

# DR. RAMANABABU KALIGATLA

*Associate Professor, Department of Mathematics and Computing, IIT (ISM) Dhanbad*

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[IRINS Profile](#) | [ORCID: 0000-0002-6726-4479](#) | [Google Scholar](#)

**Native Place:** Vizianagaram District, Andhra Pradesh, India

**Research Specialization:** Differential and Integral Equations; Wave–Structure Interactions

## EDUCATIONAL QUALIFICATIONS

| Degree | Year | University / Institution                    |
|--------|------|---------------------------------------------|
| 10th   | 1999 | MPL H School, Vizianagaram, AP State        |
| 12th   | 2001 | SBGM Junior College, Vizianagaram, AP State |
| B.Sc.  | 2004 | Andhra University, Visakhapatnam, AP State  |
| M.Sc.  | 2007 | University of Hyderabad, Hyderabad          |
| Ph.D.  | 2013 | Indian Institute of Technology Madras       |

## RESEARCH AND TEACHING EXPERIENCE

| Organisation      | Designation / Level                       | Period                  |
|-------------------|-------------------------------------------|-------------------------|
| IIT (ISM) Dhanbad | Associate Professor — Level 13A2          | 13.04.2022 – present    |
| IIT (ISM) Dhanbad | Assistant Professor — Level 13A1          | 18.12.2020 – 12.04.2022 |
| IIT (ISM) Dhanbad | Assistant Professor — 8000 AGP (Level 12) | 18.12.2017 – 17.12.2020 |
| IIT (ISM) Dhanbad | Assistant Professor — 7000 AGP            | 18.12.2015 – 17.12.2017 |
| IIT (ISM) Dhanbad | Assistant Professor — 6000 AGP            | 18.12.2014 – 17.12.2015 |
| IIT Kharagpur     | Post-Doctoral Fellow                      | 27.03.2014 – 16.12.2014 |
| ISI Kolkata       | Visiting Scientist                        | 01.02.2014 – 28.02.2014 |
| IIT Madras        | Research Scholar                          | 18.07.2008 – 19.11.2013 |

## COURSES

### Courses Taught (UG/PG Level)

- Engineering Mathematics
- Ordinary and Partial Differential Equations
- Integral Equations and Calculus of Variations
- Numerical Methods

### Courses Proposed

- Integral Equations and Calculus of Variations — open elective for PG/PhD students

- Advanced Ordinary Differential Equations — elective for PG/PhD students
- Boundary Integral Methods — elective for PG/PhD students

## SUPERVISION OF PHD / PROJECT STUDENTS

| Level        | Theses Completed | Students Ongoing |
|--------------|------------------|------------------|
| M.Sc.        | 11               | 0                |
| Int. M.Tech. | 9                | 2                |
| Ph.D.        | 4                | 4                |

### PhD Awarded — Details

#### 1. S. Tabssum (2015DR0108)

**Thesis defence date:** 07.07.2021

**Thesis title:** Mild-slope approximation and allied methods for surface gravity wave scattering by porous breakwaters in the presence of seabed undulations.

**Present Position:** Assistant Professor, Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar, India.

#### 2. Manisha (2015DR0113)

**Thesis defence date:** 12.11.2021

**Thesis title:** Mild-slope approximation and allied methods for wave interaction with floating and submerged structures in the presence of sea-bed undulations.

**Present Position:** Assistant Professor, ABESIT, Ghaziabad, Uttar Pradesh, India.

#### 3. NM. Prasad (2016DR0060)

**Thesis defence date:** 16.08.2022

**Thesis title:** Wave interaction with permeable and impermeable structures in the presence of non-uniform seabed topography.

