

# DR. ABHISEKH SAHA

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## EDUCATION

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- Doctor of Philosophy (Ph.D.), Department of Civil Engineering, Indian Institute of Technology Guwahati (July 2016 – November 2021)
- Master of Technology (M.Tech.), Geotechnical Engineering Division, Department of Civil Engineering, Indian Institute of Technology Guwahati (July 2014 – June 2016)
- Bachelor of Engineering (B.E.), Department of Civil Engineering, Indian Institute of Engineering Science and Technology Shibpur (July 2010 – June 2014)

## PROFESSIONAL EXPERIENCE

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- Assistant Professor, Department of Civil Engineering, Malaviya National Institute of Technology Jaipur, Rajasthan, India (December 2023 – till date)
- Assistant Professor, Department of Civil Engineering, Techno India University, Kolkata, India (March 2022 - April 2023)

## RESEARCH INTERESTS

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- Unsaturated soil concepts in practice
- Value addition to waste materials
- Climate-resilient soil infrastructure
- Sustainable geotechnics
- Behavior of biopolymer amended soils

## SPONSORED RESEARCH PROJECTS

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- Hydrogels as nature-based solution for migration of sand dunes in semiarid and arid regions [Amount: 62.98 Lakhs] (Funding Agency: ANRF under Prime Minister Early Career Research Grant) [**Role: PI**]
- Enhancing water retention properties of arid soil using biopolymer to combat land degradation [Amount: 5 Lakhs] (Faculty Seed Grant, Dean of Research and Consultancy, MNIT Jaipur) [**Role: PI**]
- Integrated Infrastructure Development at Sewapura Dumpsite for minimizing the environmental pollution [Amount: 22.5 Lakhs] (Funding Agency: Jaipur Nagar Nigam) [**Role: Co-PI**]

## ACHIEVEMENTS

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- **Best paper award**, North East Students Geo Congress (NESGC) on Advances in Geotechnical Engineering (2016), National Institute of Technology, Agartala.

- **Third position**, Bio-NEST NIPER-Guwahati Bio-Innovation challenge, organized by Bio-NEST NIPER-Guwahati Incubation Center.

## PATENT

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- **Saha, A.**, Sekharan, S. and Manna, U. Transformation of fly ash into non-toxic, high water absorbing polymer for drought management. Indian Patent no. 473902 granted on November 28, 2023.

## JOURNAL PUBLICATIONS

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- **Saha, A.**  (2026). Biological soil crusts as nature-inspired solution for arid soil stabilization: Integrating microbial processes with unsaturated soil mechanics. *Pedosphere*, Elsevier. [<https://doi.org/10.1016/j.pedsph.2026.02.004>]
- Rattan, B., **Saha, A.**, Garg, A. , Sreedeeep, S., Sahoo, L., and Manna, U. (2025). Degradation of Hydrophilic Polymers and its Impact on Water Retention Properties of Soil. *Environmental Geotechnics*, ICE. [<https://doi.org/10.1680/jenge.25.00114>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2025). Prediction of hysteresis in the water retention curve for the fly ash-based hydrogel-amended soils. *Irrigation and Drainage*, 74(4), 1493-1505. Wiley. [<https://doi.org/10.1002/ird.3098>]
- **Saha, A.** , Sekharan, S., Manna, U. and Tripathy, S. (2025). Quantifying water release into the soil from water absorbing polymers under drought conditions. *Journal of Irrigation and Drainage Engineering*, 151 (4). ASCE. [<https://doi.org/10.1061/JIDEDH.IRENG-10514>]
- **Saha, A.** , Drishti, Jain, P. and Nancy, K. (2025). Investigating the effect of superabsorbent hydrogel on hydraulic characteristics of desert soil. *Arid land research and management*, 39 (3), 348-369. Taylor & Francis. [<https://doi.org/10.1080/15324982.2024.2441726>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2024). Effect of Water Absorbing Polymer Amendment on Performance of Capacitance Soil Moisture Sensor. *Advances in Civil Engineering Materials*, 13(1), 116-133. ASTM. [<https://doi.org/10.1520/ACEM20230041>]
- **Saha, A.** , Sekharan, S. (2024). Potential Application of Superabsorbent Hydrogel Composite in Geotechnical Engineering Focusing Sustainability: State-of-the-Art Review. *Indian Geotechnical Journal*, 1-22. Springer. [<https://doi.org/10.1007/s40098-024-00867-z>]
- Rattan, B., **Saha, A.**, Bordoloi, S. , Garg, A., Sahoo, L., Sekharan, S. (2023). Efficacy of novel water-absorbing polymer amended soil for improving drought resilience of *Solanum lycopersicum*. *Soil Science Society of America Journal*, 87(1), 13-29, Wiley. [<https://doi.org/10.1002/saj2.20480>]
- Rattan, B., Dhobale K.V., **Saha, A.**, Garg, A. , Sahoo, L., Sreedeeep, S. (2022). Influence of inorganic and organic fertilizers on the performance of water-absorbing polymer amended soils from the perspective of sustainable water use efficiency. *Soil and Tillage Research*, 223, 105449. Elsevier. [<https://doi.org/10.1016/j.still.2022.105449>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2022). Characterization of Moisture Movement in Water Absorbing Polymer-Soil System: A Horizontal Absorption Method. *Journal of Materials in Civil Engineering*, 34(10), ASCE. [[https://doi.org/10.1061/\(ASCE\)MT.1943-5533.0004422](https://doi.org/10.1061/(ASCE)MT.1943-5533.0004422)]
- **Saha, A.** , Sekharan, S. and Manna, U. (2022). Hysteresis model for water retention characteristics of water absorbing polymer amended soils. *Journal of Geotechnical and Geoenvironmental Engineering*, 148(4), ASCE. [[https://doi.org/10.1061/\(ASCE\)GT.1943-5606.0002764](https://doi.org/10.1061/(ASCE)GT.1943-5606.0002764)]

