Dr. Gopi Krishna

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Department of Mining Engineering
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RESEARCH INTERESTS

Rock Excavation, Mechanical Cutting, Rock-tool Interaction, Rock Mechanics, and Numerical Modelling

EDUCATION & QUALIFICATIONS

Joint-Doctoral degree - IIT Kharagpur and University of Wollongong, Australia **2022**

Project: *Evaluation of Mechanical Behaviour of Polymeric Skin Support for Mining Applications Using Experimental and Numerical Modelling Methods*

- Laboratory-scale experiments on hydrostone plaster, concrete and coal specimens coated with a fibre-reinforced polymeric liner to evaluate its reinforcement capability, including rock mass with a discontinuity plane under compressive loading.
- Numerical modelling of liner-coated concrete and coal damage and dilation behaviour using a micro-plane-based damage-plasticity method with the Drucker-Prager yield criterion.
- 3D numerical models of underground coal pillars to assess the support potential of polymeric liners, with a parametric study on effective liner thickness.

Master's degree (M.Tech - Mining Engineering) - IIT Kharagpur **2015**

Project: *Investigation of Mechanical Properties of Sandstone Subjected to High Temperature*

- Studied stress-strain behaviour, peak strength and Young's modulus of Kamthi and Barakar sandstones at temperatures up to 800°C, relating strength degradation to textural and mineralogical changes observed through SEM.

Bachelor's degree (B.Tech - Mining Engineering) - Kakatiya University **2013**

Project: *Study of the Yield Pillar Method in an Underground Coal Mine*

Diploma in Mining Engineering - Government Polytechnic, Kothagudem **2009**

Project: *Study of the deployment of surface miners in open-cast mines to eliminate blasting*

WORK EXPERIENCE

Assistant Professor | IIT (ISM) Dhanbad **Aug 2023 to Present**

Subjects taught: Surface Mining (UG); Advanced Blasting Techniques (UG); Rock Excavation Engineering (UG); Rock Mechanics Laboratory (UG); Rock Excavation Laboratory (UG); Modern Blasting Technology in Mining (PG); NATM and TBM Tunnelling (PG); Design of Supports for Underground Excavations (PG).

Research Associate | IIT Kharagpur **Jan 2023 to July 2023**

Title: Indigenous Development of IoT-Enabled Technology for Monitoring, Analysis and Interpretation of Longwall Shield Pressures for Improving Safety and Productivity.

- Installed pressure and position sensors on longwall shield supports for real-time monitoring of roof pressure, and analysed the data using Python to interpret strata behaviour and production.

Project Assistant | IIT Kharagpur **Oct 2021 to July 2022**

Title: Assessment of stability of room and pillar stoping method at a depth of 350m of Kendadih copper mine, HCL/ICC.

- Inspected abandoned workings and collected rock mass data for the hanging wall, footwall and ore body; carried out laboratory testing of physico-mechanical properties.

- Developed FEM models for three lodes to recommend stable stope dimensions, extraction sequence and support for already developed stope drives.

GUIDANCE / SUPERVISION

- **Main Guide:** 5 regular (full-time) scholars and 3 part-time scholars
- **Co-Guide:** 1 full-time scholar

RESEARCH PROJECTS

- Investigation into planning and design aspects governing the selective coal-cutting technology using surface miners for various rock conditions for clean coal production. (Role: Co-PI)
  Sponsored by the Department of Science & Technology | Amount: Rs. 3,36,38,680
- Assessment of Rock Mass Rippability through Geotechnical Investigations for Selection of Suitable Ripper and its Operating Parameters for Sandstone Formations of West Bokaro Mine, Tata Steel Limited. (Role: Co-PI)
  Sponsored by Tata Steel Limited, Jamshedpur | Amount: Rs. 42,79,109
- Assessment of Rock Mass Rippability through Geotechnical Investigations for Aiding Selection of Suitable Ripper for Joda East and Khondbond Mines of Tata Steel Limited. (Role: Co-PI)
  Sponsored by Tata Steel Limited, Jamshedpur | Amount: Rs. 28,59,687

CONSULTANCY PROJECTS

Summary: 26 sponsored consultancy projects (14 as Chief Investigator, 12 as Co-Chief Investigator), for clients including WCL, MCL, BCCL, SCCL, SAIL, NHDC, East Central Railway, ITD Cementation, Birla Corporation and Star Cement.

