# Dr. Vishnu Teja Mantripragada

Assistant Professor
Department of Fuel, Minerals and Metallurgical Engineering
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## PROFESSIONAL EXPERIENCE A& EDUCATION

**Assistant Professor** *Jul 2021 – Current*
Department of Fuel, Minerals and Metallurgical Engineering
Indian Institute of Technology (ISM) Dhanbad
Dhanbad – 826004, Jharkhand, India.

**Post-Doctoral Researcher** *Jan 2020 – Jun 2021*
Department of Metallurgical and Materials Engineering
Indian Institute of Technology Madras
Chennai – 600036, Tamilnadu, India.

**M.S. + Ph.D. (Dual Degree)** *Jul 2013 – Sep 2019*
Department of Metallurgical and Materials Engineering
Indian Institute of Technology Madras
Chennai – 600036, Tamilnadu, India.
Thesis: *Study of Hydrodynamic Interactions in Gas-Stirred Steelmaking Ladles*

## RESEARCH INTERESTS

| | | |
|---|---|---|
| Multiphysics Processes | Process Metallurgy | Extractive Metallurgy |
| Fluid-Structure Interactions | Computational Fluid Dynamics | Transport Phenomena |

## TECHNICAL EXPERTISE

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|---|---|---|
| Particle Image Velocimetry | Particle Tracking Velocimetry | Statistical Analysis |
| MATLAB | COMSOL Multiphysics | ANSYS Workbench |

## ACHIEVEMENTS & RECOGNITION

**Support Grant Winner** *May 2024*
Selected as a winner of the support grant of 500 USD for the 26$^{th}$ International Congress of Theoretical and Applied Mechanics (ICTAM 2024), Daegu, South Korea.

**Teaching Appreciation** *Jan 2023*
Received letter of appreciation from the Director, IIT (ISM) Dhanbad, for excellent teaching feedback in two different courses in the Monsoon semester 2022-23.

**Excellent Reviewer** *May 2022*
Recipient of the Reviewer Appreciation Certificate awarded by the journal Transactions of the Indian Institute of Metals, Springer.

**Best Paper Award** *Mar 2021*
For the paper "An optimization of microchannel heat sink with offset grooves for enhanced thermal performance", presented at the International Conference on Advances in Thermal Engineering and Applications (ICTEA 2021), SRM Institute of Technology, Tamilnadu, India.

**Institute Research Award** *Sep 2019*
In recognition of the exemplary research done during the research period at the Indian Institute of Technology Madras, Chennai, Tamilnadu, India.

**Third Prize for Demonstration of Amphibian Robot Prototype** *Mar 2011*
In the event Conscientia 2011, Annual Technical and Astronomy Festival, Indian Institute of Space Science and Technology, Trivandrum.

## TEACHING EXPERIENCE

- Numerical Methods in Metallurgical Engineering *Jul 2024*
- Computer Applications in Metallurgical Engineering *Jul 2024*
- Thermodynamics and Kinetics *Jan 2024, Jan 2023*
- Transport Phenomena *Jul 2023*
- Mathematical Modeling of Metallurgical Processes *Jul 2023, Jul 2022*
- Waste Processing and Management *May 2023, Jul 2022, Jan 2022*
- Extractive Metallurgy Laboratory *Jul 2023*

## STUDENT SUPERVISION

- Ph.D. Scholars: 3 (Ongoing)
- M.Tech Students: 6 (4 Ongoing, 2 Completed)

## MEMBERSHIP IN PROFESSIONAL BODIES

- Life member, Indian Institute of Metals
- Member, The Institution of Engineers, India.

## RESEARCH FUNDING

- Microwave integration in urban mining processes for sustainable recovery of critical elements, Rs. 40,75,270/-, Ministry of Mines, 2025, *CO-PI* (Ongoing)
- To establish a Center for Advanced Microscopy for Reclamation and Alloy Development (C.A.M.R.A),Rs. 1,17,00,000/-, DST FIST, 2023, *CO-PI*. (Ongoing)
- Investigation of Iron ore reduction characteristics in a hybrid microwave furnace using carbon/hydrogen,Rs. 15,00,000/-, IIT (ISM) Dhanbad, 2022, *PI*. (Ongoing)

## EVENTS ORGANIZED

- Convenor, International Workshop on "CFD in Practice: Fundamental Research to Recent Industrial Applications", 16 – 20 December 2024, jointly organized by the departments of Mechanical Engineering & Fuel Minerals and Metallurgical Engineering, IIT (ISM) Dhanbad.

