

## CURRICULUM VITAE

**Dr. SUBHAM RANJAN**

Assistant Professor

Department of Fuel, Minerals and Metallurgical Engineering  
Indian Institute of Technology (Indian School of Mines) Dhanbad  
Jharkhand – 826004, India

Email: [subhamranjan@iitism.ac.in](mailto:subhamranjan@iitism.ac.in) & [ranjansr.iitk@gmail.com](mailto:ranjansr.iitk@gmail.com)

### ACADEMIC RECORD

| Degree        | Institute/ University                                                        | Marks  | Year    |
|---------------|------------------------------------------------------------------------------|--------|---------|
| Ph.D.         | Indian Institute of Technology Kanpur<br>(Materials Science and Engineering) | 8.5/10 | 2019-25 |
| M. Tech.      | Indian Institute of Technology Kanpur<br>(Materials Science and Engineering) | 9.0/10 | 2012-17 |
| B. Tech.      | Indian Institute of Technology Kanpur<br>(Materials Science and Engineering) | 7.7/10 |         |
| Intermediate  | D.A.V. Public School, Patna                                                  | 93%    | 2012    |
| Matriculation | Gyan Bharti Residential Complex, Bodhgaya                                    | 9.2/10 | 2010    |

### PROFESSIONAL EXPERIENCE

*July 2026 – Present*

#### **Assistant Professor**

Department of Fuel, Minerals and Metallurgical Engineering  
*Indian Institute of Technology (ISM) Dhanbad*

#### **Teaching Experience:**

- NPMC 201: Thermodynamics and Kinetics (core course, 3<sup>rd</sup> semester B. Tech.)
- NPMC 514: Advanced Thermodynamics and Kinetics (1<sup>st</sup> semester M.Tech & Ph.D. Metallurgical Eng.)

#### **Research Supervision:**

- M. Tech.: 01 (ongoing)
- B. Tech. (project): 02 (ongoing)

*Jan 2026 – Jun 2026*

**Postdoctoral Researcher**

Department of Materials Science and Engineering  
*Korea University*

**Guide:** Prof. Joonho Lee

**Research Projects:**

- Effect of slag holdup on fluid flow and heat transfer in coke packed bed: A mathematical modelling study. (Application: Blast Furnace Ironmaking)
- CFD Simulation of Fluidized Bed Magnetizing Roasting of Iron Ore Fines.

*Nov 2024 – Nov 2025*

**Postdoctoral Researcher (FARE Fellow)**

Department of Materials Science and Engineering  
*Indian Institute of Technology Kanpur*

**Research Projects:**

- Mathematical and physical modelling of fluid flow and heat transfer in stainless steel continuous slab casting moulds.
- Development of a flash ironmaking reactor based on the direct reduction of iron oxide fines with H<sub>2</sub>.

*Aug 2017 – Apr 2019*

**Associate Manager, (Research and Development Centre)**

*Jindal Stainless Limited*, Hisar, Haryana

**Responsibility:** To look after the steel melting shops' process optimization and development.

- Reduced chromium losses associated with EAF slag ~4% by modifying aluminium injection process.
- Reduction in sliver C defect during lead heat casting by ~8% by optimising ladle and tundish processing.
- Explored the possibility of replacing coke with in-house built biochar.

## AWARDS

- **Fellowship for Academic and Research Excellence (FARE)** [IIT Kanpur, Nov'24]
- **Prime Minister's Research Fellowship (PMRF)** [Ministry of Education, Govt. of India, Dec'20-Jul'23]
- **STAR Reward** for implementation of project titled "Alternate sources of carbon in EAF" [Jindal Stainless Ltd., 2018]
- **Academic Excellence Award** for exemplary performance in academic year 2014-15 [IIT Kanpur, 2015]