1. Scientific Study of Gadegaon Opencast Mine of Wani Area for Method of working as per Regulation 106 of CMR-2017, read with DGMS (Tech.) Circular No.3 of 2020, dated 16/01/2020.
   Client: WCL | Role: CI | FY 2026–27
2. Design of controlled blasting works during excavation for construction of the plunge pool of Subansiri Lower HE Project (2000MW).
   Client: BGS-SGS-SOMA JV (Soma Enterprise Ltd), New Delhi | Role: Co-CI | FY 2026–27
3. Scientific Study for Feasibility and Geomechanical Design of Longwall Deployment and Long Gate-Road Development in Virgin RIV Seam Considering Overlying CM Depillared Panels in RV Seam.
   Client: Coherent Mining Solutions Pvt. Ltd., West Bengal | Role: CI | FY 2026–27
4. Scientific study for framing a scientific policy and procedure for evaluation of Bench Mark Powder Factor (BMPF) for blasting in Over burden (OB) removal in 20 Opencast mines of RG, BPA and KGM areas of M/S SCCL.
   Client: Singareni Collieries Company Limited (SCCL), Telangana | Role: Co-CI | FY 2026–27
5. Scientific Slope Stability Study of Proposed ROCP Patch- III (Hired HEMM Patch) under Bastacolla Area of BCCL.
   Client: BCCL, Bastacolla Area, Dhanbad | Role: CI | FY 2026–27
6. Scientific Study on Slope Stability of Proposed Dump & Benches at Sosopi Iron Ore Mines of M/S Kushal Arjun Rathore.
   Client: Kushal Arjun Rathore (Sosopi Iron Ore Mines), Singhbhum | Role: CI | FY 2026–27
7. Scientific Study on Pit & Dump Slope Stability Analysis and Design of Tasra Open Cast Mine.
   Client: KTMPL, Dhanbad | Role: CI | FY 2026–27
8. Scientific Study on Fly Ash-filled Mine Void at South Balanda OCP of MCL.
   Client: Mahanadi Coalfields Limited, Sambalpur | Role: CI | FY 2026–27
9. Scientific study for designing of controlled deep hole blast pattern using SMS/SME explosive as per the regulation 194 & 196 (3) of CMR-2017 at Kalyneshwary-Tasra Coal Mine of M/s Kalyneshwary Tasra Mine private Limited (KTMPL).
   Client: Kalyaneshwari Tasra Mining Pvt. Ltd., Dhanbad | Role: Co-CI | FY 2025–26

