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CONTACT

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RESEARCH INTERESTS

- Gravity Concentration
- Equipment Design and Development
- E-waste processing
- Dry Processing
- Critical Mineral Processing

ONGOING PROJECTS

REE beneficiation and extraction
Graphite Schist beneficiation
Gold Ore beneficiation and extraction
PG minerals beneficiation
Magnesite ore beneficiation
Ni -Co Laterite ore beneficiation
LD Slag valorization

INTERNATIONAL PROJECTS

Bhutan, Australia

EDUCATION

Degree Name	Specialization	Year	Institute
B. Tech. & M. Tech. (Dual Degree)	Mineral Engineering & Mineral Resource Management	2012	ISM
Ph.D.	Mineral Engineering	2018	IIT (ISM)

EXPERIENCE

Assistant Professor, IIT (ISM) Dhanbad: Mar 2013 to present

RESEARCH SUMMARY*

- ❖ Research Projects – 06 (Completed), 02 (Ongoing)
- ❖ Research papers – 08 (Q1/Q2 Journals)
- ❖ Book Chapter Publication – 04
- ❖ Patents – 05
- ❖ Industrial Consultancy– 07 (Completed), 02 (ongoing)
- ❖ Membership of Professional Societies – 04

RESEARCH SCHOLARS

- Full time: 03
- Part time: 03

ONGOING RESEARCH

- Analytical approach to fluid flow and particle motion in **hydrocyclones**
- Economic recovery of **coking coal** from rejects
- Recovery of **vanadium** from graphite ore tailings
- Optimization of grinding circuit
- Recovery of **Cu and other metals** from e-waste using physical separation methods
- Recovery of Ni-Co from chromite OB
- Recovery of **PGM** from gold ore tailings
- Recovery of **critical metals** from e-waste using biomineral processing

EXPERTISE

- 🚧 Critical Minerals Processing and Extraction
- 🚧 Optimized Process Flowsheet Development
- 🚧 Mineral Processing Plant Audit
- 🚧 Coal Preparation Plant Audit
- 🚧 Fine and low-grade Mineral Processing
- 🚧 Equipment design and development
- 🚧 Gravity Concentration – coarse/fine

* See Annexure for more details

Annexure

INDUSTRIAL TRAINING

Organization	Duration
HZL, Rampura Agucha Mines, Vedanta	Six Weeks
JCPP, Tata Steel Limited, Jamadoba, Jharia	Six weeks

INDUSTRIAL EXPOSURES

- Noamundi Iron Mine and Processing plant, Tata Steel, Jharkhand
- SAIL Gua iron ore mine and processing plant, SAIL, Jharkhand
- Prism Johnson Cement Making plant, Satna, MP
- Sintering and steel making plant, Electrosteel Steel Limited, Bhagabandh, Jharkhand
- IISCO Steel Plant, Bernpur, Asansol, West Bengal
- McNally Sayaji Engineering Limited, Kumardhubi, Jharkhand
- Bokaro Steel Plant, SAIL, Bokaro, Jharkhand
- Uranium Corporation of India Limited (UCIL), Jaduguda, Jharkhand
- Indian Copper Complex (ICC), Ghatshila, Jharkhand
- Malanjkhand Copper Project (MCP), Balaghat, Mahdy Pradesh
- Hindustan Zinc Limited (HZL), Rampura Aghucha Mines, Rajasthan
- HZL Debari Smelter, Udaipur, Rajasthan
- MMIPL Gold processing and extraction plant, Lawa Gold Mines, Jamshedpur
- BHEL Hyderabad
- NMDC R&D Division, Hyderabad
- Magnesite Ore processing plant, Young, Australia
- Jindal Stainless Limited (JSL), Jajpur, Odisha
- Jamadoba Coal Preparation Plant, Jharia Division, Tata Steel Limited, Jharkhand
- Bhelatand Coal Preparation Plant, Jharia Division, Tata Steel Limited, Jharkhand
- West Bokaro Coal Preparation Plant, Ghatotand, Tata Steel Limited, Jharkhand
- Moonidih Coal Washery, BCCL Dhanbad, Jharkhand
- Mahuda Coal Washery, BCCL Dhanbad, Jharkhand
- Sudamdih Coal Washery, BCCL Dhanbad, Jharkhand
- Patherdih NLW Coal Washery, BCCL Dhanbad, Jharkhand
- Dahibari Coal Washery, BCCL Dhanbad, Jharkhand
- Chasnala Collieries, Dhanbad, Jharkhand

RESEARCH PROJECTS

Sl. No.	Project Title	Funding Agency	Status
1.	To study the pelletization of fine particles of iron and manganese ores	Institute funded	Completed
2.	Characterization and beneficiation studies on auriferous quartzite ore for producing concentrate for recovery of gold	MMIPL Jamshedpur	Completed
3.	To develop POC for beneficiation and extraction of REE from samples collected from BCCL mines	Texmin Foundation	Completed
4.	To develop a working prototype for High tension separator for dry separation of conducting particles	Texmin Foundation	Completed
5.	To develop a working prototype for an Enhanced Gravity Separator (EGS) for recovery of REE and precious metals	Texmin Foundation	Completed
6.	Design and development of a continuous film concentrator for processing fine particles	PDF (Project fund)	Completed
7.	Recovery of PG Minerals from gold ore tailings	MMIPL Jamshedpur	Ongoing
8.	Design and development of dry density separator for fine particle (<6mm) processing	PDF (Project fund)	Ongoing

