Curriculum Vitae of Prof. Paresh Nath Singha Roy

Details of Education:
1994-1997: B.Sc. in Physics(Honours), Ramakrishna Mission Vidyamandira, Belur Math under University of Calcutta.
1997-2000: M. Sc. Tech. in Geophysics, Banaras Hindu University, Varanasi, INDIA
2000-2004: Ph.D in Geophysics, Banaras Hindu University, Varanasi, INDIA

Post-Doctoral Exposure/Job Experience
Senior Research Fellow of C.S.I.R continued till July 2005 in the Department of Geophysics, Banaras Hindu University, Varanasi, INDIA

Postdoctoral Fellow (BBS Project) during August 2005 – January 2006, I.I.T, Kharagpur, India.

Visiting Faculty, Department of Geology & Geophysics, I.I.T, Kharagpur, India from January 2006 – March 2007.

Assistant Professor, Department of Applied Geophysics, Indian School of Mines, Dhanbad from March 2007 – March 2010.

Associate Professor, Department of Applied Geophysics, Indian School of Mines, Dhanbad from March 2010 – 5 September 2016.

Associate Professor, Department of Applied Geophysics, IIT(ISM), Dhanbad from 6 September 2016 – 12 November 2017.

Professor, Department of Applied Geophysics, IIT(ISM), Dhanbad from 13 November 2017 – 25 May 2018.

Professor, Department of Geology and Geophysics, IIT, Kharagpur from 26 May 2018 – continued

Chairperson/Head of Deysarkar Centre of Excellence in Petroleum Engineering, Indian Institute of Technology, Kharagpur from 7 January 2023 – 6 January 2026

Specialization: Mathematical Geophysics, Borehole Geophysics and Geophysical Signal Processing.

Research Interest
- Application of fractals and chaotic dynamics in earth sciences
- Geophysical signal processing
- Pattern recognition in earth sciences & Earthquake forecasting
- Crustal deformation monitoring with Global Positioning System(GPS)
- Hydrocarbon Exploration
- Mining Hazard mapping and forecasting

Brief Research Activity:
Presently I am working on various Earth Sciences patterns with the motive of making better quantitative characterization for the different earth complex systems. The backbone of the above analysis is completely based on theoretical development supported with data for validation of related physics involved. I have tested for my algorithm for some of the destructive strong earthquake and they are published. I have claimed the robustness to forecast in order to make a better hazard estimation and better planning to mitigate economic and human life loss. Further to give a vortex to such claim we have carried out extensive GPS field work, where more conventionally acceptable GPS field data is collected to make better understanding of large earthquake potential.

I am carrying out microseismicity fractal pattern study for roof fall prediction for underground mines.

Presently I am going to lead a high value project titled "**Use of Microseismicity as a tool for underground mines hazard monitoring with the motive to enhance safety and production** "approved by Ministry of Coal for the amount **Rs199.78Lakhs** for two years along with CMPDI and ECL.

Presently I am also guiding to analyze seismic, well log and seismic data for making better automated quantitative heterogeneity analysis of reservoir using Fractals/AI/ML in order to fulfill the challenges of area with insufficient/deficit data or conventional technology.

I am also interested in carrying out microseismicity fractal pattern study for reservoir characterizations and also enhance oil recovery using microseismicity**.**

I have completed high value project (Rs1.39crore) approved by MoES for setting up GPS permanent network in Jharkhand and Bihar for understanding the crustal deformation pattern in Eastern Shield.

Fractal Analyzer Software developed and published in the reputed Electronic Column Seismological Research Letter (Seismological Society of America) (More than **1169 downloads by 65 countries globally**, for details please see https://sourceforge.net/projects/fractalanalyzer/

Awards/Honours

Journal of Geodynamics, 41, 385-399 (2006) article is selected as one of the ***'Science Direct TOP25 Hottest Articles'*** in that journal. (2006).