**Present Position:** Assistant Professor, Govt. Eng. College, Aurangabad, Bihar, India.

#### 4. Swati Singh (2019DR0187)

**Thesis defence date:** 06.11.2024

**Thesis title:** A semi-analytical study on wave scattering by breakwaters.

**Present Position:** Post-Doctoral Fellow, Dept. of OENA, IIT Kharagpur.

## SPONSORED RESEARCH PROJECTS

- “Water wave interaction with wave-absorbing breakwaters in the presence of uneven sea bottoms” — SERB, DST, Govt. of India (ECR scheme), funding ₹16,79,480; carried out October 2018 – October 2021.
- “Wave scattering by new-type floating barriers in deep water” — SERB, DST, Govt. of India (MATRICS scheme), funding ₹6,60,000 for three years; carried out 5 January 2023 – 4 January 2026.

## RESEARCH COLLABORATORS

- Prof. Birendra Nath Mandal (Retired), PhD, FNASc (India), FIMA (UK), CMATH (UK), FWIGB (UK), NASI Senior Scientist Platinum Jubilee Fellow, Physics and Applied Mathematics Unit, Indian Statistical Institute, Kolkata, India.
- Prof. Trilochan Sahoo, Dept. of Ocean Engineering and Naval Architecture, IIT Kharagpur (Post-doctoral Supervisor).
- Prof. S. R. Manam, Dept. of Mathematics, IIT Madras (PhD Supervisor).
- Dr. S. Tabssum, Assistant Professor, Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar.
- Dr. Manisha Sharma, Assistant Professor, ABESIT, Ghaziabad, Uttar Pradesh.
- Dr. NM Prasad, Assistant Professor, Govt. Eng. College, Aurangabad, Bihar.
- Dr. Swati Singh, Post-Doctoral Fellow, Dept. of OENA, IIT Kharagpur.
- Dr. Harekrushna Behera, SRM University, Chennai.

- Dr. Santanu Koley, BITS Pilani, Hyderabad Campus.
- Dr. N. S. Vikramaditya, National Aerospace Laboratory, Bangalore.

