

SMRITI CHAULAGAIN, PHD

Tucson, Arizona | smritichaulagain@arizona.edu | cell no: 505-363-2244

[Google Scholar](#) | [LinkedIn](#) | Orcid ID: 0000-0002-9429-8834

Highly skilled, results-oriented, and self-motivated water resources researcher with 5+ years of academic and consulting experience in hydrological and hydraulic modeling, geospatial and remote sensing data analysis, and climate resilience research. Skilled in managing interdisciplinary collaborative projects on river restoration, sustainable flood risk assessment, and water resources management. Experienced in field data collection, machine learning applications, and developing reproducible workflows. Committed to continuous learning with strong communication and leadership skills, and impactful mentoring.

RESEARCH INTERESTS

Hydrology and hydraulic modeling, sustainable water management, climate resilience and adaptation, drought-flood dynamics, machine learning in environmental systems, remote sensing applications

QUALIFICATIONS AND KEY SKILLS

- Hydrologic and hydraulic modeling: HEC-HMS, FLO-2D, FLO-2D-SWMM, HEC-RAS (1D/2D), Delft3D-FM, SMS – SRH- 2D
- Geospatial tools: ArcGIS, qGIS, ArcGIS Pro, Google Earth Engine
- Programming and data analysis: Python, MATLAB, and R
- Remote sensing & Machine learning: LiDAR data analysis, Image classification
- Fieldwork: Collecting hydrology (stream gaging), geomorphology (sediment samples analysis), and topographical data (Real-time kinematic positioning surveying)
- Scientific communication: Peer-reviewed publications, grant writing, and technical report writing
- Mentoring and teaching experience: Graduate/undergraduate mentoring, workshop facilitation, and curriculum development

EDUCATION

PhD, Engineering (July 2022), *University of New Mexico*, Albuquerque, NM, USA (passed with Distinction)

Dissertation title: An investigation of emerging technologies to advance the understanding of dynamics between the floodplain and main channel due to riparian vegetation

MSc., Civil Engineering (July 2018), *University of New Mexico*, Albuquerque, NM, USA

BE, Civil Engineering (September 2013), *Kathmandu University*, Nepal

PROFESSIONAL AND RESEARCH EXPERIENCE

Researcher/Scientist IV (2026 to present) | University of Arizona

- Lead the development of models to assess the impacts of existing legacy earthworks and evaluate potential impacts of new earthworks
- Collaboration with USDA scientists to coordinate for implication analysis, best practices, and future needs

Postdoctoral Research Associate (2024 to 2025) | University of Nebraska-Lincoln

- Developed geospatial models to assess hydrologic change and water efficiency for the Rio Chama (New Mexico) and the Los Lagos region (Chile)
- Utilized hydrologic and hydraulic modeling tools to simulate the watershed-scale water balance
- Developed internal/external grant proposal; awarded USGS 104b grant (PI)
- Mentored a graduate student; served as an instructor for a summer class

Hydraulic Engineer (2022 to 2024) | Tetra Tech Inc.

- Led the FLO2D models to support the Pima County Flood Control District in identifying potential flood mitigation measures.
- Led flood routing and analysis using HEC-HMS and FLO-2D to address extreme events in Graham County, developing an EA plan to identify alternatives for flood protection and watershed improvements in coordination with NRCS and Graham County, AZ.

- Developed flood modeling for the eastern region of Texas for a multi-year Flood Basin Study of the Texas General Land Office to assist the counties and municipalities in determining cost-effective mitigation and abatement strategies that reduce the impact of flooding disasters.
- Conducted the dam breach analysis of Forked Run Dam (Ohio River tributary), Fool Hollow Dam of Navajo County (Arizona), Georgia dams, and Jamestown reservoir (Tennessee) to perform a risk analysis, and recommended rehabilitation alternatives.