Awarded Junior Associate of The Abdus Salam International Centre of Theoretical Physics" (ICTP), Trieste, Italy (The awards allow visiting ICTP thrice for 42-90 days three times during 2007-2014 period with full support and return fare. ICTP Library donates book of 400Euros every year on placing the request.)

Awarded Regular Associate of The Abdus Salam International Centre of Theoretical Physics" (ICTP), Trieste, Italy(The awards allow visiting ICTP thrice for 30-60 days three times during 2017-2022 period with full support and return fare.

SEG(USA) DISC MEMBER

Membership

- LIFE: Indian Society of Earthquake Technology,IIT, ROORKEE (2001).
- LIFE: Association of Exploration Geophysicist, India(2006)
- LIFE: Indian Society of Earthquake Science (ISES), Gandhinagar, Gujarat, India. (2010)
- LIFE: Indian Science Congress, Kolkata, India. (2010)
- LIFE: Geological Society of India, Bangalore, India. (2021)
- LIFE: Indian Geophysical Union, NGRI, Hyderbad, India. (2023)
- YEARLY(Active): Society of Exploration Geophysicists, Tulsa, OK (2007-contd.).
- YEARLY: American Geophysical Union, USA (2011-contd).
- YEARLY: American Geological Society of America, USA (2011).
- YEARLY: Seismological Society of America, USA (2012-contd.).
- YEARLY: European Association of Geoscientist and Engineers, Europe (2019-contd.).
- FELLOW: Indian Social Science Academy (2022 – contd)

Ongoing and completed Research Project

- Evaluation of the Carbon Sequestration Potential of the Indian Basalt rocks via Mienralization (Koyna Warna region): Providing Field Recommendations for conducting a CO2 Geo-storage(MoES), Rs53.74Lakhs.PI- Dr Sandeep Kulkarni, Co- Principal Investigator(PI): Prof. P. N. Singha Roy, Prof Vishnu C Nair, Prof Aditya Vyas, Prof K Pruseth(Ongoing)

- Use of microseismicity as a tool for underground mines hazard monitoring with the motive to enhance safety and production (CMPDI, Ranchi- Ministry of Coal S & T project),

Rs199.78Lakh (Including 55.55 Lakhs of CMPDI, Ranchi); Principal Investigator(PI): Prof. P. N. Singha Roy (Completed)

- Seismic Hazard Monitoring for North Bihar due to neighbouring Nepal Himalaya: Using GPS Strain, and Seismicity, (MoES)Rs62.99Lakh; Principal Investigator(PI): Prof. P. N. Singha Roy; Co-PI Dr Probal Sengupta (Completed)

- Subsidence hazard estimation for Raniganj - Asansol area: using GPS strain (ISIRD), Rs27.70Lakh; Principal Investigator(PI): Prof. P. N. Singha Roy (Ongoing)

- Seismic Hazard Estimation for Bihar-Jharkhand Using GPS strain, seismicity and seismic study(MoES), Rs. 139.786 Lakh; Principal Investigator(PI): Dr. P. N. Singha Roy; Co-PI Dr S. K. Pal(Completed)

NB: This project was carried out in remote place in Bihar and covers very wide region in Bihar-Jharkhand, which has beginning from Ranchi to Bihar Nepal border.

- Geotechnical characterization of Jharia Coal Field Area Using Geophysical Techniques (DST), Rs. 31.59 Lakh; Principal Investigator(PI):Dr S. K. Pal; Co-PI P. N. Singha Roy (Completed)

- Setting up, operation and Maintenance of GPS Station at Indian School of mines (MoES), Rs. 8.34 Lakh; Principal Investigator: Dr. P. K. Khan; Co-PI: P. N. Singha Roy (Completed)

- Evaluation of large earthquake potential in North West Himalayan Fault Zone using GPS strain and seismicity analysis (DST(Now MOES), Rs. 39.65 Lakhs) PI: Dr PARESH NATH SINGHA ROY Co-PI Dr V. K. Srivastava; (Completed).

