PUJA DAS, Ph.D.

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 [Website](#) | [LinkedIn](#)

AREAS OF EXPERTISE

Large-scale water resources systems modeling | Hydrologic and river basin simulation | Decision support systems for water management | Hybrid physics-AI modeling approaches | Operational flood forecasting | Remote sensing and GIS for water resources | Ensemble weather analytics | Stakeholder coordination and science communication

EDUCATION

Ph.D. in Interdisciplinary Engineering   2020–2025
Northeastern University, Boston, MA   GPA: 4.00/4.00

- Department of Civil and Environmental Engineering
- Advisor: Professor Auroop Ganguly
- Remote sensing focused internships: machine learning intern at NASA Ames Research Center (uncertainty-aware quantitative precipitation estimation from geostationary satellites) and data science and remote sensing intern at Capella Space Corporation (synthetic aperture radar based flood depth estimation)

M.S. in Civil and Environmental Engineering (Data and Systems)   2020–2022
Northeastern University, Boston, MA   GPA: 3.97/4.00

B.S. in Water Resources Engineering   2012–2016
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh   GPA: 3.95/4.00

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Fellow   Feb 2025–Present
Institute for Experiential AI, Northeastern University   Portland, ME

- **Science Team Lead:** Weather Ensemble Analytics and Visualization Environment (WEAVE) project with U.S. Air Force Weather, leading interdisciplinary team developing advanced ensemble weather analytics and visualization tools for weather-sensitive operations
- Develop and deploy operational flood forecasting systems with Tennessee Valley Authority (TVA) for real-time flood risk management and hydropower operations
- Successfully transition research algorithms into production-ready tools for infrastructure operators

Graduate Research Assistant   Sep 2020–Feb 2025
Sustainability and Data Sciences Lab, Northeastern University   Boston, MA

- **Project Lead:** NASA-funded "Remote sensing data driven Artificial Intelligence for precipitation Nowcasting (RAIN)" project
- Led evaluation of CMIP6 Earth System Models for surface runoff projections in major river basins worldwide
- Investigated urbanization impacts on precipitation extremes using reanalysis datasets across continental US

Lecturer   Dec 2017–Aug 2020
Military Institute of Science and Technology (MIST)   Dhaka, Bangladesh

- Delivered theory and laboratory lectures in Water Resources Engineering Department
- Junior Environmental Specialist: Monitored environmental parameters (air quality, water quality, noise) for Dhaka Mass Rapid Transit Development Project

PROJECT MANAGEMENT AND STAKEHOLDER COORDINATION

- Led multi-institutional NASA RAIN project involving federal agencies (NASA, TVA), national labs (ORNL), research institutes (RTI), and private sector partners
- Coordinated technical meetings and presentations with stakeholders including U.S. Air Force Weather, TVA operations staff, and DOT officials
- Directed information gathering activities: collected, analyzed, and synthesized technical data from diverse sources
- Contributed to successful proposal development for NASA, NSF, and DOE SBIR programs
- Managed project timelines and deliverables across interdisciplinary teams

ADDITIONAL RESEARCH EXPERIENCE

Data Science and Remote Sensing Intern   Jun 2022–Aug 2022
Capella Space Corporation   San Francisco, CA

- Led project estimating riverine and coastal flood depth using high-resolution SAR imagery and topography

Machine Learning Intern   May 2021–Aug 2021
NASA Ames Research Center   Moffett Field, CA

- Conducted preliminary studies and dataset preparation for uncertainty-aware machine learning algorithms for quantitative precipitation estimation from geostationary satellites

TEACHING AND TRAINING

Graduate Teaching Assistant   Sep 2020–Present
Northeastern University, Boston, MA

- Delivered guest lectures on climate modeling, geospatial data sciences, and infrastructure resilience
- Designed curriculum materials, tutorials, and problem sets for technical courses
- Coordinated international study abroad programs in India, Nepal, Argentina, and Chile

Dialogue of Civilizations Program Coordinator   2023–2024
Northeastern University

- Coordinated undergraduate study abroad programs in India and Nepal
- Designed and delivered orientation sessions for international experiences
- Developed comprehensive itineraries for program activities and managed logistics
- Facilitated cultural immersion activities and provided academic advising

PEER-REVIEWED PUBLICATIONS

1. **Das, P.**, Ganguly, A., Rabb, N., Smith, K., Islam, S. "Floods, Facts, and Fictions: Numbers and Narratives Behind Bangladesh's 2024 Regional Floods." Preprint at *Earth arXiv*, 2025. *(Manuscript in review)*

2. Mawalagedara, R., Ray, A., **Das, P.**, Watson, J., Pal, A., Duffy, K., Bhatia, U., Aldrich, D., Ganguly, A. "Non-linear dynamical approaches for characterizing multi-sector climate impacts under irreducible uncertainty." *npj Climate and Atmospheric Science* 8, no. 1 (2025): 329.

