Dr. Surabhi Jain

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Education

2014–2020 **Ph.D.- Geotechnical Division, Civil Engineering**, *IIT Madras,* Chennai, India.

2012-2014 **M.Tech- Geotechnical Division, Civil Engineering (CGPA-9.04/10)**, *NIT Rourkela*, Odisha, India.

2008-2012 **B.Tech- Civil Engineering (CGPA-8.48/10)**, *Institute of Technical Education and Research*, Bhubaneswar, Odisha, India.

Field of Interest

Geoenvironmental engineering, Environmental biogeotechnology, Biominerlization, Biocementation as a biostabilization and remediation technique, Bioremediation of solid waste and reuse it as an engineering material, Biopolymer as an alternative stabilizer and Microbial activity and transportation of microorganism in porous media

Academic Projects

Title: Stabilization of Coarse-grained Geomaterial by Biogeochemical Process **(2014-2020)**

Supervisor: Dr Dali Naidu Arnepalli

Description

- Evaluation of the suitability of ureolytic (isolated and procured) microorganism to enhance the geotechnical properties of geomaterial during microbially induced calcite precipitation (MICP) process.
- Investigation of biomineral precipitation efficiency over a wide range of microbial, chemical and environmental condition.
- Scrutinizing the modification of the engineering properties of coarse-grained geomaterial during MICP process by varying the microbial, chemical condition and correlate with the microscopic characteristics.

Title: A Study on Biological Degradation of Textile Reinforced Concrete (During PhD)

Supervisor: Dr Dali Naidu Arnepalli,

Description

- Degradation study of various type of textile due to the microbial activity by different organism present in the concrete.

Title: Red mud as a construction material by using bioremediation **(During M. Tech)**

Supervisor: Dr Sarat Kumar Das

Description

- Isolation of High pH tolerant (alkaliphilic) bacteria present in red mud.
- Neutralization of the pH of alkaline red mud by using the isolated bacteria and dairy waste product.
- Investigating the geotechnical properties of bio-neutralised red mud to use it as an engineering material for construction.

Title: Reuse of Red Mud for the Construction of Embankments for Red Mud Pond **(During an internship in IISc, Banglore)**

Supervisor: Prof. T. G. Sithram

Description

- Design of tailing embankment by utilising red mud based on the laboratory geotechnical investigation and the stability analysis using **slide software**.
- Assessing the factor of safety under various conditions such as end of construction, steady-state seepage, seismic condition and apid draw down condition and compare with other geomaterials to estimate the compatibility of Red mud as an embankment material.

Publication

Journal

- Panda, I., **Jain, S.**, Das, S. K. and Jayabalan. R. (2017). "Characterization of red mud as a structural fill and embankment material using bioremediation." *International Biodeterioration & Biodegradation*, 119, 368-376.
- **Jain, S.** and Arnepalli, D. N. (2019). "Biochemically Induced Carbonate Precipitation in Aerobic and Anaerobic Environments by *Sporosarcina pasteurii*." *Geomicrobiology Journal*, 36(5), 443-451.
- **Jain, S.** and Arnepalli, D. N. (2019). "Adhesion and De-adhesion of Ureolytic Bacteria on Sand under variable Pore Fluid Chemistry." *Journal of Environmental Engineering*, 146(6), DOI: 10.1061/(ASCE)EE.1943-7870.0001708.
- Mahamaya, M., Das, S. K., Reddy, K. R. and **Jain, S.** (2020). "Interaction of Biopolymer with Dispersive Geomaterials and Its Chracterization: An Eco-Friendly Approach for Erosion Control." *Journal of Cleaner Production*, Elsevier- *Under review*.
- **Jain, S.** and Arnepalli, D. N. (2020). "Efficiency of Different Microbes for Biocementation Process via Ureolysis in Coarse-grained Geomaterial." *Ecological Engineering*- In review.
- **Jain, S.** and Arnepalli, D. N. (2019). "Kinetics of carbonate biomineral precipitataion via ureolysis in different biochemical condition." *Chemosphere*- In review.

Conference

- **Jain, S.** and Arnepalli, D. N. (2019). "Biominerlisation as a remediation technique: A critical review." Geotechnical Characterisation and Geoenvironmental Engineering, 155-162, Springer, Singapore.
- **Jain, S.** and Arnepalli, D. N. (2019). "Suitability of Microbes for Bio-modification of Geomaterial during MICP Process" Proceedings of the 4th World Congress on Civil, Structural, and Environmental Engineering (CSEE'19) Rome, Italy – April 7-9, Paper No. ICGRE 170, DOI: 10.11159/icgre19.170.
- Anjana, R. K., Arnepalli, D. N., **Jain, S.**, Cherishma, P., Gandhi, S. R. and Rao, K. D. (2016). "Case Study on the Reservoir Seepage at Concentrated Solar Thermal Power Plant, Rajasthan, India" 6th asian regional conference of geosythetics-Geosynthetic for infrastructure devolpment, 8-11nov, New Delhi, India.

Skills

Experimental: Testing of Geomaterials, Characterization and degradation experiment of Geosynthetics, Isolation and characterization of microorganisms (bacteria), Sorption and desorption study, Optical microscope, Scanning electron microscope (SEM), X-ray diffractometer, Spectroscopy technique (UV/Vis spectrophotometer, Atomic adsorption spectroscopy, Fourier-transform infrared spectroscopy), Centrifuge, Thermo gravimetric analysis.

Software: Imaje j, origin Pro 9, MATLAB, STANMOD, Plaxis 2-D, Slide (Slope stability analysis).

Scholastic Achievements

- **Best paper award** at 4th world congress of Civil, Structural and Environmental Engineering (CSEE'19), Rome, Italy for the paper entitled "Suitability of Microbes for Bio-modification of Geomaterial during MICP Process".

References

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2) Dr Sarat Kumar Das
Professor
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3) Dr Krishna R. Reddy
Professor

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