NB: This project was carried out in difficult terrain (went up to height of 4,500m from MSL) of Kumaon Himalaya.

- A case study on seismic hazard assessment using fractal approach for the Dhanbad and adjoining areas (ISMU, Minor Reserch Project, Rs. 0.30 Lakhs) PI: Dr PARESH NATH SINGHA ROY; (Completed).

List of Publications

In Referred Journal (Couple of Papers accepted, submitted in SCI/Thomson Reuter Journals are not included in this list-which are under review)

1. Paper entitled "Fractal Dimensions of Blocks Using A Box Counting Technique for the 2001 Bhuj earthquake, Gujarat, India" By Avadh Ram and P.N.S.Roy in **Pure and Applied Geophysics (PAGEOPH)** Journal,**(2005), 162, 531-548(Springer Publication).**

2. Paper entitled "A Correlation Integral Approach to Understand the Cause of January 26, 2001 Bhuj earthquake, Gujarat, India" By P.N.S.Roy and Avadh Ram in **Journal of Geodynamics (2006), 41, 385-399**(Elsevier Publication).

3. Paper entitled "Multifractal analysis of earthquakes in the southeastern Iran-Bam region," By P.N.S.Roy and Ami Padhi in **Pure and Applied Geophysics (PAGEOPH)** Journal,**(2007), 167, 2271-2290(Springer Publication)**.

4. Paper entitled "Precursory correlation dimensions for three great earthquakes" By P.N.S.Roy and Sankar K. Nath in **Current Science (2007), 93(11), 1522-1529**.

5. Paper entitled "Fractal nature of earthquake occurrence in northwest Himalayan Region" By P.N.S.Roy and Saroj K. Mondal in **J. Ind. Geophys. Union (April 2009),13(2), 63-68**.

6. Paper entitled "Fractal Approach: Quantification of Seismicity in South Central Tibet" By H. Paudyal and P.N.S.Roy in **Bibechana(**ISSN:2091-0762-Online) **(2012), 8, 116-126**.
   <DOI: http://dx.doi.org/10.3126/bibechana.v8i0.5699>

7. Paper entitled "Identification of active seismicity by fractal analysis for understanding the recent Geodynamics of Central Himalaya" By P.N.S.Roy and Saroj K. Mondal in **Journal of Geological Society of India(Springer Publication) (2012),79,353-360**.

8. Paper entitled "Fractal and Multifractal study of earthquakes for analysis of stress pattern in Kumaun Himalaya and its surrounding region" By P.N.S.Roy and Saroj K. Mondal in **Journal of Earth System Sciences (Springer Publication) (2012),121(4),1033-1047.**

9. Paper entitled "Seismic Hazards Assessment of Kumaun Himalaya and adjacent region" By P.N.S.Roy and Saroj K. Mondal in **Natural Hazards(Springer Publication)(2012),64:283-297.**

10. Gupta, D., Bhowmick, D., and **Roy, P. N. S.** 2015. Himalayan hazard study on the basis of stress and strain state of 1991 Uttarkashi earthquake using Coulomb stress transfer model. **Journal of Geomatics, Natural Hazards and Risk**, **6(2),** 131-148(Taylor & Francis SCI Publication; <**DOI:10.1080/19475705.2013.820797>**

11. Naresh Kumar, Dilip K. Yadav,S. K. Mondal&**P. N. S. Roy.** 2014.Stress drop and its relation to tectonic and structural elements for the meizoseismal region of great 1905 Kangra earthquake of the NW Himalaya, **69, 2021-2038Nat Hazards<DOI 10.1007/s11069-013-0793-9>**

12. **Roy, P. N. S.**, Chowdhury, Suparna,Sarkar,Partha,Mondal, S.K. 2015. Fractal study of Seismicity in order to characterize the various tectonic block of North East Himalaya. **Nat. Hazards.(Springer Publication)**,77:S5-S18 (DOI: 10.1007/s11069-014-1188-2)