RESEARCH PAPERS

- Jain, P. K. (2021), An analytical approach to explain complex flow in spiral concentrator and development of flow equations, *Minerals Engineering*, 2021, 107027, ISSN 0892-6875, <https://doi.org/10.1016/j.mineng.2021.107027>
- Jain, P. K. (2021). A novel concept of composite coefficient of friction for slurry systems and development of flow equations for spiral concentrators. *Powder Technology*, 386, 411–419. <https://doi.org/10.1016/j.powtec.2021.03.058>
- Jain, P. K., & Rayasam, V. (2017). An analytical approach to explain the generation of secondary circulation in spiral concentrators. *Powder Technology*, 308, 165–177. <https://doi.org/10.1016/j.powtec.2016.11.040>
- Jain, P. K., Bhattacharya, S., & Kumar, S. (2016). Recovery of combustibles from electrostatic precipitator discharge. *Waste Management and Research*, 34(6). <https://doi.org/10.1177/0734242X16636956>
- Haque, Z., & Jain, P. K. (2025). Optimising metal liberation from waste printed circuit boards through controlled thermal pre-treatment. *The Canadian Journal of Metallurgy and Materials Science*, Published online: 02 Sep 2025. <https://doi.org/10.1080/00084433.2025.2546732>
- Jain, P. K. (2025). The Graphite Processing Sector: A Global Perspective on Practices, Applications, Trade, and Trends Toward 2047. *Mineral Processing and Extractive Metallurgy Review*, 1–24. <https://doi.org/10.1080/08827508.2025.2552149>
- Haque, Z., & Jain, P. K. (2025). Enhanced Metal Liberation from Waste PCBs: A Comparative Study of Grinding Mechanisms and a New Framework for Liberation Analysis. *The Canadian Journal of Metallurgy and Materials Science*, Accepted on: 19 Dec 2025. <https://doi.org/10.1080/00084433.2025.2608397>
- Haque, Z., & Jain, P. K. (2025a). Enhanced metal liberation from waste PCBs: a comparative study of grinding mechanisms and a new framework for liberation analysis. *Canadian Metallurgical Quarterly*, (Published online: 24 Dec 2025), 1–13. <https://doi.org/10.1080/00084433.2025.2608397>

BOOKS & MONOGRAPHS

Authors	Title of Book/ Chapter	Publisher	Year of Publication	ISSN/ISBN
Pankaj Kumar Jain	Gravity (Density) Separation	Elsevier	2025	ISBN: 978-0-443-40294-4
Pankaj Kumar Jain	Electrostatic Separation	Elsevier	2025	ISBN: 978-0-443-40294-4
Pankaj Kumar Jain	Magnetic Separation	Elsevier	2025	ISBN: 978-0-443-40294-4
Pankaj Kumar Jain, N R Mandre, Sumantra Bhattacharya	Flotation	Elsevier	2025	ISBN: 978-0-443-40294-4

PATENTS

Title	Inventor	Year of filing	Patent No.	Status
A method and device for concentration of solar radiation and obtaining concentrated plane beam	Pankaj Kumar Jain	2010	293820	Granted, 2018
A shredding device for shredding plastic and paper material into near-powdered form and method thereof	Pankaj Kumar Jain, Prof. A. Chattopadhyay	2016	427735	Granted, 2023
A device with an improved design of Sharpening blade with application in pencil sharpener	Pankaj Kumar Jain	2021	532620	Granted, 2024
A device to clean ambient air with filter cloth and a method of recovery thereof	Pankaj Kumar Jain, Kesavan Ravi	2021	508409	Granted, 2024
A continuous mineral concentrator for separation of fine heavy and light mineral particles	Pankaj Kumar Jain	2025	202531039656 (Application number)	April 2025

INDUSTRIAL CONSULTANCY PROJECTS

Financial Year	Title	Organization Name	Total Amount (₹)	Status
2013-14	Characterization of dry solids obtained from ESP discharge	Prakash Industries Limited	73,000	Completed
2013-14	Technical Feasibility study on recovery of Uranium bearing minerals from tailing of Mosaboni Copper Concentrator	Uranium Corporation of India Limited (UCIL), Jaduguda	15,00,000	Completed
2017-18	Ball Mill Size Calculations for limestone grinding under wet conditions	Bharat Heavy Electricals Limited (BHEL) Hyderabad	40,00,000	Completed
2022-23	Characterization and Beneficiation studies on low-grade graphite ore from Khepcheshi Hill, Chelela, Bhutan	State Mining Corporation Limited, Bhutan (International)	30,00,000	Completed
2024-25	Sampling and quality assessment of reject/slurry of all washeries of BCCL	BCCL Dhanbad	56,34,500	Ongoing
2025-26	Rom coal washability study for dry deshaling circuit capacity design	Kalyaneshwari Tasra Mining Private Limited (PowerMac) Dhanbad	14,57,300	Completed
2025-26	Sampling and analysis of Steam fraction of seam of Mines of BCCL Dhanbad	BCCL Dhanbad	15,98,900	Completed
2025-26	Sampling and quality assessment of BCCL Washery Rejects	BCCL Dhanbad	32,42,467	Completed
2025-26	Characterization and Beneficiation Studies on Magnesite ore for Flowsheet Development	Causmag International, Australia (International)	18,00,000	Ongoing

PROFESSIONAL MEMBERSHIPS

Sl. No.	Name of Society	Membership type	Date of enrollment/Application	Membership details
1.	Indian Institute of Mineral Engineers	Life Member	30 July 2015	LM-1179
2.	Institute of Engineers India	Life Member,	28.02.2025	M-1818737, Metallurgical & Materials Engineering Division
3.	Indian Institute of Metals	Life Member (LM01)	20.03.2025	Membership no. 62242 Chapter: Jamshedpur (IMJ01)
4.	The Mining, Geological & Metallurgical institute of India	Life Member	31.05.2025	LM 11267,