# Dr. Prashant Modi, PhD

**Assistant Professor**
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## Academic Details

| Course | Year | Name of the Institution |
|---|---|---|
| Ph.D. | 2022 | Indian Institute of Technology (Banaras Hindu University), India |
| M.Sc. (Tech.)-Geology | 2016 | Institute of Science, Banaras Hindu University, India |
| B.Sc. (Hons.)-Geology | 2013 | Institute of Science, Banaras Hindu University, India |

**PhD Thesis Title:** ***"Coal Characterization And Its Relation To Quality And Occurrence of Rare Earth Elements"*** under the supervision of Prof. Aarif Jamal, Professor, Department of Mining Engineering, Indian Institute of Technology (Banaras Hindu University), India.

## Professional Experience

| From | To | Designation | Organisation |
|---|---|---|---|
| November, 2022 | February, 2024 | Post Doctoral Fellow | Indian Institute of Technology (Indian School of Mines), Dhanbad, India |

**Post Doctoral Fellow:** Worked as a Post Doctoral Fellow (N-PDF)/PI on the project titled **"Rare Earth Elements Identification and Its Recovery From Coal and Coal Waste"** under the supervision of Prof. Aarti Kumari funded by Science and Engineering Research Board (SERB), India (Project cost in Rs. 19.5 lakhs).

## Research Interests

- Study on critical minerals and secondary resources
- Study on Rare Earth Elements (REEs) in coal and coal by-products
- Recovery of REEs from coal and coal by-products
- Characterization of basin based on coal studies

## Research Guidance

- Guided **6 students for their Master's Dissertation Research** (M.Sc. in Geology):
  - Mr. Abhijeet Anand for dissertation topic on "**Land Degradation and Ecological Restoration in Sijua Mining Area of Jharia Coalfield, Jharkhand, India**".
  - Mr. Himansu Kumar Barik for dissertation topic on "**A Study of Petrographic and Geochemical Characterization of Coal of Shyampur (B) Colliery, Raniganj Coalfield, Jharkhand for Its Suitability in Other Industries**".
  - Ms. Janhabi Priyadarsani for dissertation topic on "**Geochemical Characterisation and Geospatial Analysis of Fluoride Contamination in Tarabola Geothermal Region, Odisha**".
  - Mr. Pranay Dey for dissertation topic on "**Comparative Studies of Different Lithotypes of Coal Samples of Khoodia Colliery of Raniganj Coalfield with Special Reference to Petrography, Geochemical Characterization and Rare Earths**".
  - Mr. Rohit Kumar Mahto for dissertation topic on **"Environmental Implications of Water Infiltration in Coal Mines and Surrounding Ecosystem of Bastacolla Area of Jharia Coalfield, Jharkhand, India**".
  - Mr. Santosh Kumar Mahto for dissertation topic on "**Hydrogeological Assessment and Water Management Strategies in Katras Mining Area of Jharia Coalfield, Jharkhand**".

## Research Skills

- **Study on REEs in coal and coal by-products**

Characterization of REEs in coal, calcined coal, fly ash, shaly coal, overburden, inorganic bands of coal, coal rejects, coal middling, water samples of acid mine drainage (AMD) *etc.*

- **Recovery of REEs from coal and coal by-products**

Recovery of these valuable elements by physical beneficiation, chemical beneficiation particular to hydrometallurgy *etc.*

- **Geochemistry and Petrography**

Geochemical characterization of material, petrography of coal, geochemical evolution of basin based on petrography, paleo-environmental condition based on petrography and geochemical analysis.

- **Instruments Operated**

Hands-on experience with Inductively Coupled Plasma Mass Spectrometer (Agilent ICP-MS 7700 Series), Thermogravimetric Analyzer (TGA-5O M/s Shimadzu), Scanning Electron Microscope (EVO MA15 / 18, CARL ZEISS), X-ray Diffraction (Rigaku), Fourier Transform Infrared Spectroscopy (FTIR), CHNOS Analyzer and Microwave Digestion System.

- **Calculation and Packages**

Corel Draw, OriginPro, HighScore Plus, MS Office, iWork

## Awards and Academic Recognition

- Received **National Post Doctoral Fellowship (N-PDF)** from SERB, India, November 2022.
- Qualified National Level Examination **Graduate Aptitude Test in Engineering** (Geology) in 2021.
- Received **SRF** at IIT (BHU) Varanasi from CSIR, India, July 2018 – July 2021.
- Received **JRF** at IIT (BHU) Varanasi from CSIR, India, July 2016 – July 2018.