13. **Roy, P.N.S.**, Gupta, D.K., 2015, Fractal analyzer: A MATLAB application for multifractal seismicity analysis, Seismological Research Letters,86(5):1-8. <DOI: **10.1785/0220150013> Online**

14. Mondal, S.K., Borghi, A., **Roy, P.N.S**., Aoudia, A., 2015, GPS, scaling exponent and past seismicity for seismic hazard assessment in Garhwal and Kumaun Himalayan region, **Nat Hazards**80 (2), 1349-1367**.(Springer Publication)**.

15. Chingtham, P., Yadav, R.B.S., Chopra, S., Yadav, A.K., Gupta, A.K., **Roy, P.N.S.**,2015 Time-dependent seismicity analysis in the Northwest Himalaya and its adjoining regions, **Nat Hazards,** 80 (3), 1783-1800**.(Springer Publication)**,<DOI: 10.1007/s11069-015-2031-0>Online

16. B Mukherjee, V Srivardhan, **PNS Roy**,2016,Identification of formation interfaces by using wavelet and Fourier transforms, Journal of Applied Geophysics 128, 140-149(Elsevier Publication)

17. A Kumar, **PNS Roy**, LK Das, 2016, Vertical density contrast and mapping of basement, Conrad and Moho morphologies through 2D spectral analysis of gravity data in and around Odisha, India, Journal of Asian Earth Sciences, doi:10.1016/j.jseaes.2016.05.002,124,181-190. (Elsevier Publication)

18. VKG Rajeev Kumar Yadav, **P.N.S. Roy**, Sandeep Kumar Gupta, P.K. Khan, J.K. Catherine, Sanjay K. Prajapati, Amit Kumar, N. Puviarasan, Harsh Bhu, M. Devachandra, Javed Malik, BhaskarKundu, ChandraniDebbarma, 2017, Rupture model of Mw 7.8 2015 Gorkha, Nepal earthquake: Constraints from GPS measurements of coseismic offsets, Journal of Asian Earth Sciences, doi.org/10.1016/j.jseaes.2016.04.015,133,56-61. (Elsevier Publication)

19. B Mukherjee and P. N. S. Roy, 2016, Comparative study of unconventional tools in reservoir characterisation. A case study from Bhogpara, N-E, India, Journal of Geophysics,XXXVII(2), 65-75.

20. Mondal, S.K., **Roy, P.N.S.** 2016, Temporal multifractal pattern of seismicity in Northwest Himalayan region, Journal of Geological Society of India(Springer Publication) (2016)(Vol 88.

21. Chingtham, P., Sharma, Babita, Chopra, S., **Roy, P.N.S.,2016** Statistical analysis of aftershock sequences related with two major Nepal earthquakes: April 25, 2015, *MW* 7.8, and May 12, 2015, *MW* 7.2,Annals of Geophysics,59 (5),S0540,1-16**.**, c

22. JK Catherine, DU Maheshwari, VK Gahalaut, **PNS Roy**, PK Khan, N Puviarasan, **2017**. Ionospheric disturbances triggered by the 25 April, 2015 M7. 8 Gorkha earthquake, Nepal: Constraints from GPS TEC measurements, Journal of Asian Earth Sciences,133,80-88. (Elsevier Publication)

23. Mondal, Debjeet, **Roy, P.N.S.,** Behera P. K.**2017**,Use of Correlation Fractal Dimension signatures for understanding the Overlying Strata Dynamics in Longwall Coal Mines, **International Journal of Rock Mechanics and Mining Sciences**(Elsevier Publication),91,210-221.