## JOURNAL PUBLICATIONS

1. **S. Ranjan** and D. Mazumdar, “Mathematical and Experimental Investigation of Hot Metal Flow in a Blast furnace Trough”, *Steel Research International*, **2026**, 97 (7), 3810-3826. [\[DOI\]](#)
2. **S. Ranjan**, D. Mazumdar, I.N. Chakraborty, S. Sinha, and R. Sarkar, “Statistical Analysis and Prediction of Al<sub>2</sub>O<sub>3</sub>-SiC-C Based Blast Furnace Trough Refractory Wear Rate”, *Ironmaking & Steelmaking*, **2025**, 10, 1408-1420. [\[DOI\]](#)
3. D. Mazumdar, R. Mishra, **S. Ranjan**, and K. Avatar, “Discussion on "Optimization of Multiphase Flow and Initial Solidification Behaviours in a Stainless Steel Mold by SEN Design"", *Metallurgical and Materials Transactions B*, **2025**, 56, 3278-3281. [\[DOI\]](#)
4. **S. Ranjan** and D. Mazumdar, “Role of Gas Aspiration Through Ladle Shroud and Influence on Tundish Hydrodynamic Performances: A Physical and Mathematical Modelling Study”, *Steel Research International*, **2024**, 95 (7), 2300709. [\[DOI\]](#)
5. **S. Ranjan**, S. Mukherjee, and D. Mazumdar, “Mathematical and Physical Modeling of Inertization and Control of Tundish Atmosphere During Continuous Casting of Steel”, *Transactions of Indian Institute of Metals*, **2023**, 76 (3), 837-847. [\[DOI\]](#)
6. **S. Ranjan**, S. Mukherjee, A. Agnihotri, and D. Mazumdar, “Physical Modelling of Nitrogen Variation in Continuously Cast Blooms Resulting from Atmospheric Exposure of Steel in Tundish during Initial Stages of Teeming”, *ISIJ International*, **2022**, 62 (3), 609-612. [\[DOI\]](#)
7. **S. Ranjan**, D. Mazumdar, I.N. Chakraborty, S. Sinha, and R. Sarkar, “Review and Analysis of Metallurgical Processes in Blast Furnace Main Trough and Trough Performances”, *Transactions of Indian Institute of Metals*, **2022**, 75 (3), 589-611. [\[DOI\]](#)

## CONFERENCE PUBLICATIONS

1. D. Nama, **S. Ranjan**, M. Ishfaq, A. Das, and R. Sarkar, “Adapting the Flash Ironmaking Technology for Direct Reduction of Iron Ore Fines- Results from Preliminary Studies at IIT Kanpur” in STIS-V, IISc Bangalore, India, 2025, pp. 189-194.
2. P.K. Singh, **S. Ranjan**, and D. Mazumdar, “Gas-Liquid Flows in Ladle Shroud and their Impact on Tundish Process Performance and Steel Quality”, *Advanced High Strength Steel*, ed. by T K Roy et al., Springer, 2017, pp. 149-158. [\[DOI\]](#)

## CONFERENCE PRESENTATIONS

1. **S. Ranjan**, "Impact of Two-phase Gas-liquid Flows in Ladle Shroud on Tundish Hydrodynamic Performance: A Computational and Experimental Investigation", 2026 Spring Conference of the Korean Institute of Metals and Materials, Jeju Island, Korea, April 28-30.

2. **S. Ranjan**, S. Mukherjee, and D. Mazumdar, "Steel Contamination And Its Prevention During Initial Teeming Stage In A Continuous Casting Tundish: A Mathematical And Physical Modeling Study" ICS 2025, Seoul, Korea, July 2-5.
3. **S. Ranjan** and D. Mazumdar, "Gas Aspiration in Ladle Shroud and Its Impact on Tundish Process Performance: A Physical and Mathematical Modeling Study" IIM-ATM 2024, GKVK, Bengaluru, Nov. 22-24.
4. **S. Ranjan** and D. Mazumdar, "A Macroscopic Model for Prediction of Refractory Wear in Blast Furnace Main Trough" AISTech 2022, Pittsburgh, USA.
5. **S. Ranjan** and D. Mazumdar, "Modelling of Metallurgical Processes in a Blast Furnace Trough", Asia Steel 2021, Gyeongju, South Korea.

### TEACHING EXPERIENCE (Others)

#### Workshops conducted:

- “Introduction to Numerical Modelling: Theory & Problem Solving Through ANSYS Fluent” at IIT Ropar. [Apr’23]
- “Introduction to Computational Fluid Dynamics and Ansys Fluent” at CSJM University, Kanpur. [Aug’22]

**Lab instructor:** Flow visualization in key steelmaking units using water modelling. A part of short-term industrial course on Steelmaking -and Refractories by Prof. Dipak Mazumdar at IIT Kanpur. [Semi-annual course]

**Teaching assistant (IIT Kanpur):** Trasport phenomena | Process metallurgy laboratory | Nature and properties of materials | Mechanics of Solid