- **Saha, A.** , Rattan, B., Sekharan, S., and Manna, U. (2021). Quantifying the combined effect of pH and salinity on the performance of water absorbing polymers used for drought management. *Journal of Polymer Research*, 28(11), 428, Springer. [<https://doi.org/10.1007/s10965-021-02795-5>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2021). Predictive Model for Water Retention Curve of Water Absorbing Polymer Amended Soil. *Géotechnique Letters*, 11(3), 164-170, ICE. [<https://doi.org/10.1680/jgele.21.00015>]
- **Saha, A.** , Gupt, C.B., and Sekharan, S. (2021). Recycling Natural Fibre to Superabsorbent Hydrogel Composite for Conservation of Irrigation Water in Semi-arid Regions. *Waste and Biomass Valorization*, 12, 6433–6448, Springer. [<https://doi.org/10.1007/s12649-021-01489-9>]
- **Saha, A.**  and Sekharan, S. (2021). Importance of Volumetric Shrinkage Curve (VSC) for determination of Soil-Water Retention Curve (SWRC) for Low Plastic Natural Soils. *Journal of Hydrology*, 596, 126113. Elsevier. [<https://doi.org/10.1016/j.jhydrol.2021.126113>]
- **Saha, A.**  and Sekharan, S. (2021). Estimation of unsaturated hydraulic conductivity function: implication of low to high suction measurements. *Acta Geophysica*, 69(2), 547-559, Springer. [<https://doi.org/10.1007/s11600-021-00548-y>]
- **Saha, A.**, Sekharan, S. , Manna, U. and Sahoo, L. (2020). Transformation of non-water sorbing fly ash to a water sorbing material for drought management. *Scientific Reports*, 10(1), 1-16, Nature. [<https://doi.org/10.1038/s41598-020-75674-6>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2020). Superabsorbent hydrogel (SAH) as a Soil Amendment for Drought Management: A Review. *Soil and Tillage Research*, 204, 104736. Elsevier. [<https://doi.org/10.1016/j.still.2020.104736>]
- **Saha, A.** , Sekharan, S. and Manna, U. (2020). Evaluation of Capacitance Sensor for Suction Measurement in Silty Clay Loam. *Geotechnical and Geological Engineering*, 38(4), 4319-4331, Springer. [<https://doi.org/10.1007/s10706-020-01297-3>]
- **Saha, A.**, Rattan, B., Sekharan, S.  and Manna, U. (2020). Quantifying the interactive effect of water absorbing polymer (WAP)-soil texture on plant available water content and irrigation frequency. *Geoderma*, 368, 114310, Elsevier. [<https://doi.org/10.1016/j.geoderma.2020.114310>]