24. Pandey Auchitya, Singh Chingtham, P., **Roy, P.N.S**.,**2017**, Homogeneous earthquake catalogue for Northeast region of India using robust statistical approaches, **Geomatics, Natural Hazards and Risk**, 1-15,s0540-16. <DOI: https://doi.org/10.1080/19475705.2017.1369168> Online

25. Singh Chingtham, P.,Sanjay K. Prajapati, Vineet K. Gahalaut, Sumer Chopra,**Roy, P.N.S**.,**2017**, Forecasting seismicity rate in the north-west Himalaya using rate and state dependent friction law, **Geomatics, Natural Hazards and Risk**, <DOI: doi/full/10.1080/19475705.2017.1345794>Online

26. B Mukherjee, **PNS Roy**,**2017**, Fractal analysis of logs to characterize the hydrocarbon and non-hydrocarbon zones of Bhogpara oil field, Northeast India", Arabian Journal of Geosciences<DOI: 10.1007/s12517-017-3282-8> (Springer Publication)

27. B Mukherjee, **PNS Roy**,**2018**, "Characterization of the hydrocarbon potential and non-potential zones using wavelet-based fractal analysis", Fractals **26**, 1850001 [13 pages] https://doi.org/10.1142/S0218348X18500019 (World Scientific Publication)

28. Rakesh Kumar Mishra, **P N S Roy**, Virendra Kumar Singh, Jai Krishna Pandey, **2018**, Detection and delineation of coal mine fire in Jharia coal field, India using geophysical approach: A case study, **Journal of Earth System Sciences**, 127:107< https://doi.org/10.1007/s12040-018-1010-8> (Springer Publication)

29. Rakesh Kumar Mishra, **P N S Roy**, Virendra Kumar Singh, Jai Krishna Pandey, **2018**, Detection and delineation of coal mine fire in Jharia coal field, India using geophysical approach: A case study, **Journal of Earth System Sciences**, 127:107 https://doi.org/10.1007/s12040-018-1010-8 (Springer Publication)

30. Jyoti Sharma, M. Ravi Kumar, Ketan Singha Roy, **P. N. S. Roy**, **2018**, Seismic Imprints of Plume-Lithosphere Interaction Beneath the Northwestern Deccan Volcanic Province, **Journal of Geophysical Research(Solid Earth)**, < https://doi.org/10.1029/2018JB015947> (AGU-Wiley Publication)

31. Auchitya Kumar Pandey, **P. N. S. Roy**, P. R. Baidya, A. K. Gupta, **2018**, Estimation of current seismic hazard using Nakamura technique for the Northeast India, **Natural Hazards**, 93(2), 1013-1027< https://doi.org/10.1007/s11069-018-3338-4> (Springer Publication)

32. A Kumar, LK Das, **PNS Roy**, AK Singh, **2019**, Prognosticating buried potential mineral deposits in virgin areas of Odisha and adjoining regions, India, using 3D Euler's deconvolution technique on gravity data for detailed exploration in future, **Ore Geology Reviews** 104, 373-383< https://doi.org/10.1016/j.oregeorev.2018.11.014> (Elsevier Publication).

33. Auchitya KumarPandey, Prasanta Chingtham, Sanjay K.Prajapati, P.N.S.Roy, A.K.Gupta, **2019**, Recent seismicity rate forecast for North East India: An approach based on rate state friction law, **Journal of Asian Earth Sciences , 174,167-176** < https://doi.org/10.1016/j.jseaes.2018.12.004> (Elsevier Publication).

34. Mondal, Debjeet, **P.N.S. Roy, .2019**, Fractal and seismic b-value study during dynamic roof displacements (roof fall and surface blasting) for enhancing safety in the longwall coal mines, **Engineering Geology**, (Elsevier Publication), 253,184-204.