## RESEARCH PUBLICATIONS IN PEER-REVIEWED JOURNALS

\* Corresponding author

28. P. Panja, R.B. Kaligatla\*, B.N. Mandal — *Surface wave scattering by a rectangular structure with two unequal thin plates*. European Journal of Mechanics / B Fluids, 121 (2027): 204624. [SCIE, Q2]
27. S. Singh, R.B. Kaligatla\*, B.N. Mandal — *Water wave propagation in the presence of a U-shaped barrier*. Fluid Dynamics, 61(40) (2026):1-15. [SCIE, Q4]
26. R.B. Kaligatla\*, P. Panja, B.N. Mandal — *Wave interaction with an H-shaped submerged breakwater*. The ANZIAM Journal, 67, e32 (2025): 1–22. [SCIE, Q3]
25. S. Singh, R.B. Kaligatla\*, B.N. Mandal — *Wave scattering by  $\pi$ -shaped breakwaters in finite depth water*. Applied Ocean Research, 148 (2024): 104014. [SCIE, Q1]
24. R.B. Kaligatla\*, N.M. Prasad — *Topographical effects on wave scattering by an elastic plate floating on two-layer fluid*. Mathematical Modelling and Analysis, 29(2) (2024): 215–237. [SCIE, Q1]
23. R.B. Kaligatla\*, S. Singh, B.N. Mandal — *Wave scattering by Pi-type breakwater floating in deep water*. Journal of Engineering Mathematics, 143(7) (2023): 1–18. [SCIE, Q2]
22. R.B. Kaligatla\*, S. Singh — *Wave interaction with a rigid porous structure under the combined effect of refraction-diffraction*. Ocean Engineering, 283 (2023): 115042. [SCI, Q1]
21. S. Singh, R.B. Kaligatla\* — *The combined refraction-diffraction effect on water wave scattering by a flexible-porous structure*. Journal of Fluids and Structures, 116 (2023): 103791. [SCIE, Q1]
20. R.B. Kaligatla, S. Tabssum, T. Sahoo — *Surface gravity wave interaction with a partial porous breakwater in a two-layer ocean having bottom undulations*. Waves in Random and Complex Media, 34(4) (2021): 3381–3412. [SCIE, Q1]
19. N.M. Prasad, R.B. Kaligatla\*, S. Tabssum — *Wave interaction with an array of porous walls in a two-layer ocean of varying bottom topography*. Meccanica, 56 (2021): 1087–1108. [SCI, Q3]
18. R.B. Kaligatla, Manisha Sharma, T. Sahoo — *Wave interaction with a pair of submerged floating tunnels in the presence of an array of submerged porous breakwaters*. Journal of Offshore Mechanics and Arctic Engineering, 143(2) (2021): 021402. [SCI, Q3]
17. S. Tabssum, R.B. Kaligatla\*, T. Sahoo — *Surface gravity wave interaction with a partial porous breakwater in the presence of bottom undulation*. Journal of Engineering Mechanics, 146(9) (2020): 04020088. [SCIE, Q2]
16. Manisha, R.B. Kaligatla\*, T. Sahoo — *Wave interaction with a submerged floating tunnel in the presence of a bottom mounted submerged porous breakwater*. Applied Ocean Research, 96 (2020): 102069. [SCIE, Q1]
15. S. Tabssum, R.B. Kaligatla\*, T. Sahoo — *Gravity wave interaction with a porous breakwater in a two-layer ocean of varying depth*. Ocean Engineering, 196 (2020): 106816 (1–15). [SCI, Q1]
14. R.B. Kaligatla\*, N.M. Prasad, S. Tabssum — *Oblique interaction between water waves and a partially submerged rectangular breakwater*. Proc. IMechE Part M: J. Engineering for the Maritime Environment, 234(1) (2020): 1–16. [SCIE, Q2]
13. Manisha, R.B. Kaligatla\*, T. Sahoo — *Effect of bottom undulation for mitigating wave-induced forces on a floating bridge*. Wave Motion, 89 (2019): 166–184. [SCI, Q2]
12. R.B. Kaligatla\*, S. Tabssum, T. Sahoo — *Effect of bottom topography on wave scattering by multiple porous barriers*. Meccanica, 53 (2018): 887–903. [SCI, Q2]
11. R.B. Kaligatla\*, Manisha, T. Sahoo — *Wave trapping by dual porous barriers near a wall in the presence of bottom undulation*. Journal of Marine Science and Application, 16 (2017): 286–297. [Scopus, Q3]
10. R.B. Kaligatla, S. R. Manam — *Bragg resonance of membrane-coupled gravity waves over a porous bottom*. International Journal of Advances in Engineering Sciences and Applied Mathematics, 8(3) (2016): 222–237. [ESCI, Q3]

9. H. Behera, R.B. Kaligatla, T. Sahoo — *Wave trapping by porous barrier in the presence of step type bottom*. *Wave Motion*, 57 (2015): 219–230. [SCI, Q2]
8. R.B. Kaligatla, S. Koley, T. Sahoo — *Trapping of surface gravity waves by a vertical flexible porous plate near a wall*. *Journal of Applied Mathematics and Physics*, 66 (2015): 2677–2702. [SCI, Q1]
7. S. Koley, R.B. Kaligatla, T. Sahoo — *Oblique wave scattering by a vertical flexible porous plate*. *Studies in Applied Mathematics*, 135(1) (2015): 1–34. [SCI, Q1]
6. N.S. Vikramaditya, R.B. Kaligatla — *Acoustic field in ducts with sinusoidal area variation*. *Journal of Vibration and Acoustics*, 136 (2014): 014502. [SCIE, Q2]
5. R.B. Kaligatla, S. R. Manam — *Flexural gravity wave scattering by a nearly vertical porous wall*. *Journal of Engineering Mathematics*, 88 (2014): 49–66. [SCI, Q3]
4. S. R. Manam, R.B. Kaligatla — *Membrane-coupled gravity wave scattering by a vertical barrier with a gap*. *The ANZIAM Journal*, 55(3) (2014): 267–288. [SCIE, Q2]
3. S. R. Manam, R.B. Kaligatla — *Structure-coupled gravity waves past a vertical porous barrier*. *Journal of Engineering for the Maritime Environment*, 227(3) (2013): 266–283. [SCIE, Q3]
2. S. R. Manam, R.B. Kaligatla — *A mild-slope model for membrane-coupled gravity waves*. *Journal of Fluids and Structures*, 30 (2012): 173–187. [SCI, Q1]
1. S. R. Manam, R.B. Kaligatla — *Effect of a submerged vertical barrier on flexural gravity waves*. *International Journal of Engineering Science*, 49(8) (2011): 755–767. [SCI, Q1]

