BANDARU GOUTHAM RAJEEV GANDHI

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Department of Civil Engineering

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Degree	Institute	CGPA/%	Years
Ph.D.	Indian Institute of Technology Guwahati	~	*2016-2023*
M.Tech.	Indian Institute of Technology Guwahati	9.89	*2013-2015*
B.Tech.	Jawaharlal Nehru Technological University Kakinada	81.68%	*2009-2013*
Intermediate (BIEAP)	Sri Chaitanya Junior College Visakhapatnam	96.4%	*2007-2009*
Class X(BSEAP)	Saint Francis De' Sales School Visakhapatnam	86.5%	*2007*

KEY AREA OF RESEARCH

Detection and Management of Virus Sources in Groundwater under Equilibrium and Kinetic Sorption *July 2016 to February 2023*

PhD Research Guide: *Prof. Rajib Kumar Bhattacharjya, Professor in Department of Civil Engineering, IIT Guwahati.*

The objectives that I have achieved in the PhD Research work are

- Develop a numerical simulation model in Darcy Scale that accounts for all the heterogeneities in aquifer medium and other factors such as Temperature, pH and Solution chemistry, considering the spatial and temporal variations of the parameters.
- Develop a pore scale model that translates the pore network characteristics to the Darcy scale models.
- Translate the parameters in the aquifer from the pore-scale to Darcy scale by solving the pore network flow and correlation equations for a single pore.
- Develop an inverse optimization model that can identify the potential source strengths of virus.
- Develop an optimal management strategy by altering the parameters that effect the viruses' deposition and inactivation through Darcy scale models.

RESEARCH AND CONSULTANCY PROJECTS

Assessment of Flood Vulnerability in the upstream catchment of Himalayan River Basin *October 2020 to March 2023*

Research Project: *Dr. Dilip Kumar, Assistant Professor in Department of Civil Engineering, GBPIET. (PI)*
Dr. BG Rajeev Gandhi, Assistant Professor in Department of Civil Engineering, GBPIET. (Co-PI)
Mr. Ajay Kumar, Assistant Professor in Department of Civil Engineering, GBPIET. (Co-PI)

- Research project funded by ISRO under SARITA scheme by Space Application Centre – ISRO, Ahmedabad.

Protection work of hill side behind the four occupancy block for Rastriya Sanskrit Sansthan at Devprayag, Pauri *May 2021 to June 2021*

Consultancy Project: *Dr. Sareesh Chandrawanshi, Assistant Professor in Department of Civil Engineering, GBPIET. (PI)*
Dr. Dilip Kumar, Assistant Professor in Department of Civil Engineering, GBPIET. (PI)
Dr. BG Rajeev Gandhi, Assistant Professor in Department of Civil Engineering, GBPIET. (PI)

- A procedure to stabilize steep slope of 20 m height and 85^0 with horizontal and another slope of 40 m height and 75^0 with horizontal using soil nailing analysis and procedure (SNAP) software.

Estimation of Groundwater Fluctuations in different regions of Bihar using GRACE data *October 2019 to February 2021*

Research Project: *Mr. Abhinav Rawat, Assistant Professor in Department of Civil Engineering, GBPIET. (PI)*
Dr. Dilip Kumar, Assistant Professor in Department of Civil Engineering, GBPIET. (Co-PI)
Dr. BG Rajeev Gandhi, Assistant Professor in Department of Civil Engineering, GBPIET. (Co-PI)
Dr. Hira Lal Yadav, Assistant Professor in Department of Civil Engineering, GBPIET. (Co-PI)
Dr. Pramod Kumar Sharma, Associate Professor in Department of Civil Engineering, IIT Roorkee. (Co-PI)

- Research project funded by National Project Implementation Unit under TEQIP scheme.

Determination of aquifer parameters and Safe yield at National Institute of Pharmaceutical Education and Research (NIPER), Guwahati *January 2019*

Consultancy Project: *Prof. Rajib Kumar Bhattacharjya, Professor in Department of Civil Engineering, IIT Guwahati. (PI)*
BG Rajeev Gandhi, Research Scholar, IIT Guwahati (Team Member)

- Testing and determination of aquifer parameters using pump-out method and Cooper-Jacob solution.

Hydraulic Transient Analysis for water pipe line at National Thermal Power Corporation (NTPC), Gadarwara *November 2016 to May 2017*

Consultancy Project: *Prof. Arup Kumar Sharma, Professor in Department of Civil Engineering, IIT Guwahati.*
Prof. Rajib Kumar Bhattacharjya, Professor in Department of Civil Engineering, IIT Guwahati.

- Development of a thorough hydraulic transient analysis code in MATLAB using the finite difference scheme by method of characteristics.
- Determination the optimal number and location of air valves so that the pipeline is subjected to minimum vacuum pressure when valves are closed or pumps fail.