3. **Das, P.**, Posch, A., Barber, N., Hicks, M., Vandal, T., Duffy, K., Singh, D., Werkhoven, K., Ganguly, A. "Hybrid Physics-AI Outperforms Numerical Weather Prediction for Extreme Precipitation Nowcasting." *npj Climate and Atmospheric Science* 7, no. 1 (2024): 282.

4. **Das, P.**, Ganguly, A. R. "Finer Resolutions and Targeted Process Representations in Earth System Models Improve Hydrologic Projections and Hydroclimate Impacts." *npj Climate and Atmospheric Science*, 8, 247 (2025).

REPORTS AND WHITE PAPERS

1. **Das, P.** "Enhancing Flood Resilience: Predictive Tools for Flood and Flash Flood Nowcasting." *International Coalition for Sustainable Infrastructure: Climate Resilient Infrastructure Report— A Focus on Technology*, 2024. (Launched at COP29).

2. **Das, P.** "Improving Flood Emergency Management, Bangladesh and Indonesia." *International Coalition for Sustainable Infrastructure: Accelerating Implementation of Disaster Risk Reduction and Resilience in Infrastructure*, United Nations Headquarters, 2023.

3. Ganguly, A.R., Archibald, R., Bakker, C., Duffy, K., Maulik, R., Mueller, J., Sargsyan, K., **Das, P.**, Watson, J. "Neural Networks." In *Artificial Intelligence for Earth System Predictability (AI4ESP) Workshop Report*. U.S. Department of Energy, Office of Science, 2021.

CONFERENCE PRESENTATIONS

1. **Das, P.**, Ganguly, A. "Predictive Insights in Hydrology with Hybrid Physics and Data Sciences for Climate Adaptation." *AMS 106th Annual Meeting*, Houston, Tx, January 2026.

2. **Das, P.**, Ganguly, A. "Improved Resolution, Physics and Parameterization Enhance Runoff Projections." *AAAS Annual Meeting: Science Shaping Tomorrow*, Boston, MA, February 2025.

3. **Das, P.**, Posch, A., Barber, N., Duffy, K., Vandal, T., Hicks, M., Singh, D., Werkhoven, K., Ganguly, A. "Exploring Uncertainties and Post-processing for Physics-Embedded Deep Generative Precipitation Nowcasting." *AGU Fall Meeting*, 2024.

4. Mawalagedara, R., Ray, A., Aggarwal, K., **Das, P.**, Benavides, F., Pal, A.K., Ganguly, A. "Integrating Internal Climate Variability into Impact Assessments for Resilient Cities and Ecosystems." *AGU Fall Meeting*, 2024.

5. Indrawati, D., **Das, P.**, Ganguly, A. "Interdependence and Cascade of Variability Across Regional Projections from Earth System Models." *AGU Fall Meeting*, 2024.

6. **Das, P.**, Posch, A., Barber, N., Duffy, K., Vandal, T., Hicks, M., Singh, D., Werkhoven, K., Ganguly, A. "Predictive Insights in Hydrology with Hybrid Physics and Data Sciences for Climate Adaptation." *Science Understanding through Data Science (SUDS) Conference*, 2024.

7. **Das, P.**, Jensen, K., De, S., Ganguly, A. "Flood Depth Estimation using Synthetic Aperture Radar (SAR) Imagery And Topography: A Case Study of the 2021 and 2022 Floods in Hawkesbury Valley, Australia." *IEEE IGARSS Conference*, 2023.

8. **Das, P.**, Vandal, T., Duffy, K., Barber, N., Ganguly, A. "Remote-sensing data driven Artificial Intelligence for precipitation Nowcasting (RAIN)." *AGU Fall Meeting*, 2023.

9. **Das, P.**, Barber, N., Vandal, T., Posch, A., Duffy, K., Hicks, M., Singh, D., Werkhoven, K., Ganguly, A. "Hybrid Physics and Machine Learning for Precipitation Nowcasting." *Statistical Hydrology (STAHY) Conference*, 2023.

10. **Das, P.**, Ganguly, A. "Evaluation of Surface Runoff Projections from Earth System Models in Major Basins of the World." *Fragile Earth Workshop, ACM SIGKDD Conference*, 2022.