## PAPERS PRESENTED IN CONFERENCES

- S.R. Manam and R.B. Kaligatla, “Effect of surface piercing barriers on membrane-coupled gravity waves,” *Advances in PDE Modelling and Computation*, Ane Books Pvt. Ltd. (2013), 281–298. (Presented by S.R. Manam).
- S. Tabssum, R.B. Kaligatla, “Wave trapping by a partial porous breakwater in water of varying depth,” *International Conference on Applications of Fluid Dynamics*, VIT Chennai, 13–15 December 2018. (Presented by S. Tabssum).
- Manisha, R.B. Kaligatla, “Wave interaction with a tunnel in a sea with bottom undulation,” *International Conference on Differential Equations and Control Problems: Modelling, Analysis and Computations*, IIT Mandi, 17–19 June 2019. (Presented by Manisha).
- R.B. Kaligatla, S. Singh, “Wave scattering by partial flexible breakwater moored in water varying depth,” *ISTAM 2022*, IIT Mandi, 14–16 December 2022. (Presented by R.B. Kaligatla).
- R.B. Kaligatla, P. Panja, B.N. Mandal, “Wave interaction with rectangular breakwater with two unequal legs in oblique sea,” *XII International Scientific Conference on Modern Problems of Mathematics and Mechanics*, Institute of Mathematics and Mechanics, Baku, Azerbaijan, 3–6 September 2025. (Presented by R.B. Kaligatla).

## SHORT-TERM VISITS FOR RESEARCH COLLABORATION

- Dept. of Ocean Engineering and Naval Architecture, IIT Kharagpur, 9–23 December 2017, through the CTS visitors programme, for research collaboration with Prof. T. Sahoo.
- Dept. of Ocean Engineering and Naval Architecture, IIT Kharagpur, 14–22 May 2015, through the CDPA grant of Prof. T. Sahoo, for research collaboration.
- PAMU, ISI Kolkata, February 2014, for collaboration with Prof. B.N. Mandal.
- Dept. of Mathematics, IIT Kharagpur, October 2013, with the support of CTS. Host: Prof. G.P. Raja Sekhar.

## INVITED TALKS DELIVERED

- “Advances in Differential Equations and Numerical Analysis,” Dept. of Mathematics, IIT Guwahati, 12–15 October 2020.
- International Workshop on Water Wave Phenomena: Mathematical Approaches to Offshore Structures, VIT Vellore, Chennai, 24–28 March 2025.

- International Conference on Mathematical Sciences and Engineering (ICMSE-2025), Dept. of Mathematics and Computer Science, Mizoram Central University, Aizawl, 9–11 June 2025.
- FDP on Recent Trends in Differential Equations and Numerical Computing, Dept. of Mathematics, NIT Calicut, 20–24 June 2025.

## INVITED RESEARCH TALKS CONDUCTED (HOSTED)

- “An introduction to the unified transform method,” by Dr. Vishal Vasani, Reader, International Centre for Theoretical Sciences, TIFR Bengaluru — 5 August 2022.
- “Inverse modelling and its applications to the identification of emission sources in the atmosphere,” by Prof. Maithili Sharan (Emeritus), FNA, FNASc, FNAE, Centre for Atmospheric Sciences, IIT Delhi — 31 October 2023.