PUBLICATIONS FROM PHD RESEARCH

- **Gandhi, B.G.R.,** & Bhattacharjya, R.K. (2024). A semi-probabilistic Bayesian method to identify the number and location of potential sources in 3D unconfined aquifer using limited observed concentration. Journal of Contaminant Hydrology, Vol 267, 104447. https://doi.org/10.1016/j.conhyd.2024.104447
- **Gandhi, B.G.R.,** Bhattacharjya, R.K. (2020). Differential Evolution and Its Application in Identification of Virus Release Location in a Sewer Line. In: Bennis, F., Bhattacharjya, R. (eds) Nature-Inspired Methods for Metaheuristics Optimization. Modeling and Optimization in Science and Technologies, vol 16. Springer, Cham. https://doi.org/10.1007/978-3-030-26458-1_4
- **Gandhi, B.G.R.,** Bhattacharjya, R.K. (2020). Introduction to Shuffled Frog Leaping Algorithm and Its Sensitivity to the Parameters of the Algorithm. In: Bennis, F., Bhattacharjya, R. (eds) Nature-Inspired Methods for Metaheuristics Optimization. Modeling and Optimization in Science and Technologies, vol 16. Springer, Cham. https://doi.org/10.1007/978-3-030-26458-1_7
- **Rajeev Gandhi, B. G.,** Rajib Kumar Bhattacharjya, and Mysore G. Satish. "Simulation–optimization-based virus source identification model for 3D unconfined aquifer considering source locations and number as variable." Journal of Hazardous, Toxic, and Radioactive Waste 21, no. 2 (2017): 04016019. https://doi.org/10.1061/(ASCE)HZ.2153-5515.0000334

PUBLICATIONS FROM RESEARCH PROJECTS

- Rautela, Kuldeep Singh, Dilip Kumar, **Bandaru Goutham Rajeev Gandhi**, Ajay Kumar, Amit Kumar Dubey, and Bhishm Singh Khati. "Evaluating hydroelectric potential in Alaknanda basin, Uttarakhand using the snowmelt runoff model (SRM)." Journal of Water and Climate Change 14, no. 11 (2023): 4146-4161. https://doi.org/10.2166/wcc.2023.341

- Rautela, Kuldeep Singh, Dilip Kumar, **Bandaru Goutham Rajeev Gandhi,** Ajay Kumar, and Amit Kumar Dubey. "Long-term hydrological simulation for the estimation of snowmelt contribution of Alaknanda River Basin, Uttarakhand using SWAT." Journal of Water Supply: Research and Technology-Aqua 72, no. 2 (2023): 139-159. https://doi.org/10.2166/aqua.2023.176
- Rautela, Kuldeep Singh, Dilip Kumar, **Bandaru Goutham Rajeev Gandhi,** Ajay Kumar, and Amit Kumar Dubey. "Application of ANNs for the modeling of streamflow, sediment transport, and erosion rate of a high-altitude river system in Western Himalaya, Uttarakhand." RBRH 27 (2022). https://doi.org/10.1590/2318-0331.272220220045
- Rautela, Kuldeep Singh, Dilip Kumar, **Bandaru Goutham Rajeev Gandhi**, Ajay Kumar, and Amit Kumar Dubey. "Flood Vulnerability Assessment Across Alaknanda River Basin using GIS-based combined analysis of geomorphometric approach and MCDM-AHP." Journal of the Geological Society of India 99, no. 11 (2023): 1604-1615. https://doi.org/10.1007/s12594-023-2512-9

OTHER PUBLICATIONS

- Gupta, A., and **Rajeev Gandhi, B.G.,** 2025. Real Time Groundwater Prediction Models using RNN and LSTM Techniques. International Groundwater Conference (IGWC 2025), pp. 542-543, 2025-03-06.
- **Rajeev Gandhi, B.G.,** Kumar, D., Yadav, H.L. (2020). An Artificial Neural Network Model for Estimating the Flood in Tehri Region of Uttarakhand Using Rainfall Data. In: Pant, M., Kumar Sharma, T., Arya, R., Sahana, B., Zolfagharinia, H. (eds) Soft Computing: Theories and Applications. Advances in Intelligent Systems and Computing, vol 1154. Springer, Singapore. https://doi.org/10.1007/978-981-15-4032-5_43
- Kumar, D., **Gandhi, B.G.R.,** Bhattacharjya, R.K. (2020). Introduction to Invasive Weed Optimization Method. In: Bennis, F., Bhattacharjya, R. (eds) Nature-Inspired Methods for Metaheuristics Optimization. Modeling and Optimization in Science and Technologies, vol 16. Springer, Cham. https://doi.org/10.1007/978-3-030-26458-1_12
- Kumar, D., **Gandhi, B.G.R.,** Bhattacharjya, R.K. (2020). Firefly Algorithm and Its Applications in Engineering Optimization. In: Bennis, F., Bhattacharjya, R. (eds) Nature-Inspired Methods for Metaheuristics Optimization. Modeling and Optimization in Science and Technologies, vol 16. Springer, Cham. https://doi.org/10.1007/978-3-030-26458-1_6
- Mamata Das, **B.G. Rajeev Gandhi,** Rajib Kumar Bhattacharjya (2019), "Estimation of the flow parameters in unsaturated zone using shuffled frog leaping algorithm", 11th World Congress of European Water Resources Association, Madrid, Spain, 25-29, June 2019.
- **Rajeev Gandhi BG,** Manikanta PNV, Vema Reddy G, Girish Kumar U, Vijay Babu K, Rahimunisa Begum M, Sai Kiran Y S. "Detection of illegal groundwater pumping – modelling and experimental verification." 21st Intl. Conf. on Hydraulics, Water Resources and Coastal Engineering, Hydro 2016.
- Arnesh Das, **Rajeev Gandhi BG,** Rajib Kumar Bhattacharjya, 2015, "Determination of illegal pumping and monitoring network using genetic algorithm-based simulation-optimization model." Third Intl. Conf. on Advances in Civil, Structural and Environmental Engineering – ACSEE.