< https://doi.org/10.1016/j.enggeo.2019.03.018>

35. Mondal, S.K., **P.N.S. Roy,** J.K. Catherine, A. K. Pandey, **2019**,Significance of fractal correlation dimension and seismic b-value variation due to 15th July 2009, New Zealand earthquake of Mw 7.8, **Annals of Geophysics**(INGV Publication), 62, 1-31 Accepted(Online).< Doi: 10.4401/ag-8020>

36. Swain, Sagar, **P.N.S. Roy,** Bappa Mukherjee, R. H. Sawkar.**2019**, Fractal dimension and its translation into a model of gold spatial proxy, **Ore Geology Review**, (Elsevier Publication), Accepted (Online)110(2019), 102935. < https://doi.org/10.1016/j.oregeorev.2019.102935>

37. Sandeep Kumar Gupta, **P.N.S. Roy**, Rajeev Kumar Yadav, , J.K. Catherine, Roland Burgmann, Vineet K Gahalaut **2019**, Anomalous transients in GPS measurements due to induced changes in local site conditions, **Journal of Earth System Sciences**, 128:186, 1-7 https://doi.org/10.1007/s12040-019-1213-7 (Springer Publication).

38. Rakesh Kumar Mishra, Jai Krishna Pandey, Jitendra Pandey, Sumit Kumar, **Paresh Nath Singha Roy**, **2019**, Detection and Analysis of Coal Fire in Jharia Coalfield (JCF) Using Landsat Remote Sensing Data, **Journal of the Indian Society of Remote Sensing**, https://doi.org/10.1007/s12524-019-01067-6(Springer Publication).

39. Binay Kumar Singh, Debjeet Mondal, Mohd Shahid, Amit Saxena, **Paresh Nath Singha Roy**, **2019**, Application of digital image analysis for monitoring the behavior of factors that c control the rock fragmentation in opencast bench blasting: A case study conducted over four opencast coal mines of the Talcher Coalfields, India, **Journal of Sustainable Mining**, 18, 247 - 256. https://doi.org/10.1016/j.jsm.2019.08.003(Elsevier Publication)

40. Mamuni Sucheeta Ekka, Vandana, P.N.S. Roy,O. P. Mishra, **2020**, Coda wave seismic structure beneath the Indian Ocean region and its implications to seismotectonics and structural heterogeneity, Journal of Asian Earth Sciences, 18, 104104, 1-29. https://doi.org/10.1016/j.jseaes.2019.104104(Elsevier Publication)

41. Mukherjee, B., Roy, P.N.S. & Sain, K. Delineation of hydrocarbon and non-hydrocarbon zones using fractal analysis of well-log data from Bhogpara oil field, NE India. Carbonates Evaporites 35, 22 (2020). https://doi.org/10.1007/s13146-020-00556-x

42. PARTHA SARKAR, P N S ROY, and SANJIT KUMAR PAL, Rejuvenation of 'pop-up' tectonics for Shillong Plateau in NE Himalayan region, J. Earth Syst. Sci. (2020) 129:123 https://doi.org/10.1007/s12040-020-01389-x

43 Debjeet Mondal, P.N.S. Roy, Manoj Kumar, Monitoring the strata behavior in the Destressed Zone of a shallow Indian longwall panel with hard sandstone cover using Mine-Microseismicity and Borehole Televiewer data, Engineering Geology(2020), 271,105593,https://doi.org/10.1016/j.enggeo.2020.105593.

44. Telluri Ramakrushna Reddy, Pawan Dewangan, Prasad Kumar Bhaskaran, Paresh Nath Singha Roy; Possible Linkages between Microseisms in the Andaman-Nicobar Region and Swells in the South Indian Ocean. Seismological Research Letters 2020; 92 (2A): 1052–1068. <doi: https://doi.org/10.1785/0220200193>

45. Suresh Kannaujiya, Param K. Gautam, Prashant K. Champati ray, Prakash Chauhan, Paresh Nath Singha Roy, Sanjit Kumar Pal, Ajay K. Taloor, Contribution of seasonal hydrological loading in the variation of seismicity and geodetic deformation in Garhwal region of Northwest Himalaya, Quaternary International (2021) 575–576,62-71,ISSN 1040-6182, https://doi.org/10.1016/j.quaint.2020.04.049