 Corresponding author

## BOOK CHAPTERS

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- **Saha, A.** and Sekharan S. (2026). Challenges and future perspectives on combating climate change impact on urban geotechnical infrastructures. In: *Climate Change Effects on Infrastructure*. Elsevier. [ISBN: 9780443336850] (in print)
- **Saha, A.**, Sreedeeep, S. and Manna, U. (2024). Role of Biopolymers and Their Composites in Sustainable Agriculture: Recent Developments and Future Perspectives. In: *Applications of Biopolymers in Science, Biotechnology, and Engineering*, 57-87. Wiley. <https://doi.org/10.1002/9781119783473.ch3> [ISBN: 9781119783473]
- **Saha, A.**, Sekharan S. and Manna, U. (2021). Performance of an Electromagnetic Sensor for Field Monitoring of Volumetric Water Content in Water-Absorbing Polymer Amended Soil. In: *Transportation, Water and Environmental Geotechnics*. Lecture Notes in Civil Engineering, Vol 159. Springer, Singapore. [https://doi.org/10.1007/978-981-16-2260-1\\_2](https://doi.org/10.1007/978-981-16-2260-1_2) [ISBN: 978-981-16-2260-1]
- Mushahary, L., Deka, D., **Saha, A.** and Sreedeeep, S. (2020). Numerical Modeling of Tunnel Support Designing in Weak Rock. In: *Geotechnical Characterization and Modelling* (pp. 539-547). Springer, Singapore. [https://doi.org/10.1007/978-981-15-6086-6\\_44](https://doi.org/10.1007/978-981-15-6086-6_44) [ISBN: 978-981-15-6086-6]
- **Saha, A.**, Rattan, B., Sreedeeep, S. and Manna, U. (2020). Effect of Water Absorbing Polymer Amendment on Water Retention Properties of Cohesionless Soil. In: *Advances in Computer Methods and Geomechanics* (pp. 185-195). Springer, Singapore.

[https://doi.org/10.1007/978-981-15-0886-8\\_15](https://doi.org/10.1007/978-981-15-0886-8_15) [ISBN: 978-981-15-0886-8]

- Sekharan, S., Gadi, V. K., Bordoloi, S., **Saha, A.**, Kumar, H., Hazra, B. and Garg, A. (2019). Sustainable geotechnics: a bio-geotechnical perspective. In: *Frontiers in Geotechnical Engineering* (pp. 313-331). Springer, Singapore. [https://doi.org/10.1007/978-981-13-5871-5\\_15](https://doi.org/10.1007/978-981-13-5871-5_15) [ISBN: 978-981-13-5871-5]

## CONFERENCE PROCEEDINGS

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- **Saha, A.**, Muskan and Saini, S. (2026). Low Carbon Approach for Arid Soil Stabilization with Alkali Activated Ground Granulated Blast Furnace Slag. Proceedings of Future Challenges for Sustainable Development in Geotechnical Engineering, Jadavpur University, Kolkata, INDIA.
- **Saha, A.** and Sekharan, S. (2025). Assessing Moisture Transport in Soil-Superabsorbent Hydrogel System for Drought Stress Management, Proceedings of Japan Geoscience Union 2025, Tokyo, JAPAN.
- Jangir, S. and **Saha, A.** (2025). Stabilization of Arid Sand Using Bio-Based Polymer Additives for Pavement Applications. Proceedings of 11th International Conference on Transportation Systems Engineering & Management (CTSEM-2025), MANIT Bhopal, Madhya Pradesh, INDIA.
- **Saha, A.**, Sekharan, S. and Manna, U. (2020). Performance of an Electromagnetic Sensor for Field Monitoring of Volumetric Water Content in Water Absorbing Polymer Amended Soil. Proceedings of Indian Geotechnical Conference, Andhra University, Visakhapatnam, INDIA.
- **Saha, A.**, Gupt, C. B. and Sekharan, S. (2020). Synthesis and Utilization of Bentonite Modified Hydrogel Towards Sustainable Water Resource Management. Proceedings of Second ASCE India Conference on Challenges of Resilient and Sustainable Infrastructure Development in Emerging Economies (CRSIDE2020), Kolkata, INDIA.
- **Saha, A.**, Rattan, B., Sekharan, S. and Manna, U. (2020). Characterization and reutilization prospective of an industrial solid waste fly ash: A state of the art review. Proceedings of 3rd International Conference on Waste Management-Recycle 2020, Indian Institute of Technology Guwahati, INDIA.
- **Saha, A.**, Yamsani, S. K. and Sreedeeep, S. (2016). Soil water characteristic curve prediction using Grain size distribution. Northeast students Geo congress (NESGC) on Advances in Geotechnical Engineering, NIT Agartala, INDIA.

## SUBJECTS TAUGHT

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- Soil Mechanics (Undergraduate)
- Ground Improvement Techniques (Postgraduate)
- Numerical Methods (Undergraduate)
- Mechanics of solid (Undergraduate)
- Engineering Mechanics (Undergraduate)
- Geotechnical Engineering Lab (Undergraduate)
- Engineering Drawing and Sketching (Undergraduate)
- Computer-aided Civil Engineering Drawing (Undergraduate)

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