EXPERIENCE

Scientist C (Level 11) *06-11-2023 to 19-01-2024 (On Lien)*

National Institute of Hydrology, Roorkee, Uttarakhand, ***India***

- Research in the Groundwater Hydrology Division of the institute.

Assistant Professor (Level 10) *22-04-2019 to 31-01-2024*

Govind Ballabh Pant Institute of Engineering and Technology, Pauri Garhwal, Uttarakhand, ***India***

- UG and PG courses of **Fluid Mechanics, Hydraulic Machines, Water Resources Engineering, Groundwater Engineering, Engineering Graphics** for Under Graduates and **Optimization Methods, Programming Applications for Engineers** for Post Graduates.

Assistant Professor (Level 10) *13-08-2015 to 23-04-2016*

Anil Neerukonda Institute of Technology and Sciences, Visakhapatnam, Andhra Pradesh, ***India***

- Taught the courses **Water resources engineering** and **Irrigation Structures Design and Drawing** for undergraduates IV/IV year of Bachelor of Engineering
- Taught a Laboratory course for **Fluid Mechanics and Hydraulic Machines** for undergraduates II/IV year of Bachelor of Engineering.

Visiting Scholar *15-09-2014 to 15-11-2014*

Dr. M G Satish, Professor in Civil and Resource Engineering, Dalhousie University, Halifax, NS, ***Canada***.

- Visiting Scholar at Dalhousie University to continue the research on the **modelling of virus transport in porous media using MATLAB** under the guidance of Dr. M G Satish.
- Three-dimensional transport of virus is modelled using MATLAB for simple cases and the results are **validated with the MT3DMS** module in Groundwater Modelling Software.

SPECIAL COURSES

Transport of Viruses and Colloids in Variably Saturated Soil and Groundwater *12-02-2019 to 20-02-2019*

Prof. S. Majid Hassanizadeh, Utrecht University, ***Netherlands***
Dr. Brijesh K. Yadav, Asst. Professor, Indian Institute of Technology Roorkee, ***India***

- Participated in the international credit course under Global Initiative for Academic Network (GIAN) organized at Indian Institute of Technology Roorkee.
- The Course dealt with the basic transport processes of viruses and colloids in porous medium. Advanced treatment methods of virus contamination using variably saturated flow of water through porous medium.

Groundwater Flow and Transport Modelling through Fractured Geologic Media *27-06-2016 to 08-07-2016*

Prof. Walter A. Illman, University of Waterloo, ***Canada***
Dr. K.B.V.N. Phanindra, Asst. Professor, Indian Institute of technology Hyderabad, ***India***

- Participated in the international credit course under Global Initiative for Academic Network (GIAN) and secured Excellent (10 CGPA) grade points, organized at Indian Institute of Technology Hyderabad.
- The Course dealt with the basic modelling differences with the porous media and the fractured geologic media. Advanced techniques in determining the hydraulic conductivity of any media using hydraulic tomography and electrical resistivity are emphasized.

Water Resource Management and Climate Change Impacts *22-12-2014 to 26-12-2014*

Dr. M.K. Goyal, Asst. Professor, Indian Institute of technology Guwahati, Assam, ***India***

- Participated in the national course under Technical Education and Quality Improvement Programme sponsored by the Ministry of Human Resource Development and Government of India.
- The course dealt with various impacts of climate change, downscaling the various Global Climatological Models (GCM), importance of Regional Climatological Modes (RCM) as main emphasis.

TECHNICAL PROFICIENCY

- Basics in 'C' language, Python
- GMS (Groundwater Modelling System) MODFLOW/MT3DMS
- MATLAB (Developed the Codes for flow and transport models of virus contamination using FVM)
- MATLAB (Developed the Codes for Pore Network Modeling and Upscaling techniques from Pore Network to Darcy Scale)
- Python (Developed Finite Difference Models for contaminant flow and transport through porous media)
- HAMMER (Bentley) for Hydraulic Transients