11. Pal, A.K., **Das, P.**, Yadav, N., Ganguly, A. "Robustness of Urban Coastal Rail Network Under Projected Future Floods." *Fragile Earth Workshop, ACM SIGKDD Conference*, 2022.

12. **Das, P.**, Yadav, N., Ganguly, A. "Urbanization Impacts on Precipitation Extremes Statistics and Design Curves for Hydraulic Infrastructures." *AGU Fall Meeting*, 2022.

13. **Das, P.**, Ganguly, A. "Surface Runoff and Streamflow Projections from Earth System Models." *AGU Fall Meeting*, 2021.

14. **Das, P.**, Vandal, T., Duffy, K., Ganguly, A. "Preliminary Assessment for Enabling Machine Learning based Quantitative Precipitation Estimation with High Spatio-temporal Resolution from Geostationary Satellites." *AGU Fall Meeting*, 2021.

INVITED TALKS AND PRESENTATIONS

- Guest lecture on Earth System Modelling, Dialogue of Civilizations Program, Argentina and Chile (2025). Tutorial uploaded to YouTube for broader educational access.
- Participated in S&P Global Sustainable1 roundtable on "Transforming Research: The Role of AI in Sustainability and Climate Modeling," Boston, MA (November 13, 2025)
- Presentation at NASA Annual Water Resources Program on NASA RAIN Project (September 17, 2024 and September 28, 2023)
- Research presentation to U.S. Air Force Weather on AI for Weather Forecasting, Northeastern University (April 26, 2024)
- Invited talk at CDM Smith Inc. on "Precipitation Nowcasting with AI" (January 4, 2024)
- Invited talk for Scalable Solutions for Resilience at United Nations Headquarters for Disaster Risk Resilience Program (May 17, 2023)
- Research presentation to Indonesian Ministry BAPPENAS delegation on potential long-term collaborations (May 1, 2023)
- Research presentation to U.S. Department of Transportation on "Predictive Insights on Precipitation Nowcasting for Flooding, River, and Hydropower Management" (2023)
- Poster presentation at Industry Leadership Night, Civil and Environmental Engineering Department (2023)
- Project updates presentation to Tennessee Valley Authority (2023)

MENTORSHIP

- Assisted Ph.D. students in conceptualizing qualifying exam presentations and developing research methodology (2024)

- Mentored undergraduate students on machine learning applications in weather forecasting, including generative AI and computer vision (2023)
- Guided high school student in researching conditional generative adversarial networks and precipitation nowcasting (2023)
- Mentored high school student on climate model data simulation and analysis (2021)

SERVICE AND PROFESSIONAL ACTIVITIES

Editorial and Review Activities

- Reviewer, *Environmental Research Letter* journal (2025)
- Reviewer, *Environmental Data Science* journal (2024, 2025)
- Rapporteur, Neural Network session, Artificial Intelligence for Earth System Predictability workshop (2023)

Professional Memberships

- American Geophysical Union (AGU) (2021–Present)
- American Society for Civil Engineers (ASCE) (2021–Present)

Collaboration and Outreach

- Participated in strategic reporting to various stakeholder levels including Northeastern University President (2023–Present)
- Stakeholder engagement for Geospatial AI Foundation Model development with NASA Marshall Center and IBM (2023–Present)
- Collaborative research with postdocs, graduate students, entrepreneurs, and lab alumni (2021–Present)
- Assisted in preparing lecture materials for AI for Science course at Northwestern University (2024)
- Conducted tutorials on Earth System Modeling data analysis for Tufts University students (2023)

SOFTWARE PRODUCTS AND TOOLS

- Pretrained models for quantitative precipitation forecasting: implemented machine learning based models leveraging advanced AI techniques for enhanced predictive accuracy
- Satellite and radar observations for quantitative precipitation estimation: built models integrating satellite and radar observations for improved precipitation data resolution
- Earth System Model projections for impact assessments: conducted projection analysis to assess impacts on hydrology and infrastructure resilience under future climate scenarios

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, R, SQL, VBA
- **Geospatial Analysis:** ArcGIS Pro, QGIS, Google Earth Engine, Gephi
- **Watershed Modeling:** HEC-RAS, HEC-HMS, SWMM, VIC
- **Computing:** Cloud storage services, high performance computing (HPC)
- **Machine Learning:** Deep learning frameworks, generative AI, computer vision

HONORS AND AWARDS

- Outstanding Ph.D. Student Award for Teaching, Northeastern University (2023)
- CEE Fellowship Award, Northeastern University (2020)
- University Merit List and Dean's List Award, Bangladesh University of Engineering and Technology (2012–2016)

REFERENCES

Available upon request