10. Scientific Study Regarding the Method of Mining for M/S Shri Stones, Bili Markundi, Sonebhadra, UP.
    Client: Shri Stones, Bili Markundi, Chopan-Sonebhadra, UP | Role: CI | FY 2025–26
11. Feasibility Study for the Widening of 03 Nos. of Tunnels Between Gurpa-Gujhandi Ghat Section.
    Client: East Central Railway, Dhanbad Division | Role: Co-CI | FY 2025–26
12. Scientific Study for Slope Stability at Baitarani Iron Ore Mines.
    Client: M/S Sunandan Pradhan, Baitarani Iron Ore Mines, Bhubaneswar | Role: CI | FY 2025–26
13. Scientific study to conduct controlled deep hole blasting, under regulation 164 (1-B) of MMR-1961 for Baitarani Iron Ore Mines of M/S Sunandan Pradhan.
    Client: M/S Sunandan Pradhan, Baitarani Iron Ore Mines, Bhubaneswar | Role: Co-CI | FY 2025–26
14. Vibration monitoring studies (pre-blasting) at proposed 640 MW Indira Sagar Pump Storage Scheme, NHDC Ltd., M.P.
    Client: NHDC Ltd., M.P | Role: Co-CI | FY 2025–26
15. Scientific Study of method of working, ultimate pit slope, dump slope and monitoring of slope stability, has been planned, designed and worked as per Coal Mines Regulations, 2017 of 106 and DGMS (Tech) Cir. No. 02/2020-Reg.
    Client: Sushee Chandugupt Coal Mine Private Limited, Ranchi | Role: CI | FY 2025–26
16. Scientific Study to Assess the Feasibility of Implementing Blast-Less Mining Technology and the Use of Surface Miner Near Existing Habitats.
    Client: RCCPL Pvt. Ltd., Kolkata | Role: CI | FY 2025–26
17. Scientific study to design an appropriate blasting methodology tailored to the site conditions ensuring minimal impact on the failure zone and overall slope stability at ROCP colliery, Bastacolla Area, BCCL.
    Client: BCCL, Dhanbad | Role: CI | FY 2025–26
18. Scientific Study and Diversion Proposal for Ekra Jore, Kumari Jore and Nagari Jore in Jharia Coalfield of BCCL.
    Client: BCCL, Dhanbad | Role: Co-CI | FY 2025–26
19. Scientific Study on Systematic Monitoring of Slopes and Ultimate Pit Slope of Brishyrnot Limestone Mine-II Deposit Mining Lease Area, 65.00 Ha. of Star Cement Limited.
    Client: M/s Star Cement Limited, Meghalaya | Role: CI | FY 2025–26
20. Scientific Study of Systematic Monitoring of Slopes, Dumps and the Ultimate Pit Slope of Star Cement Limited Mine.
    Client: M/s Star Cement Limited, Meghalaya | Role: CI | FY 2024–25
21. Monitoring of Controlled Blasting Methodology for Rock Dredging in the inner Harbour Channel near ORI, ORII, ORIII and Fertiliser Berth, Visakhapatnam Port Authority.
    Client: ITD Cementation India Ltd | Role: Co-CI | FY 2024–25
22. Scientific Study for controlled deep hole blasting and assessment of blast induced ground vibrations as per regulation 196(3) of CMR-2017 for Narayankuri Highwall Mining Project, Kunustoria Area, ECL of M/s Resurgent Mining Pvt. Limited.
    Client: M/s Resurgent Mining Solutions Pvt. Ltd., Asansol | Role: Co-CI | FY 2024–25
23. To conduct a Scientific Study to reduce fragmentation to increase the generation of fines in Bolani Ores Mines of M/s SAIL.
    Client: M/s Central Coordination (Mines), RSP SAIL | Role: Co-CI | FY 2024–25
24. Strata Monitoring and Analysis for Longwall Panels 13 and 14 at the Jhanjra Longwall Project.
    Client: M/s Coherent Mining Solutions Private Limited (CMSPL), Hyderabad | Role: CI | FY 2024–25
25. Monitoring of controlled blasting methodology for dismantling ORII concrete berth, Visakhapatnam Port Trust.
    Client: ITD Cementation India Ltd | Role: Co-CI | FY 2024–25
26. A Scientific Study on the Assessment of Impact of Mine Blasting Operations on Environmental Pollution and Important Structures of Chittorgarh Fort for Suggesting Suitable Remedial Measures.
    Client: M/s Birla Corporation Ltd., Kolkata | Role: Co-CI | FY 2023–24

PROFESSIONAL DEVELOPMENT PROGRAMMES & WORKSHOPS

Summary: Co-Coordinator of 12 executive development programmes and workshops for NHPC, Border Roads Organisation (BRO) and Hindustan Zinc Ltd..

1. Professional Development Program on Latest Tunnelling and Blasting Technologies (FND-DE 3) (2 batches).
   Client: NHPC Ltd | Role: Co-Coordinator | FY 2026–27
2. Professional Development Program on Controlled Blasting Management and Safety for Road Construction for BRO Young Officers.
   Client: Border Roads Organisation (BRO) | Role: Co-Coordinator | FY 2026–27
3. Professional Development Program on Tunnel Engineering for BRO Young Officers.
   Client: Border Roads Organisation (BRO) | Role: Co-Coordinator | FY 2026–27
4. Professional Development Program on Geotechnical Engineering in Mining for HZL Executives.
   Client: M/S Hindustan Zinc Ltd. Udaipur | Role: Co-Coordinator | FY 2026–27
5. Professional Development Program on Controlled Blasting at BRO Sites.
   Client: BRO, Govt. of India, New Delhi | Role: Co-Coordinator | FY 2025–26
6. Tunnelling Advancements in Difficult Grounds: Numerical Modelling and Machine Learning Approach TUNAID-2025.
   Client: Various | Role: Co-Coordinator | FY 2025–26
7. Professional Development Program on Advanced Controlled Blasting Techniques for tunneling.
   Client: NHPC, Faridabad, Haryana | Role: Co-Coordinator | FY 2025–26
8. Professional Development Program on Introduction of Latest Tunnelling Technique.
   Client: NHPC, Faridabad, Haryana | Role: Co-Coordinator | FY 2025–26
9. Professional Development Program on Controlled Blasting Management and Safety for Road Construction for BRO Young officers.
   Client: BRO, GOI, New Delhi | Role: Co-Coordinator | FY 2025–26
10. Professional Development Program of Controlled Blasting at BRO site.
    Client: BRO, GOI, New Delhi | Role: Co-Coordinator | FY 2024–25
11. Professional Development Program on Introduction of the Latest Tunneling Technique for NHPC Executives.
    Client: NHPC Ltd | Role: Co-Coordinator | FY 2024–25

