Indian Institute of Technology (ISM), Dhanbad

Office of Dean R&D

CALL FOR POST-DOCTORAL FELLOWSHIP UNDER
Technology Innovation Hub (TIH)

IIT (ISM) has been approved as Govt. of India's Technology Innovation Hub (TIH) in Mineral Exploration and Mining under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS). Thus, IIT (ISM) is set to become the nodal centre for ushering Mining 4.0 in India. The major objective of TIH is to develop cyber-physical systems for improved resource discovery, enhanced efficiency, and productivity by integrating Sensors, the Internet of Things, and Artificial Intelligence in Physical Systems. The primary aim here is to improve mineral discovery and product development for Mining 4.0.

Post-Doctoral Fellowships(PDFs) are available in TIH for a maximum period of three years, with initial offer for a period of one year extendable on yearly basis on satisfactory progress as certified by the Performance Assessment Committee (PAC). It will enable young Indian researchers to carry out clearly defined research projects in TIH at IIT (ISM) for a maximum period of 36 months subject to availability of funds. The individual availing this fellowship would be called as IIT (ISM) CHANAKYA PD Research Fellow. The selected PDFs will be guided by domain experts of the TIH through the PI/Co-PI. PDFs will be eligible to serve as co-guides along with their mentors for guiding students enrolled for projects/internships/dissertation works in the TIH.

The scope of TIH in Mining 4.0 includes, but not limited to, the following Cyber-Physical Systems (CPS):

- AI and ML: Use of AI and ML in the Discovery of Mineral Resources and decision-making process in mines.
- Augmented Reality: Integrating information from the digital system to the physical workplace. A real-time problem-solving system such that problems and solutions can be shared and visualized in real-time.
- Virtual Reality: Hardware and Software based simulation and training on real-life mining situations such as simulating mine fire, roof failure, dump slope, etc., Operation and maintenance practices for Heavy Earth Moving Machines etc.
- Smart Sensors and Miner's Tracking Systems: Development of wearable sensors and underground positioning systems (UPS) akin to GPS systems.
- Smart and Intelligent Sensing System: Heavy Earth Moving Machineries (HEMM) Real-time condition monitoring & health prediction to improve Overall Equipment Efficiency (OEE), Intelligent personal assistance system for miners for interfacing with machines, computers/PDAs and other information system.

At present RFID based systems are in place for communicating with smartphones and other personal devices for reporting purposes.

- Robotic Miners System: Robotic based systems and their integration for performing hazardous and repetitive operations in mines such as drilling robots, rescue robots, robotic Loading and Hauling machines, Robotic roof bolters and dressers etc.
- Enterprise based Decision Support Systems: Introduction of robust underground hybrid communication system (WIFI/TTE/5G) for interaction between the miners in operations and decision makers with IoT in place.
- Mine Data Analytics: Use of Big Data and other related tools for useful information discovery and prediction of various unforeseen events in mines such as prediction of roof fall, dump failure, unsafe mine environment etc.

Total positions for PDF under phase I : 10

Eligibility

PhD holders (within 5 years of completion of Ph.D.) with at least two papers (as first or corresponding author) in Journals of repute or SCI/SCIE is eligible to apply.

Age Maximum 35 years (to be relaxed as per Government of India guidelines.

S.No.	Domain	Essential qualifications	Desired Area of Expertise
1.	AI & Data Analytics	PhD in Computer Science & Engineering, Electronics Engineering, Electronics & Communication Engineering, Mathematics and related field	Artificial intelligence. Machine learning, Deep learning, data Mining , Data analytics, Soft Computing, Algorithms,
2.	• Sensors and System • Communication System • System Automation • Control & Instrumentation	PhD in Electronics Engineering, Electronics & Communication Engineering, Electrical Engineering, and related field	Microwave Communication System and Antennas, Communication System, Computer Networking, Signal Processing, Control & Instrumentation, System Engineering, Embedded System,

			Robotics, Sensors, and Transducers, IoT
3.	Mineral Exploration	PhD in Geophysics, Geology or Earth Sciences	Numerical techniques, AI, Machine learning, Exploration
4.	Mine Planning, Operation, Mines Safety, Geo-spatial Technology, Eco-restoration, Mineral Processing	PhD in Mining Engineering, Mining Machinery Engineering, Mineral Engineering, Geoinformatics, Geomatics, Remote Sensing & GIS.	Mine Planning & Operations, Mines Safety, Sustainable Mining, HEMM Operation & Maintenance, Remote Sensing & GIS, Mineral Beneficiation & Ore Extraction.

Application Processing and Interview

The guidelines for selecting PDFs in the TIH will be same as the institute post-doctoral fellow. The recommended candidates will be called for interview. Such candidates will be reimbursed TA/DA as per the institute norms. Candidates may be interviewed through Video conferencing /on-line platforms as the situation demands.

Amount of Fellowship and other benefits to PDFs

Year	Consolidated Fellowship per month (inclusive)*
I Year	Rs. 60,000
II Year	Rs. 60,000+5% increment
III Year	Rs. 63,000+5% increment

* subjected to change upon approval of DPR by DST and formation of TIH governing body

LST DATE OF APPLICATION: July 17, 2020

APPLICATIONS WITH GRADE CARD/CERTIFICATES/ SHOULD BE SENT TO
tih_pdf@iitism.ac.in

APPLICATION FOR POST-DOCTORAL FELLOW

Curriculum Vitae

Name: <>

Date of Birth: <<>>

Category: <<>>

EWS:<<YES/NO>>

PhD: << Write the Date of Award of PhD, Title of the PhD, Name of the Institute/University>>

Educational Qualification: << Write the name of degree, Year of passing, Name of the Degree awarded Institute/university, Percentage of Marks/Grade/Class>> (including marks obtained during PhD Course Work). The details to be provided from Class Xth Onwards in tabular form) Teaching/Research/Industrial Experience: << Write the number of Years of Experience for each>>

Awards & Honour:<>

Area of Expertise: << Areas of Research >>

Major Research Achievements: <<>>

List of Publications: <>

Research Proposal (1000 Words; Proposals submitted need to be original and plagiarism in any form will not be acceptable.)

Signature (Name of the Candidate)