Graduate Research Assistant (2016 to 2022) | University of New Mexico

- Performed the historical analysis (30 years) of riparian vegetation and channel morphology using Google Earth Engine along the Middle Rio Grande
- Conducted a study to determine the impact of riparian vegetation on hydraulic roughness and energy transfer during high flow using SRH-2D with the vegetation module
- Performed 2D hydraulic modeling (Delft3D-FM) to advance understanding of hydrologic interaction and ecosystem services for the Jemez River, NM, in collaboration with New Mexico Tech.
- Executed HEC-RAS 2D modeling to determine the impacts of the post-wildfire on flood extent for the recruitment of the vegetation in Peralta Canyon, NM.
- Examined the effects of the bendway weirs on the hydraulic and biological characteristics across the Middle Rio Grande, NM.
- Investigated the floodplain resilience impacted by the diversion of the flow of the Gila River, NM, using the SMS-SRH2D model.
- Examined the hydraulic improvements for habitat restoration made by rehabilitation designs along the Middle Rio Grande Reach, NM.
- Collaboratively developed the interdisciplinary GIS and hydrology curriculum for the Southwestern Indian Polytechnic Institution to enhance the instructional and research capacity of hydrological sciences.

TEACHING AND MENTORING EXPERIENCE

- **Instructor**, Google Earth Engine Independent study course, 2025, UNL
- **Lead trainer**, HEC-RAS boot camp training for graduate students, 2022, UNM
- **Co-instructor**, qGIS and Python scripting lessons, 2021, UNM
- **Teaching Assistant**, GIS for Water Resources, UNM
- **Supervised**, an undergraduate student for the McNair Scholars program and research opportunity program (Summer 2018) and a high school student in lab work to determine drag due to swimsuits (Fall 2019)

RESEARCH GRANTS

- **PI, USGS 104b** (2025-2026), “Examining River Evolution: A historical analysis of riparian vegetation and channel morphology of the Platte River, Nebraska”, PI. Funded: \$28,982
- **PI, Nebraska Department of Transportation (2026-2028)** Virtual Stream Gages for Nebraska Highway Flood Resilience, requested for full proposal by NDOT

PEER REVIEW PUBLICATIONS

- **Chaulagain, S.**; Kremer, C.E.; Stone, A. B; Harvey, M.D; Caplan, T. & Stone, M. C., (2025) Remote Sensing and Hydrodynamic Modeling to Assess Riparian Vegetation and Geomorphological Responses to Flow Regulation, Rio Chama, New Mexico, USA, *Ecohydrology*,
- Mittelstet, A; Shrestha, N.; C Zeyrek; **Chaulagain, S** & T Gilmore. Groundwater Flooding on Highways in the Nebraska Sandhills: Applying Remote Sensing, Precipitation, and Groundwater Modeling to Determine Depth, Cause, and Frequency (2025, *Journal of Flood Management, under review*)
- **Chaulagain, S.**; Stone, M. C.; Morrison, R.; & Byrne, C. F. (2025), Mass and Momentum Flux Prediction at the Channel-Floodplain Interface Associated with Riparian Vegetation. *River Research and Applications*. <https://doi.org/10.1002/rra.4436>
- **Chaulagain, S.**; Stone, M. C.; Morrison, R.; Yang, L.; Coonrod, J. & Villa, N. E. (2023). Determining the

response of riparian vegetation and river morphology to drought using Google Earth Engine and machine learning. *Journal of Arid Environments*, 219, 105068. <https://doi.org/10.1016/j.jaridenv.2023.105068>

- **Chaulagain, S.**, Stone, M., Dombroski, D., Gillian, T., Chen, L., and Zhang, S. (2022). An investigation into remote sensing techniques and field observations to model hydraulic roughness from riparian vegetation. *River Research and Applications*, 38(10), 1730–1745. <https://doi.org/10.1002/rra.4053>
- Sumali, A. X.; **Chaulagain, S.**; Sumali, M. F. & Stone, M. C. (2020). Measuring Hydrodynamic Drag of Swimsuits Using Acoustic Doppler Velocimetry. *New Mexico Journal of Science (Volume 54, Issue 1)*

SERVICE & LEADERSHIP

Graduate committee member: MSc. Student, UNM (Summer 2023)