46. Jyoti Sharma, M. Ravi Kumar, Ketan Singha Roy, S. K. Pal, P. N. S. Roy, Low-Velocity Zones and Negative Radial Anisotropy Beneath the Plume Perturbed Northwestern Deccan Volcanic Province,(2021),JGR Solid Earth,126(1) https://doi.org/10.1029/2020JB020295

47. Somak Hajra, Devajit Hazarika, Naresh Kumar, Sanjit K. Pal, P.N.S. Roy, Seismotectonics and stress perspective of the Kumaon Himalaya: A Geophysical evidence of a Lesser Himalayan duplex, Tectonophysics(2021),806,228801,ISSN 0040-1951, https://doi.org/10.1016/j.tecto.2021.228801.

48. Karmanov, P., Roy, P.N.S., Rangarajan, S. *et al.* Automated seismic horizon recognition from seismic data using correlation exponent and its double derivative: a case study of Parihaka field, Offshore Taranaki Basin, New Zealand. Mar Geophys Res 42, 37 (2021). https://doi.org/10.1007/s11001-021-09462-w

49. Sandeep K. Gupta, P.N.S. Roy, S.K. Pal, Scale invariance behavior for pre and post-2015 Nepal Gorkha earthquake GPS time series based on fractal analysis, Chaos, Solitons & Fractals,(2021), 152, 111341,ISSN 0960-0779, https://doi.org/10.1016/j.chaos.2021.111341

50. Suresh Kannaujiya, Rajeev K. Yadav, Prashant K. Champati ray, Tandrila Sarkar, Gopal Sharma, Prakash Chauhan, Sanjit K. Pal, Paresh N.S. Roy, Param K. Gautam, Ajay K. Taloor, Abhishek Yadav(2022), Unraveling seismic hazard by estimating prolonged crustal strain buildup in Kumaun-Garhwal, Northwest Himalaya using GPS measurements, Journal of Asian Earth Sciences, 223,104993,ISSN 1367-9120, https://doi.org/10.1016/j.jseaes.2021.104993

51. Somak Hajra, Devajit Hazarika, S Mondal, Sanjit K. Pal, P.N.S. Roy(2022), Deformation of the upper crust in the Kumaon Himalaya analyzed from seismic anisotropy and gravity lineament studies, Physics of the Earth and Planetary Interiors, 322, 106827, ISSN 0031-9201, https://doi.org/10.1016/j.pepi.2021.106827

52. Mamuni Sucheeta Ekka, Soumyashree Debasis Sahoo, Sanjit Kumar Pal, Paresh N. Singha Roy & Om Prakash Mishra (2022) Comparative analysis of the structural pattern over the Indian Ocean basins using EIGEN6C4 Bouguer gravity data, Geocarto International, https://doi.org/10.1080/10106049.2022.2087748 .

53. Haritha Chandriyan, Ramakrushna Reddy, P.N.S. Roy (2022), Numerical precursory study on strong earthquakes in southern and Baja California, Geosystems and Geoenvironment, Volume 1, Issue 3, 2022,100066,ISSN 2772- 8838, https://doi.org/10.1016/j.geogeo.2022.100066

54. Partha Sarkar, Subhendu Mondal, Sanjit Kumar Pal, P.N.S. Roy, Soumyashree Debases Sahoo, Andhika Widyadwatmaja, Sandeep Gupta, Arun Gupta, New insights on the tectonic framework using EIGEN6C4 gravity data, seismicity, and finite element stress analysis: An attempt to map earthquake vulnerable zones in parts of North-East India and surroundings, Physics and Chemistry of the Earth, Parts A/B/C,Volume 127,2022,103195,ISSN 1474-7065,https://doi.org/10.1016/j.pce.2022.103195. https://www.sciencedirect.com/science/article/pii/S1474706522000882

