SRES', Sanjivani College of Engineering , Kopargaon, Maharashtra

(An Autonomous Institute affiliated to SPPU, Pune)

Staff Profile

Personal Information				
Name of Teaching Staff: Dr. Neeraj Kumar **Designation:** Assistant Professor **Department:** Civil Engineering (Geotechnical Engineering) **Date of Joining:** 21st January, 2026 **Email ID:** nky9637@gmail.com				
Contact No.: +91-9517455444				
Education Details				
Qualification	**Specialization**	**University / Institute**	**Year**	**Title of Thesis / Dissertation**
Ph.D.	Geotechnical Engineering	MANIT Bhopal	2025	*Behaviour of Dual-Layer Geosynthetic Encased Stone Column in Soft Soils*
M.Tech	Geotechnical Engineering	NIT Srinagar	2019	*Stabilization of Dredged Soil Using Rice Husk Ash and Nanomaterials*
B.Tech	Civil Engineering	HCST Mathura	2016	Geotechnical Engineering, Structural Analysis, Transportation Engineering
Total Experience				
Teaching: 1. **REC Akbarpur** **From:** 29 Jan 2020 **To:** 15 Oct 2020 2. **REC Sonbhadra** **From:** 29 Apr 2025 **To:** 01 Jan 2026				1 year and 5 months
Research: Ph.D. Researcher (2020–2025)				4.5 years

Project: 1. Medicity Ujjain(September, 2024) 2. RBI staff Quarters (November, 2024)	Active year (2024)

Research and Publications

SCIE Indexed Journals (7)

1. *Performance of Geosynthetic-Encased Stone Columns in Sandy Soils Subjected to Vertical Cyclic Loads*, **ASCE – International Journal of Geomechanics**.
2. *Numerical Analysis of a Dual-Layer Geosynthetic-Encased Stone Column Installed in Soft Soil*, **Advances in Civil Engineering**.
3. *Bibliometric Analysis of Stone Column Research Trends: A Web of Science Perspective*, **Science and Engineering of Composite Materials**.
4. *Geotechnical Properties of Lime-Stabilized Dredged Soil for Sustainable Construction Applications*, **National Academy Science Letters**.
5. *Influence of Dual Layer Confinement of Stone Column Material on the Shear Modulus of the Soil-Column Combined System*, **National Academy Science Letters**.
6. *Performance of Stone Column Configurations in Floating Conditions Under Vertical Loading*, **National Academy Science Letters**.
7. *Optimization of Stone Column Performance Using Waste Rubber Crumbs and Construction and Demolition Aggregate Combination*, **National Academy of Science Letters.**

Scopus Indexed Publications (3)

- *Influence of Water Content on Elastic Properties of Expansive Soil*, Lecture Notes in Civil Engineering (Springer), Vol. 538, pp. 275–285.
- *Numerical Analysis of Circular Skirted Footing in Granular Soil*, Lecture Notes in Civil Engineering, Vol. 662, pp. 439–450.
- *Evaluating the Performance of Sand-Lime Piles in Mitigating Swelling Pressure of Expansive Black Cotton Soil*, Lecture Notes in Civil Engineering, Vol. 708.

Conference Publications (3)

- *Advancement in Geotechnical Engineering and Infrastructural Developments*, Indian Geotechnical Society, Jabalpur Chapter, 19–20 Nov 2022.
- *Performance of Geosynthetic Encased Granular Columns Using C&D Waste as a Sustainable Material*, 10th IYGEC Conference, IIT Indore.
- *Sustainable Construction: Enhancing Concrete Performance with Rice Husk Ash, Copper Slag, and Basalt Manufactured Sand*, ICCMS 2025, IIT Tirupati.