## JOURNAL PUBLICATIONS

1. Lipak Kumar Sahoo, Vishnu Teja Mantripragada, Sabita Sarkar. Mathematical Modeling of Fluidized Bed Magnetizing Roasting of Iron Ore Fines, *Steel Research International*, 2400446, 2025, DOI:10.1002/srin.202400446.
2. Soumen Chakraborty, Vishnu Teja Mantripragada, Aranyak Chakravarty, Debkalpa Goswami, Antarip Poddar. Unravelling the complex interplay between abnormal hemorheology and shape asymmetry in flow through stenotic arteries, *Computer Methods and Programs in Biomedicine,* **257**, 108437, 2024, DOI:10.1016/j.cmpb.2024.108437.
3. Pankaj Kumar and Vishnu Teja Mantripragada. An Optimization of Grooves Structure for Thermal Performance Enhancement in Microchannel Heat Sink, *Heat Transfer Engineering*, **45**, 1–12, 2023, DOI:10.1080/01457632.2023.2268868.
4. Vishnu Teja Mantripragada and Antarip Poddar. Rheology dictated spreading regimes of a non-isothermal sessile drop, *Journal of Fluid Mechanics*, **951**, A42, 2022, DOI: 10.1017/jfm.2022.900.
5. Vishnu Teja Mantripragada and Sabita Sarkar. Multi-Objective Optimization of Bottom Purged Steelmaking Ladles, *Transactions of the Indian Institute of Metals*, **75**, 2289–2298, 2022, DOI:10.1007/s12666-022-02602-9.
6. Vishnu Teja Mantripragada, Krishanu Kumar, Pankaj Kumar, and Sabita Sarkar. Modeling of powder production during centrifugal atomization, *Journal of Sustainable Metallurgy*, **7**, 620–629, 2021, DOI:10.1007/s40831-021-00370-2.
7. Vishnu Teja Mantripragada, Srikrishna Sahu, and Sabita Sarkar. Morphology and flow behavior of buoyant bubble plumes, *Chemical Engineering Science*, **229**, 116098–116113, 2021, DOI:10.1016/j.ces.2020.116098.

8. Prithvi R.Y., Vishnu Teja Mantripragada, and Sabita Sarkar. On path oscillation of a particle-laden bubble in stationary liquid, *Transactions of the Indian Institute of Metals*, **73**, 2061–2067, 2020, DOI:10.1007/s12666-020-01966-0.
9. Vishnu Teja Mantripragada and Sabita Sarkar. Slag eye formation in single and dual bottom purged industrial steelmaking ladles, *Canadian Metallurgical Quarterly*, **59(2)**, 159–168, 2020, DOI:10.1080/00084433.2020.1715697.
10. Vishnu Teja Mantripragada, Prithvi R.Y., and Sabita Sarkar. On oscillations of asymmetrically coalescing bubbles. *Minerals Engineering*, **132**, 76–83, 2019, DOI:10.1016/j.mineng.2018.12.002.
11. Vishnu Teja Mantripragada and Sabita Sarkar. Wall stresses in dual bottom purged steelmaking ladles. *Chemical Engineering Research and Design*, **139**, 335–345, 2018, DOI:10.1016/j.cherd.2018.09.036.
12. Vishnu Teja Mantripragada and Sabita Sarkar. Prediction of drop size from liquid film thickness during rotary disc atomization process. *Chemical Engineering Science*, **158**, 227–233, 2017, DOI:10.1016/j.ces.2016.10.027.