PUBLICATIONS

1. Dondapati G.K., Deb D., Porter I., Karekal S. (2022). Improvement of strength–deformability behaviour of rock-like materials and coal using fibre-reinforced thin spray-on liner (FR-TSL). *Rock Mechanics and Rock Engineering* 55, 3997–4013. doi:10.1007/s00603-022-02825-8.
2. Dondapati G.K., Deb D., Porter I., Karekal S. (2023). Elasto-plastic damage and dilation analysis of fibre-reinforced thin spray-on liner-coated concrete and coal specimens under compressive loading. *57th US Rock Mechanics/Geomechanics Symposium (ARMA 2023)*, Atlanta. doi:10.56952/ARMA-2023-0259
3. Dondapati G.K., Deb D., Porter I., Karekal S. (2024). Reinforcement capabilities of a thin polymeric liner under flexural loading applied in hydrostone plaster beams. *EUROCK 2024*, Alicante. CRC Press. doi:10.1201/9781003429234-160.
4. Dondapati G.K., Deb D., Porter I., Karekal S. (2026). Performance evaluation of polymeric liner as surface support by simulating a field-size coal pillar in an underground mine. *Advances in Rock Mechanics—Infrastructure Development, Vol. 3 (ARMS 2024), Lecture Notes in Civil Engineering 785*, Springer. doi:10.1007/978-981-95-4247-5_28.

AWARDS & ACHIEVEMENTS

- All India Rank 94 in GATE-2013 (Mining Engineering)
- State First Rank in Andhra Pradesh ECET-2009 (Mining Engineering)

FUNDING

- University Postgraduate Award (UPA) - The University of Wollongong - AUD 26,682/Year (2017-2018)
- Institute research fellowship – IIT Kharagpur (2015-2020)
- Graduate fellowship by MHRD, Govt. of India during M.Tech (2013-2015)

TECHNICAL SKILLS

- Ansys, RS2/RS3, Abaqus - FEM software
- Slide - LEM software
- Python - data analysis

LANGUAGES

- English – Proficient (PTE-80); Telugu – Mother tongue; Hindi – Competent

MEMBERSHIP IN PROFESSIONAL ASSOCIATIONS

- International Society of Rock Mechanics (ISRM)
- Professional Engineer (PE) – Engineers Australia
- Tunnelling Association of India (TAI)
- The Australian Institute of Mining and Metallurgy (AusIMM) - (2017-2021)
- Convenor, Youth Research Forum (ISRM India)

REFERENCES

- **Prof. Debasis Deb** | Professor (HAG), Department of Mining Engineering, Indian Institute of Technology Kharagpur, India. Email: deb@iitkgp.ac.in
- **Prof. V.M.S.R. Murthy** | Director IIEST Shibpur, Professor (HAG), Department of Mining Engineering, IIT(ISM) Dhanbad, India. Email: vmsrmurthy@iitism.ac.in
- **Prof. Bhanwar Singh Choudhary** | Professor, Department of Mining Engineering, IIT(ISM) Dhanbad, India. Email: bhanwarschoudhary@iitism.ac.in
- **Dr Ian Porter** | Honorary Associate Professor, School of Civil, Mining and Environmental Engineering, Faculty of Engineering and Information Sciences, University of Wollongong, Australia. Email: ian_porter@uow.edu.au
- **Dr. Rama Krishna Morla** | Director, AU-Ventilation & Senior Mining Engineer – Ventilation & Projects, Genesis Minerals, Australia. Email: Ramakrishna.Morla@genesisminerals.com.au

(Gopi Krishna Dondapati)