

Dr. Sandip Mondal   

Scientist, Rigid Pavement Division

CSIR-Central Road Research Institute (CSIR-CRRI)

Mathura Road, New Delhi – 110025, India

***Email:* sandipmondal16061992@gmail.com**

***Mobile No.:* (+91) 7278448571**

PROFILE SUMMARY Scientist Gr. IV(2) at CSIR–Central Road Research Institute (CSIR-CRRI) with over eight years of research and academic experience in sustainable construction materials, microbial concrete, cementitious composites, and rigid pavement engineering. Expertise in bacteria-based self-healing concrete, concrete durability, hydration behaviour, and microstructural characterization of cementitious materials. Committed to developing innovative, low-carbon, and durable construction materials for sustainable infrastructure.

RESEARCH INTERESTS

- Concrete technology
- Self-healing concrete
- Supplementary cementitious materials
- Durable and sustainable cement-based materials
- Fiber reinforced concrete
- Sustainable rigid pavement

EDUCATIONAL BACKGROUND **Ph.D., Department of Civil Engineering, July 2021, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, West Bengal, India**

- Thesis title: *A study on microbial concrete with focus on MICP pathways, optimal dosing and suitable non-spore-forming bacteria*
- Supervisors: Professor Aparna (Dey) Ghosh, Ph.D. and Dr. Pallab Datta, Ph.D.

M.Tech (Specialization - Structural Engineering), June 2016, Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, West Bengal, India.

- Thesis title: *Application of bio-technology in concrete*
- Supervisors: Professor Arun Kumar Chakraborty

B.E., June 2014, Department of Civil Engineering, Jadavpur University, Kolkata, West Bengal, India .

Higher Secondary, June 2010, Barasat P.C.S. Govt. High School, Board- WBCHSE, Barasat, West Bengal, India).

Secondary, June 2008, Barasat M.G.M. High School, Board-WBBSE, Barasat, West Bengal, India.

RESEARCH EXPERIENCE	Senior Research Fellow September 2018 to July 2021 Department of Civil Engineering Indian Institute of Engineering Science and Technology, Shibpur Supervisor: Professor Aparna (Dey) Ghosh, Ph.D.
	Junior Research Fellow August 2016 to August 2018 Department of Civil Engineering Indian Institute of Engineering Science and Technology, Shibpur Supervisor: Professor Aparna (Dey) Ghosh, Ph.D.
	Research Assistant June 2015 to June 2016 Department of Civil Engineering Indian Institute of Engineering Science and Technology, Shibpur Supervisor: Professor Arun Kumar Chakraborty
TEACHING EXPERIENCE	Assistant Professor January 2022 to May 2026 Department of Civil Engineering Chandigarh University, India (NIRF-20)
	Assistant Professor November 2021 to January 2022 Department of Civil Engineering Swami Vivekananda University, India
ADMINISTRATIVE RESPONSIBILITIES	<ul style="list-style-type: none">• Project Coordinator <i>March 2022 – May 2026</i> <i>Department of Civil Engineering, Chandigarh University</i> Implementation of project rubrics, monitoring of project progress and evaluation, preparation of student groups for participation in in-house and external competitions.• Experiential Learning Coordinator <i>January 2023 – May 2026</i> <i>Department of Civil Engineering, Chandigarh University</i>

Assessment verification according to Bloom's Taxonomy (BT levels).

- **ABET Accreditation–Project Coordinator** *January 2022 – May 2026*
Department of Civil Engineering, Chandigarh University
Handled documentation and coordination for ABET accreditation; organized project displays for the visiting ABET team.
- **NBA Accreditation–Project Coordinator** *July 2023 – May 2026*
Department of Civil Engineering, Chandigarh University
Compiled project-related data and showcased projects to the NBA peer review team.
- **Board of Studies (BoS) Member** *July 2024 – May 2026*
Department of Civil Engineering, Chandigarh University
Participated in curriculum revision, approved course content, and contributed to enhancement of academic standards.
- **Member of MSC and DQAC** *January 2022 – May 2026*
Department of Civil Engineering, Chandigarh University
Formulated course content, question banks, and managed evaluation processes; vetted submissions by respective MSCs.
- **Mentor for B.E. Students** *January 2022 – May 2026*
Department of Civil Engineering, Chandigarh University
Guided students on academic and personal matters; encouraged participation in curricular and co-curricular activities.
- **DRC Member** *January 2022 – May 2026*
Department of Civil Engineering, Chandigarh University
Reviewed and guided departmental research activities; supported research proposal development for students and faculty.
- **Course Outcome (CO) Definition and Mapping:**
Defined COs for various Civil Engineering subjects using Bloom's Taxonomy action verbs, ensuring measurable and assessable learning outcomes.