## ACADEMIC / ADMINISTRATIVE / INSTITUTIONAL ACTIVITIES

- Examiner for IIT (ISM) JRF examination conducted at IIT Madras, 7–11 May 2015.
- Tabulator for UG, PG and JRF level examinations, Dept. of Applied Mathematics and BTech common courses, 2 November 2015 – 30 June 2019.
- Scrutinized candidate documents for M.Sc. / M.Sc. Tech. EE-2016 admissions, 16 July 2016.
- Mentor for a first-year BTech batch of 25 students, academic year 2017–2018.
- Mentor for a first-year BTech batch of 26 students, academic year 2018–2019.
- In-charge for updating the quarterly/annual progress report, Dept. of Applied Mathematics, September 2018 – August 2020.
- Member, Documentation Cell, Dept. of Mathematics and Computing, 6 March 2019 – March 2021.
- In-charge of seminar and conference rooms, Dept. of M&C, June 2020 – May 2022.
- Invigilator for several central and state government examinations, including JEE (Advanced 2020).
- Member, DPGC, Dept. of Mathematics and Computing, since 15 October 2020.
- Warden, Jasper Hostel, 1 July 2021 – 30 June 2023.
- JRF In-charge, Dept. of Mathematics and Computing, December 2021 – November 2024.
- Member, IIT JAM scrutiny committee, Dept. of M&C, academic year 2024.
- Member, DSC for several PhD students of IIT (ISM) Dhanbad.
- Member, DFSC, Dept. of Mathematics & Computing, since 19 November 2024.
- Question paper setter, APPGECET-2025, Andhra University, Visakhapatnam, AP State.

## OTHER CO-CURRICULAR ACTIVITIES

- Attended Workshop on PDE and Related Analysis, 31 August – 18 September 2009, IISc Mathematics Initiative, Dept. of Mathematics, IISc Bangalore.
- Participated in the International Congress of Mathematicians 2010, Hyderabad.
- Attended Advanced Instructional School on Mechanics, 5–24 December 2011, School of Mathematics and Computer/Information Sciences, University of Hyderabad.
- Attended Induction Training/Orientation Programme for college/university teachers, 28 December 2017 – 25 January 2018, IIT (ISM) Dhanbad.
- Paper setter for JEE Mains 2020, 15–19 July 2019, National Testing Agency, Noida.
- Treasurer, National Conference on Modeling, Analysis and Simulation, 16–18 December 2019, Dept. of Mathematics and Computing, IIT (ISM) Dhanbad.
- Speaker/organizing support, IQAC Initiated Webinar Series — Two-Day International Webinar on Fluid Dynamics and its Applications, 28–29 May 2020, Dept. of Mathematics, Govt. First Grade College, Vijayanagara, Bengaluru.

## REVIEWER OF JOURNAL AND CONFERENCE PAPERS

- Results in Applied Mathematics
- Physics of Fluids
- Applied Mathematical Modelling
- Archive of Applied Mechanics
- Applied Ocean Research
- Ocean Engineering
- Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment
- Ships and Offshore Structures
- Marine Systems and Ocean Technology
- ISTAM Conference, India
- Ocean Dynamics
- International Journal of Advances in Engineering Sciences and Applied Mathematics

## MEMBERSHIP OF PROFESSIONAL BODIES

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- Life Member, Indian Society of Theoretical and Applied Mechanics, IIT Kharagpur, India.
- Life Member, Society of Applied Mathematics, IIT (ISM) Dhanbad, India.

## SERVICE TO THE NATION

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- Micro-Observer, Parliament Election 2019, Kenduadih region, Dhanbad constituency.
- Micro-Observer (PWD & 80+ Voter), Legislative Assembly General Election 2019, Dhanbad constituency — 8 December 2019.
- Micro-Observer, Legislative Assembly General Election 2019, Chirkunda region, Dhanbad constituency — 16 December 2019.