Manuscripts Under Review / Submitted (5)

- *Time Dependent Behaviour of Stone Columns in Soft Soil Under Embankment Loading – A Numerical Analysis*, **World Journal of Engineering**.
- *Numerical Analysis of a Geosynthetic Encased Stone Column Installed in Sand under Vertical Cyclic Loading*, **Geomechanics & Engineering**.
- *Performance Optimization of Concrete Using Deccan Basalt Manufactured Sand: Integrated Analysis of Strength Development, Durability Indices, Microstructural Characteristics, and Economic Aspects*, **Structures**.
- *Integrated Analysis of M-Sand Concrete with Fly Ash and Copper Slag: Mechanical and Durability Insights*, **National Academy of Science Letters**.
- *Zinc-Filled Hybrid Polymer–Inorganic Composites Utilizing Waste Tire Rubber and Demolition Aggregates for Sustainable Waste Valorization*, **Journal of Inorganic and Organometallic Polymers and Materials**.

IPRs / Patents

1. *A Composite Diameter Stone Column for Soft Soil Reinforcement* — Application No. **202521070633**
2. *Concrete Composition with Ternary Binder System and Deccan Basalt Sand for Enhanced Mechanical Properties* — Application No. **202521057218**

Research Expertise	Technical Expertise
• Computational geomechanics and finite element modeling • Geosynthetic-encased stone columns (single and dual-layer systems) • Flow-coupled deformation and consolidation in saturated soils • Seismic and cyclic behavior of reinforced soil–foundation systems • Ground improvement using recycled and sustainable materials • AI/ML-based prediction of settlement and stiffness (ongoing)	**Numerical Modeling Tools:** PLAXIS 3D, ABAQUS, SEEP/W, SLOPE/W **Data & Analysis Tools:** Excel, Origin **Core Competencies:** • Geotechnical analysis • Soil mechanics • FEM modeling • Data interpretation **Emerging Skills:** Python automation, AI/ML in geotechnics

Professional Experience

Jan 2020- Oct 2020	Dec 2020– July 2025	April 2025–Jan 2026

Guest Faculty, REC Akbarpur	Ph.D. Researcher, MANIT Bhopal	Guest Faculty, REC Sonbhadra
1. Soil Mechanics, Foundation Engineering, 2. Geotechnical Laboratory	1. FEM modeling, geosynthetics, dynamic loading 2. High-speed rail loading, flow-coupled analysis	Teaching geotechnical courses 1. Foundation design 2. Research mentoring and lab supervision

Key Research Contributions

1. **Computational Geomechanics:** Developed 3D FEM models for geosynthetic-encased stone columns (including dual-layer systems) to study settlement, stress transfer, and confinement under static and cyclic loading.
2. **Ground Improvement Systems:** Demonstrated improvement in composite stiffness and shear modulus using dual-layer encasement strategies.
3. **Sustainability & Materials:** Engineered sustainable ground improvement systems using waste tire rubber and recycled C&D aggregates, validated through laboratory testing and numerical simulation.
4. **Dynamic & Seismic Analysis:** Simulated cyclic and seismic loading effects on reinforced soil–foundation systems, including pore pressure buildup and stiffness degradation.
5. **Hydro-Geotechnical Coupling:** Modeled flow-coupled deformation in soft soils under fluctuating groundwater conditions.
6. **AI/ML Integration (Ongoing):** Applying machine learning models to predict settlement and stiffness evolution for data-driven geotechnical design.

Professional Recognition & Memberships

Fellowship: Ministry of Education Fellowship, Government of India

Professional Memberships:

- Member, ASCE Geotechnical Institute (ID: 12477037)
- Life Member, Indian Geotechnical Society (LM-6023)

Journal Reviewer:

- Reviewer for ASCE, Springer, and Wiley journals

References

1. **Dr. Rakesh Kumar**, Professor, MANIT Bhopal
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2. **Dr. Narendra Kumar Samadhiya**, Professor, IIT Roorkee
   Email: narendra.samadhiya@ce.iitr.ac.in
3. **Dr. Nitin Dindorkar**, Professor, MANIT Bhopal
   Email: dindorkarnit@rediffmail.com
4. **Dr. Kumar Venkatesh**, Professor, MNNIT Allahabad
   Email: venkatesh@mnit.ac.in