

# HARSHIT SHUKLA

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## EDUCATION

**Ph.D.** Civil Engineering, Clemson University, Clemson SC GPA 4.0, *December 2020*  
**MS** Civil Engineering, National Institute of Technology, Patna, India GPA 4.0, *July 2016*  
**BS** Civil Engineering, OP Jindal Institute of Technology, Raigarh India GPA 3.8, *June 2014*

## TECHNICAL STRENGTHS

**Software** ArcGIS, HydroCAD, SWMM, EPANET, Tableau, ANSYS Fluent, & AutoCAD  
**Programming** MATLAB, Python, SQL, & R studio  
**Tools** HEC-RAS, HEC-HMS, Pandas, NumPy, Deep Learning, & Signal Processing Toolbox  
**Courses** Applied Data Science, Underground Construction, Risk Assessment, Statistical Modeling, Advanced Hydraulics, Waste Water Management, Six Sigma, & Supply Chain Management

## WORK EXPERIENCE

**Graduate Research Assistant** Clemson, SC *August 2016 - December 2020*

- Developed a novel statistical model to predict leakage rates on a buried water pipeline system using ANN
- Implemented a 98% accurate Convolutional Neural Network architecture to classify the signal images into leaky and non-leaky state
- Identified and managed technical project inputs; coordinated with Clemson University Facilities Office to procure new sensors and implement the required changes to the pipeline test-bed
- Successfully analyzed impact of soil backfill on vibrational characteristics used in leakage detection
- Simulated vortex-induced vibration due to flow over a circular cylinder to further develop an in-flow energy harvester for small diameter pipelines using ANSYS Fluent
- Investigated the impact of inflow-infiltration & sediment on stormwater pipelines during hurricane Florence

**Civil Intern at Kleinfelder** Atlanta, GA *January 2019 - August 2019*

- Implemented best stormwater management practices in ArcGIS; created HydroCAD runoff models, and prepared hydrology reports deliverable to clients
- Performed pre & post development hydrological analyses of solar and mining sites
- Leveraged state & federal codes and industry standards to design hydraulic structures for regulating the runoff volume through basin outlets
- Formulated technical specification and commercial documents of bid packages for oil & gas pipeline rehabilitation and relocation projects

**GIS Analyst Intern** RWTH Aachen, Germany *August 2015 - October 2015*

- Assessed susceptibility of groundwater contamination in Raipur region using DRASTIC model; performed the sensitivity analysis of the results in ArcGIS
- Created spatial maps in ERDAS Imagine to investigate the land use changes in the Raipur region and performed Mann-Kendall trend analysis on precipitation data
- A highly vulnerable zone of 102.59 km<sup>2</sup> (13.91%) was found within boundaries of Raipur city, and urbanization increased from 9.59 km<sup>2</sup> to 131.35 km<sup>2</sup> approximately 1300% from 1972 to 2016

## ACADEMIC PROJECTS

**Credit Card Fraud Detection** Clemson, SC *August 2019 - December 2019*

- Prepared, cleaned, and visualized credit card transaction data in Python
- Used SMOTE (Synthetic minority oversampling) and machine learning techniques Decision Tree, Logistic Regression, and KNeighbors Classifier on a highly imbalanced dataset of credit card transactions to classify them as fraudulent or legitimate with F1 score of 0.9995 (from KNeighbors Classifier)

- Deployed multi-objective optimization framework to arrive at potential rehabilitation alternatives and quantified total resilience index (TRI); enhanced TRI with least possible cost using the EPANET and GANetXL tool
- Designed a water distribution network with 30 pipes, a 4.52kW pump, and the reservoir for the given set of demand and pressure requirements
- Proposed an optimal solution for the network, based on the capital cost and TRI

- Quantified the peak flood discharge and created a model using HEC-HMS to suggest flood protection measures in Power Grid Corporation India Limited
- Generated flood inundation map by coupling the HEC-HMS model with HEC-RAS tool and calibrated the resulting map using the field observation data
- Simulated the hydraulic model according to the inundation pattern and site suitability, based on different structural measures

## **PUBLICATIONS**

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### **Book**

Verma M. K., Sinha M. K., and **Shukla, H.** (2018) “Application of groundwater vulnerability models in an urban area –Integrating with GIS environment”, Scholars’ Press, Düsseldorf, Germany, ISBN:978-620-2-31582-1

### **Selected Refereed Journal Publications**

**Shukla, H.** and Piratla, K. R., (2020) “Leakage ection in Water Pipelines Using Supervised Classification of Acceleration Signals”, Journal of Automation in Construction, 117: 103256, DOI:10.1016/j.aut.con.2020.103256

**Shukla, H.**, Piratla, K. R., and Atamturktur, S., (2019) “Influence of Soil Backfill on Vibration-based Pipeline Leakage Detection”, ASCE Journal of Pipelines Systems Engineering and Practice, DOI:10.1061-1949-1204.435

### **Selected Peer Reviewed Conference Proceedings**

**Shukla, H.** and Piratla, K. R., (2020) “Unsupervised Classification of Flow-Induced Vibration Signals to Detect Leakages in Water Distribution Pipelines”, 2020 ASCE Pipelines Conference, San Antonio, Texas, DOI:10.1061/9780784483190.048

**Shukla, H.** and Piratla, K. R., (2019) “An Automated Leakage Detection Model For Water Distribution Pipeline Systems”. 37<sup>th</sup> International No-Dig Conference. Florence, Italy, Paper Ref 2356, [www.istt.com/main/task.pdf/byID.2308](http://www.istt.com/main/task.pdf/byID.2308)

**Shukla, H.** and Piratla, K. R., (2019) “A Novel Statistical Approach to Detect Leakages in Water Pipeline Systems”, NASTT No Dig, Chicago, Illinois, Paper Ref TM1-T3-04, [member.nastt.org/product/TM1-T3-04](http://member.nastt.org/product/TM1-T3-04)

## **PROFESSIONAL SERVICES & MEMBERSHIPS**

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- Reviewer, ASCE Journal of Pipelines Systems Engineering and Practice
- Reviewer, ASCE Pipelines Conference 2019, 2020, and 2021
- Reviewer, ASCE Construction Research Congress Conference 2020
- Associate Member of American Society Of Civil Engineers, [Member ID - 11148143]
- Student Member of Water Environment Federation, [Member ID - 18027052]
- Student Member of North American Society for Trenchless Technology, [MEM-03504]

## **AWARDS & LEADERSHIP**

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- Poster chair and group lead of student scholarship program for the 2020 Pipelines Conference
- Secretary-Treasurer for UESI Younger Member Engagement Committee, October 2018 - August 2019
- Rozendale Emerging Leaders Award to attend 37<sup>th</sup> International No-Dig Conference, Florence, Italy
- National Science Foundation Travel Grant to attend 2019 icRS Cities Conference, Adelaide, Australia
- UESI Student Scholarship Award to attend 2018 ASCE Pipelines Conference, Toronto, Canada