OBE IMPLEMENTATION

- **CO-PO Matrix Development:**
Developed and validated CO-PO articulation matrices for multiple courses, aiding in structured attainment analysis and course evaluation.
- **Assessment Planning:**
Designed direct and indirect assessment tools including assignments, quizzes, project evaluations, and course exit surveys to ensure quality learning assessments.
- **Curriculum Enrichment through Experiential Learning:**
Integrated real-life case studies and student-led projects to support levels 4–6 of Bloom’s Taxonomy (Analyze, Evaluate, Create)
- **Development of Project Rubrics Aligned with Accreditation Criteria:**
Designed and implemented detailed project evaluation rubrics incorporating CO-PO mapping, Bloom’s Taxonomy levels, and performance indicators as per NBA, ABET, and NAAC guidelines to ensure objective assessment and continuous quality improvement.
- **NEP 2020 Implementation**
Aligned curriculum delivery and assessments with NEP 2020 directives, emphasizing multidisciplinary learning, skill development, and academic flexibility.

RESEARCH
PUBLICATIONS

1. Jeevna Bhardwaj and **Sandip Mondal**. “Environmental Sustainability Assessment of Microbial concrete: A Comprehensive Life Cycle Analysis”, Innovative Infrastructure Solutions, Springer, 10, 84, 2025 (ESCI, IF-2.3).
<https://doi.org/10.1007/s41062-025-01903-4>.
2. Satyam Karna, Plaban Deb and **Sandip Mondal**. “Consequences of fatigue in concrete structures: A state-of-the-art review and possible remedial measures”, Innovative Infrastructure Solutions, Springer, 9, 320, 2024 (ESCI, IF-2.3).
<https://doi.org/10.1007/s41062-024-01630-2>.
3. **Sandip Mondal** and Aparna (Dey) Ghosh. “Biom mineralization, bacterial selection and properties of microbial concrete: A re-

view”, Journal of Building Engineering, Elsevier, 106695, 2023 (SCI, IF-6.7).

<https://doi.org/10.1016/j.jobbe.2023.106695>.

4. **Sandip Mondal** and Aparna (Dey) Ghosh. “Response surface methodology based optimization of bacterial cell concentration for microbial concrete”, Iranian Journal of Science and Technology, Transactions of Civil Engineering, Springer, 46, 1087–1102, 2022 (SCI, IF-1.7).
<https://doi.org/10.1007/s40996-021-00610-1>.
5. **Sandip Mondal** and Aparna (Dey) Ghosh. “Spore-forming *Bacillus subtilis* vis-à-vis non-spore-forming *Deinococcus radiodurans*, a novel bacterium for self-healing of concrete structures: A comparative study”, Construction and Building Materials, Elsevier, 266, 121122, 2021 (SCI, IF-7.4).
<https://doi.org/10.1016/j.conbuildmat.2020.121122>.
6. **Sandip Mondal**, Pratyusa Das, Pallab Datta and Aparna (Dey) Ghosh. “*Deinococcus radiodurans*: A novel bacterium for crack remediation of concrete with special applicability to low-temperature conditions”. Cement and Concrete Composites, Elsevier, 108, 103523, 2020 (SCI, IF-10.8).
<https://doi.org/10.1016/j.cemconcomp.2020.103523>.
7. **Sandip Mondal** and Aparna (Dey) Ghosh. “Review on microbial induced calcite precipitation mechanisms leading to bacterial selection for microbial concrete”, Construction and Building Materials, Elsevier, 225, 67-75, 2019 (SCI, IF-7.4).
<https://doi.org/10.1016/j.conbuildmat.2019.07.122>.
8. **Sandip Mondal** and Aparna (Dey) Ghosh. “Investigation into the optimal bacterial concentration for compressive strength enhancement of microbial concrete”, Construction and Building Materials, Elsevier, 183, 202-214, 2018 (SCI, IF-7.4).
<https://doi.org/10.1016/j.conbuildmat.2018.06.176>.
9. Arun Kumar Chakraborty and **Sandip Mondal**. “Bacterial concrete: A way to enhance the durability of concrete structures”, The Indian Concrete Journal, 91(7), 30-36, 2017 (SCOPUS).