## Teaching

At the Department of Geology, SNRM, Central University of Jharkhand, India

- Fuel Geology
- Engineering and Mining Geology
- Hydrogeology
- Igneous and Metamorphic Geology

## Works in Collaboration (On-going)

- Study on REEs (Birbal Sahni Institute of Palaeosciences, Lucknow, India)
- Study on Indian coals (Wadia Institute of Himalayan Geology,Dehradun, India)
- Recovery of Rare earths (Dept. of Fuel, Minerals & Metallurgical Engg., IIT-ISM)

## Publications

- **Modi, P.,** Hower, J.C., Giri, R., Rahi, I.C., Siddiqui, M.A., Rajak, P.K., and Jamal, A. (2023). Extraction of rare earth elements from coal samples from the Sohagpur Coalfield, Madhya Pradesh, India. *International Journal of Coal Preparation and Utilization.* Doi: https://doi.org/10.1080/19392699.2023.2179998 **(Impact Factor: 2.7)**
- **Modi, P.,** and Kumari, A. (2023). Extraction of rare earths from coal and coal by-products as a non-traditional source. *Materials Today: Proceedings.* Doi: https://doi.org/10.1016/j.matpr.2023.08.188
- **Modi, P.**, Jamal, A., Varshney, R., Rahi, I. C., and Siddiqui, M. D. (2022). Rare Earth Elements mobility, leaching and recovery by different chemicals treatment on coal samples and calcined samples of Sohagpur Coalfield, Madhya Pradesh India. *International Journal of Coal Preparation and Utilization.* Doi: 10.1080/19392699.2022.2031171 **(Impact Factor: 2.7)**
- **Modi, P**., Jamal, A., Varshney, R., and Rahi, I. C. (2022). Occurrence, mobility, leaching and recovery of Rare Earth Elements and Trace elements in Sohagpur Coalfield, Madhya Pradesh, India. *International Journal of Coal Preparation and Utilization.* January 2022. Doi: https://doi.org/10.1080/19392699.2021.2014823 **(Impact Factor: 2.7)**
- Varshney, R., **Modi, P.**, Sonkar, A. K., Singh, P., and Jamal, A. (2022). An investigation of surface water quality of Singrauli coalfield with special reference to Govind Ballabh Pant Reservoir, India and application of phytoremediation for removal of pollutants. Doi: 10.1007/s12517-022-10806-y **(Impact Factor: 1.8)**
- **Modi, P.**, Jamal, A., and Singh, N. (2021). Coal characterization and occurrence of rare earth elements in coal and coal-ash of Sohagpur Coalfield, Madhya Pradesh, India. *International Journal of Coal Preparation and Utilization*. July, 2021. Doi: https://doi.org/ 10.1080/19392699.2021.1923489 **(Impact Factor: 2.7)**
- **Modi, P.**, and Jamal, A. (2020). Geochemical characterisation of coal with special reference to thermal industries of Dhanpuri Open Cast Project, Sohagpur Coalfield, Madhya Pradesh, India. *International Journal of Engineering Trends and Technology* (IJETT) – Volume 68 Issue 4 - April 2020. Doi: 10.14445/22315381/IJETT-V68I4P207S **(Impact Factor: 2.4)**
- Rajak, P., **Modi, P.** and so on (2024). Evaluation of Sensitive Element Distribution in Miocene Lignites, Prospecting of Neyveli Deposit (Under review).
- **Modi, P.** And Kumari, A. (2024). Coal Washery Rejects: Potential secondary resource for rare earths extraction (in preparation).

## Conferences

- **Modi, P.** and Kumari, A., (2025). “Coal Washery Rejects: Potential Secondary Resource For Rare Earths Extraction” in the National Conference on Critical Metals: Recycling, Innovation, Separation, and Processing (CRISP-2025), at IIT (ISM) Dhanbad.
- **Modi, P.** and Kumari, A., (2024). “Geochemical characterization and extraction of rare earths from coal washery rejects” in the in the Goldschmidt 2024 Conference, Chicago, USA (https://doi.org/10.46427/gold2024.21658).
- **Modi, P.**, Kumari, A., and Jamal, A. (2024). “ Exploration and Extraction of Rare Earths from Coal & Coal by-products via Hydrometallurgical Route” in the national seminar of Mineral Exploration & Water Resource Management: Recent trends organised by CMPDI, Ranchi.
- **Modi, P.**, and Kumari, A. (2023). “Exploration and geochemical characterization of Indian coal and coal by-products for extraction of rare earths” in the Goldschmidt 2023 Conference, Lyon, France with the **Travel Grant** (https://doi.org/10.7185/gold2023.14587).
- **Modi, P.**, and Kumari, A. (2023). “Extraction of rare earths from coal and coal by-product as a non traditional source” in the International conference on Management and Recycling of Metallurgical Wastes, IIT-BHU, India.
- **Modi, P.**, and Jamal, A. (2022). “Coal Quality and Its Utilization” in The Indian Mining & Engineering Journal, AKS University, Satna, Madhya Pradesh, India.
- **Modi, P**., Jamal, A., Varshney, R., and Rahi, I.C. (2021). “Coal: A source of Rare earth elements other than thermal energy” in ICOMS-2021 of Northern Coalfields Limited (NCL), Singrauli, Madhya Pradesh, India.

## Membership of Professional Societies

- The Society for Organic Petrology (TSOP)
- European Association of Geochemistry (EAG)

## Reviewer in Journal

- Reviewed research articles for “Environmental Science and Pollution Research” by Springer, "Land Degradation & Development” by Wiley and so on.

## Declaration

I hereby declare that the above-furnished details are true to the best of my knowledge.

Thanking You,

Yours sincerely,

(Dr. Prashant Modi)

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