Journal reviewer: *Journal of Hydrometeorology, Ecology and Society, Water Resources Research, Environmental Modelling and Software, Geomorphology, Remote Sensing Applications: Society and Environment*

Proposal reviewer: Internal grant Layman Seed Awards, UNL

REGISTRATION AND CERTIFICATION

Engineer Intern (Civil), New Mexico, certificate number 7432

CONFERENCE PRESENTATION

- **Chaulagain, S.**, Stone, M. C., Morrison, R. R., Yang, L., Coonrod, J., & Villa, N. E. (2024). Application of Google Earth Engine to determine spatiotemporal changes in riparian vegetation and river morphology along Middle Rio Grande, New Mexico, Poster Presentation, *MARGESCP, Science Symposium*, Albuquerque (NM), USA
- **Chaulagain, S.**, Stone, M., and Dombroski, D. (2023) Application of remote sensing techniques to characterize riparian vegetation for modeling hydraulic roughness, Poster presentation, *Sedhyd Conference*, St. Louis (MO), USA
- **Chaulagain, S.**, Stone, M., Morrison, R., and Byrne, C. F. (2022) Modeling hydrological connectivity matrices due to riparian vegetation at the channel-floodplain interface, *AGU fall meeting*, Online poster presentation, Chicago (IL), USA
- Morrison, R. R, Thoms M. C., Stone M. C., and **Chaulagain S.** (2022) New Functional Trajectories of Anthropocene Floodplains: Implications of Floodplain Management and Restoration, *AGU fall meeting*, Oral presentation, Chicago (IL), USA
- Bixby R. J., Burdett A., **Chaulagain S.**, and Stone M. C. (2022). The role of scale and hydraulics/hydrology in shaping biological communities in an aridland river. Joint Aquatic Science Meeting in Grand Rapids, virtual presentation (MI), USA
- **Chaulagain, S.**, Stone, M., Morrison., R., and Yang, L. (2021). The Response of Riparian Vegetation and River Geomorphology due to Extended Drought and other External Stressors. *AGU Meeting*, Poster presentation, New Orleans (LA), USA
- **Chaulagain, S.**, Stone, M., and Dombroski, D. (2020). An Investigation into Field and Remote Sensing Methods for the Estimation of Dynamic Hydraulic Roughness of Floodplains from Riparian Vegetation. *AGU Meeting*, Virtual poster presentation, San Francisco (CA), USA
- Jaramillo, L. V., Stone, M. C., Morrison, R., and **Chaulagain, S.**, (2019). Bayesian Network Modeling Approach Assessing Floodplain Resilience of the Gila River, New Mexico, USA. *AGU Meeting*, Poster presentation, San Francisco (CA), USA
- **Chaulagain, S.**, Stone, M. C. (2018) An Investigation into Remote Sensing Techniques for Describing Hydraulic Roughness of Floodplains, *Proceedings of the 12th International Symposium on Ecohydraulics*, Tokyo, Japan
- Miller, S J., Gregory A. E, Turner, M. T., **Chaulagain, S.**, Cadol, D., Stone, M. C., and Sheneman, L., (2017) Floodplain Vegetation Dynamics Modeling Using Coupled RiPCAS-DFLOW (CoRD): Jemez Canyon, Jemez River, New Mexico. *AGU Meeting*, Poster presentation, New Orleans (LA), USA

AWARDS AND SCHOLARSHIPS

- CE Emeritus Scholarship, UNM - 2021/2022 school year
- ASCE New Mexico Section, Elvidio V. Diniz, P.E., Water Resources Memorial Scholarship – 2020 & 2017

- Grants for Centers of Research Excellence in Science and Technology (CREST) program- Summer 2019
- Passport to Success scholarship, UNM Global Education Office and UNM Bookstore- Summer 2019
- Linda E. Jennett Fellowship, UNM School of Engineering - Summer 2019 & Fall 2016
- Civil Engineering Scholarship - Spring 2016

PROFESSIONAL MEMBERSHIPS

American Society of Civil Engineers, American Water Resources Association, American Geophysical Union, International Association for Hydro-Environment Engineering and Research