December

4. Wasti, A., Ray, P. (2021) “Hydrology in the sub-basins of Upper Arun Basin”, Report on Progress to the World Bank Group, Virtual Discussion, 19 October.
5. Wasti, A., Ray, P. (2021) “Climate resilience: safeguarding future energy systems”, World Hydropower Congress, Invited Speaker in Virtual Panel Discussion, 7 September.
6. Wasti, A., Schlef, K., Rahat, S., Ray, P. (2020). “Estimating the Probable Maximum Flood under Climate Change.” AGU Fall Meeting 2020, San Francisco, CA, 16 December.
7. Ray, P., Wasti, A., Zhu, Z., Schade, T. (2020). “Evaluation of the Effectiveness of the Modifier Process in National Weather Service Flood Forecasts.” AGU Fall Meeting 2020, San Francisco, CA, 11 December.
8. Rahat, S., Steinschneider, S., Kucharski, J., Arnold, W., Olszewski, J., Walker, W., Maendly, R., Wasti, A., Ray, P. (2020). “Investigating the Reservoir Response for the Antecedent Conditions related to Extreme Flood Events under Climate Non-Stationarity.” AGU Fall Meeting 2020, San Francisco, CA, 16 December.
9. Wasti, A., Wi, S., Rahat, S., Karki, P., Ubierna, M., Ray, P. (2019). “Towards a Holistic Process for Climate Change Risk Assessments of Hydropower Projects.” Proceedings of the American Geophysical Union 2018 Fall Meeting, Washington, D.C., 9 December.
10. Rahat, S., Steinschneider, S., Kucharski, J., Arnold, W., Olzewski, J., Walker, W., Wasti, A., Maendly, R., Ray, P. (2019). A Framework for Flood Risk Management Under Non-Stationary Climate Conditions: Performance Evaluation of Continuous vs. Event-Based Simulations.” Proceedings of the American Geophysical Union 2018 Fall Meeting, Washington, D.C., 9 December.
11. Wasti A., Ray, P., (2019) “Understanding and Modeling Climate Change Impact on Water Infrastructures” (2019) Seminar to graduate students in Water Resources Engineering and Climate Change Development at Tribhuvan University, Nepal, 5 June
12. Ray, P., Wasti, A. (2019). “International Hydropower Association Hydropower Sector Climate Resilience Guide: Training Modules 1-4”. World Hydropower Congress, Espace Grande Arche, Parvis de la Défense, 92044 Paris, France, 14 May.
13. Ray, P., Wasti, A. (2019). “Kabeli A Hydropower Project, Nepal”. Report on Progress to the World Bank Group, Washington, DC, 6 February.
14. Ray, P., Wasti, A. (2019). “Kabeli A Hydropower Project: Pilot Demonstration of the IHA Climate Resilience Guide”. International Hydropower Association Resilience Workshop, European Bank for Reconstruction and Development, London, England, 30 Jan 2019
15. Wasti, A. and Ray, P. (2018). “A Framework for Data Visualization of Uncertainty in the Component Parts of Flood Forecasts: Application to the Ohio River Basin.” Proceedings of the American Society of Civil Engineers 2018 World Environmental and Water Resources Congress, Minneapolis, MN, 3-7 June.
16. Behzadi, F., Ray, P., Wasti, A., Tracy, J., Rahat, S. H., Rodriguez, D. (2017). “H13K-1535: Establishing a Water Resources Resilience Baseline for Mexico City.” Proceedings of the American Geophysical Union 2017 Fall Meeting, New Orleans, Louisiana, 11-15 December.