## CONFERENCE PROCEEDINGS

1. Somenath Mukherjee, Vishnu Teja Mantripragada. Machine Learning Approach for Accurate Slag Eye Predictions in Steelmaking Ladles. *Proceedings of the International Conference on Fundamental and Industrial Research on Materials (iConFIRM 2023), Springer Proceedings in Physics*, 308, 2020 DOI:10.1007/978-981-97-4557-9_5.
2. Ayush Mishra, Amit Varakhedkar, Vishnu Teja Mantripragada, and Pankaj Kumar. Numerical study of thermal performance with nanoparticles and grooves in microchannel. *IOP Conference Series: Materials Science and Engineering, 3rd International Conference on Advances in Mechanical Engineering, SRM Institute of Science and Technology, India*, 912, 042062, 2020, DOI:10.1088/1757-899X/912/4/042062.
3. Vishnu Teja Mantripragada and Sabita Sarkar. On Modeling of Modified Single Strand Slab Caster Tundish. *Proceedings of the 3rd International Conference on Science and Technology of Ironmaking & Steelmaking (STIS-2017), IIT Kanpur, India*, 259–262, 2017.
4. Vishnu Teja Mantripragada. A numerical study on mixing time in dual bottom plug argon stirred steel making ladles. *Proceedings of the 3rd International Conference on Science and Technology of Ironmaking & Steelmaking (STIS-2017)*, IIT Kanpur, India, 391–394, 2017.
5. Vishnu Teja Mantripragada and Sabita Sarkar. Study of transient behavior of slag layer in bottom purged ladles: A CFD approach. *Proceedings of the 4th World Congress on Integrated Computational Materials Engineering (ICME 2017), Ypsilanti, Michigan, USA*, 145–154, 2017, DOI:10.1007/978-3-319-57864-4.

## PATENTS

1. Vishnu Teja Mantripragada and Sabita Sarkar, Single or multi-strand tundish for better inclusion separation, Indian Patent No: 201741034594, Publication date: 02–08–2019, **Grant Date: 28-11-2023**.

## CONFERENCE PRESENTATIONS

1. Novel single-strand tundish for improved inclusion separation. *26th International Congress of Theoretical and Applied Mechanics (ICTAM 2024)*, Daegu, South Korea. Vishnu Teja Mantripragada, Somenath Mukherjee, and Sabita Sarkar, August 25 – 30, 2024.
2. Thermocapillary migration of a biofluid droplet. *10th International and 50th National Conference on Fluid Mechanics and Fluid Power (FMFP 2023)*, IIT Jodhpur, India. Antarip Poddar and Vishnu Teja Mantripragada, December 20 – 22, 2023.
3. Machine Learning Approach for Accurate Slag Eye Predictions in Steelmaking Ladles. *International Conference on Fundamental and Industrial Research in Materials (iConFIRM 2023)*, IIT Ropar, India. Somenath Mukherjee and Vishnu Teja Mantripragada, December 11 – 15, 2023. **[Invited Talk]**
4. Microstructural and Microhardness Investigation on Copper-Aluminium Alloy Bimetal. *77th Annual Technical Meeting of The Indian Institute of Metals and International Conference on Metals (IIM-ATM 2023)*, KIIT, Bhubaneswar, India. Somenath Mukherjee, Vishnu Teja Mantripragada, and Amitesh Kumar, November 22 – 24, 2023.
5. Experimental and numerical simulation of centrifugal atomization process for fine metal powder production. *23rd Australasian Fluid Mechanics Conference (AFMC 2022), Sydney, Australia.* Prashanth Ethirajulu, Vishnu Teja Mantripragada and Sabita Sarkar, December 4 – 8, 2022.
6. Physical modeling of bubble behavior in steelmaking ladle. *International Conference on Physical and*

*Mathematical Modeling in Iron and Steelmaking (PMMIS 2022), Indian Institute of Technology Kanpur, India*. Vishnu Teja Mantripragada, Srikrishna Sahu and Sabita Sarkar, December 18 – 19, 2022.