10. **Sandip Mondal** and Aparna (Dey) Ghosh. “Mix design of microbial concrete - a step towards a sustainable environment”. Proceedings of the International UKIERI Concrete Congress, Dr B R Ambedkar NIT Jalandhar, Punjab, India, 2023.
11. Md. Omar Faruk, S.K. Singh and **Sandip Mondal**. “Comparative study of buckling restrained braces and fluid viscous damper applied in an RCC structure following pushover analysis”. International Conference on advances in Construction Materials and Structures (ICCMS), NIT Calicut, India, 2022.
<https://doi.org/10.1016/j.matpr.2023.03.471>
12. Vikas Mehta, **Sandip Mondal**, Naresh Kumar and Sushil Kumar. “Use of wood sawdust ash as effective raw material for clay bricks”. IOP Conference Series: Earth and Environmental Science, International Conference on Advance Earth Sciences and Foundation Engineering, Mohali, India, 2022.
<https://doi.org/10.1088/1755-1315/1110/1/012081>
13. **Sandip Mondal** and Aparna (Dey) Ghosh. “Microbial Concrete: a sustainable construction material for underwater concrete structures”, Challenges of Resilient and Sustainable Infrastructure Development in Emerging Economies, ASCE India conference, Novotel, Kolkata, India, 2020.
14. **Sandip Mondal** and Aparna (Dey) Ghosh. “A study on property augmentation of microbial concrete at different cell concentrations with time”. UKIERI Concrete Congress, Dr B R Ambedkar NIT Jalandhar, Punjab, India, 2019.
15. **Sandip Mondal** and Aparna (Dey) Ghosh. “Effect of w/c ratio vis-à-vis bacterial cell concentration on microbial concrete”. Structural Engineering Convention, Jadavpur University, Kolkata, India, 2018.
16. **Sandip Mondal** and Aparna (Dey) Ghosh. “Microbial Concrete as a sustainable option for infrastructural development in emerging economies”, Urbanization challenges in emerging economies, ASCE India conference, IIT Delhi, New Delhi, India, 2017.
<https://doi.org/10.1061/9780784482032.042>

17. **Sandip Mondal**, Palash Das and Arun Kumar Chakraborty. “Application of Bacteria in Concrete”, International Conference on Recent Trends in Engineering and Material Sciences (ICEMS-2016), Jaipur, India, 2016.

<https://doi.org/10.1016/j.matpr.2017.06.276>

HONORS AND
AWARDS

- **Innovative Student Projects Award** from Indian National Academy of Engineering (INAE) (Govt. of India) for M.Tech Thesis, 2016.
- **Reviewer** of several journals including Journal of Building Engineering (Elsevier), Cement and Concrete Composites (Elsevier), Ain Shams Engineering Journal (Elsevier), Journal of Environmental Chemical Engineering (Elsevier), Structural Concrete (Wiley), Scientific Reports (Nature Portfolio) etc.
- **Editor** of for the Special Issue titled *Advances in Marine Geotechnology and Offshore Structural Systems: Design, Monitoring and Performance*, published by Frontiers.

STUDENTS’
ACHIEVEMENT

- **Third Position** in ASCE Poster making competition, ASCE North India Chapter, 2024.
- **Best Poster Presentation in Structure** in CESAFIESTA 2.0, 2024 at IIT, Ropar.
- **Second Position** in Poster making competition in Reconnaissance 2025: Annual Civil Engineering Technical Fest at Punjab Engineering College.