7. An optimization of grooves structure for thermal performance enhancement in microchannel heat sink. *4th International Conference on Advances in Mechanical Engineering (ICAME 2022), SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, India*. Pankaj Kumar and Vishnu Teja Mantripragada, March 24 – 26, 2022.
8. Modeling of powder production during centrifugal atomization. *11th International Conference on Molten Slags, Fluxes, and Salts (MOLTEN 2021), Seoul, Korea*. Vishnu Teja Mantripragada, Krishanu Kumar, Pankaj Kumar, and Sabita Sarkar, February 21 – 25, 2021.
9. Numerical study of thermal performance with nanoparticles and grooves in microchannel. *3rd International Conference on Advances in Mechanical Engineering (ICAME 2020), SRM Institute of Science and Technology, Chennai, India*. Ayush Mishra, Amit Varakhedkar, Vishnu Teja Mantripragada, and Pankaj Kumar, February 24 – 29, 2020.
10. Fluidization of red mud fines in a reduction atmosphere: Recovery of Fe. *International Conference on Innovations in Aluminum Technology (INALT 2020), NALCO, Angul, Odisha, India*. Jayant Barode, Krishanu Kumar, Vishnu Teja Mantripragada, Lipak Sahoo, Sabita Sarkar, Manas Mukherjee, and Lakshman Neelakantan, February 8 – 9, 2020.
11. Modeling of droplet formation during centrifugal atomization process. *178th Iron & Steel Institute of Japan (ISIJ) meeting, Okayama University, Okayama city, Japan*. Vishnu Teja Mantripragada, Krishanu Kumar, Pankaj Kumar, and Sabita Sarkar, September 11 – 13, 2019.
12. On path oscillation of a particle laden bubble in stationary liquid. *Conference on the Advances in Process Metallurgy (APM 2019), Indian Institute of Science Bangalore, India*. Prithvi R.Y., Vishnu Teja Mantripragada, and Sabita Sarkar, July 4 – 5, 2019.
13. Morphology and flow analysis of buoyant bubble plumes. *12th European Fluid Mechanics Conference (EFMC 12), Vienna, Austria*. Vishnu Teja Mantripragada, Srikrishna Sahu, and Sabita Sarkar, September 09 – 13, 2018.
14. A numerical study on mixing time in dual bottom plug argon stirred steel making ladles. *3rd International Conference on Science and Technology of Ironmaking & Steelmaking (STIS-2017), Indian Institute of Technology Kanpur, India*. Vishnu Teja Mantripragada, December 11 – 13, 2017.
15. On Modeling of Modified Single Strand Slab Caster Tundish. *3rd International Conference on Science and Technology of Ironmaking & Steelmaking (STIS-2017), Indian Institute of Technology Kanpur, India*. Vishnu Teja Mantripragada and Sabita Sarkar, December 11 – 13, 2017.
16. Prediction of wall stresses in a steelmaking ladle during argon gas purging. *12th International Conference on Computational Fluid Dynamics of Oil & Gas, Metallurgical and Process Industries (CFD 2017), Trondheim, Norway*. Vishnu Teja Mantripragada and Sabita Sarkar, May 30 – June 1, 2017.
17. Study of transient behavior of slag layer in bottom purged ladle: A CFD approach. *4th World Congress on Integrated Computational Materials Engineering (ICME 2017), Ypsilanti, Michigan, USA*. Vishnu Teja Mantripragada and Sabita Sarkar, May 21 – 25, 2017.
18. Effect of jet position on liquid film thickness in rotary disc atomization. *National Metallurgist's Day Annual Technical Meeting (NMD ATM 2015), Coimbatore, India*. Vishnu Teja Mantripragada and Sabita Sarkar, November 13 – 16, 2015.
19. Mathematical modeling of oscillations of a bubble during rise in water column. *International Symposium for Research Scholars (ISRS 2014), Indian Institute of Technology Madras, India*. Vishnu Teja Mantripragada, Prithvi R.Y., and Sabita Sarkar, December 11 – 14, 2014.

## WORKSHOPS ATTENDED

1. *NASA Vision 2040: A Roadmap for Integrated, Multiscale Modeling and Simulation of Materials and Systems, Ypsilanti, Michigan, USA*. Vishnu Teja Mantripragada, May 21, 2017. [Workshop Technical Report].
2. *Remote Control Aircraft Design Workshop, Indian Institute of Space Science and Technology, Trivandrum, Kerala, India.* Vishnu Teja Mantripragada, Mar 4 – 6, 2011.

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07 Feb 2024