55. Debjeet Mondal, P.N.S. Roy, Manoj Kumar, Roof fall threat analysis using fractal pattern recognition and neural network over mine microseismicity in a Central Indian longwall panel overlain by massive sandstone roof, Geosystems and Geoenvironment,Volume 2, Issue 1,2023,100138,ISSN 2772-8838,https://doi.org/10.1016/j.geogeo.2022.100138. https://www.sciencedirect.com/science/article/pii/S2772883822001133

56. Tejaswini Mangalagiri, Haritha Chandriyan, Paresh Nath Singha Roy; Fractal Seismicity and Coulomb Stress Pattern Analysis for 7 January 2020 Mw 6.4 Puerto Rico Earthquake. *Seismological Research Letters* 2023;94(1), 66-74. doi: https://doi.org/10.1785/0220220031

57. Hao Liu, Bappa Mukherjee, Yujun Zuo, P.N.S. Roy, Zhonghu Wu, Wenjibin Sun, Lulin Zheng, Chao Pan, Jianyun Lin, Fractal dimension used as a proxy to understand the spatial distribution for carlin-type gold deposits, Ore Geology Reviews,Volume 158,2023,105534,ISSN 0169-1368,https://doi.org/10.1016/j.oregeorev.2023.105534 . (https://www.sciencedirect.com/science/article/pii/S0169136823002500)

58. Haritha Chandriyan, Paresh Nath Singha Roy; Tectonic Duets: Self-Similar Approach to Investigate Eastern Anatolian Fault's Recent Seismicity, with Special Emphasis on the 6 February 2023 Earthquake Doublet. Seismological Research Letters 2024; 95 (2A): 626–642. doi: https://doi.org/10.1785/0220230341

59. Karmanov, Pavel., P.N.S. Roy, Ramakrushna Reddy, Introduction of new attributes: Scaling Exponent and its double derivatives for better land seismic volume interpretation, Journal of Applied Geophysics, Volume 221, 2024,105279,ISSN 0926-9851, https://doi.org/10.1016/j.jappgeo.2023.105279 . (https://www.sciencedirect.com/science/article/pii/S0926985123003579)

60. Ghosh, D., Kumar, A., Yadav, A. K., Kannaujiya, S., & Roy, P. N. S. (2024). Surface deformation monitoring of Raniganj coalfield, India, using advanced InSAR and DGPS. Geomatics, Natural Hazards and Risk, 15(1). https://doi.org/10.1080/19475705.2024.2375546

61. Chandriyan, H., Reddy, T.R. & Roy, P.N.S. Decoding self-similar earthquake patterns and static stress: a study on major California earthquakes. Nat Hazards, 121, 2825-2848 (2025). https://doi.org/10.1007/s11069-024-06899-1

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63. Gyanasmita Pradhan, Ramakrushna Reddy, Paresh Nath Singha Roy, Characterization of microseism noise sources in Indian Ocean due to ocean atmospheric dynamics, Geosystems and Geoenvironment,Volume 3, Issue 1, 2024,100220,ISSN 2772-8838, https://doi.org/10.1016/j.geogeo.2023.100220. (https://www.sciencedirect.com/science/article/pii/S2772883823000432)

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In Symposia/Workshop/Seminar Volume

1. Paresh Nath Singha Roy, Radhika Gupta, 2025. Delivered Poster on "Application of fractals in detecting unconformities within depositional sequences of the Krishna-Godavari basin", 15th Biennial International Conference SPG 2025: ROCK TO CLOUD: GEO EXPLORATION EMPOWERING ENERGY EVOLUTION, Jaipur, India (26-28, October, 2025).

2. Paresh Nath Singha Roy, Hrishabh Kumar Saini, Abhishek Kumar Yadav, Investigation of Ionospheric Total Electron Content anomalies as Potential Precursors to the Mw 5.8 Lone Pine, California Earthquake, IUGG-IASPEI/IAGA, Lisbon Portugal, August 30 to September 5, 2025.

3. **Roy, P. N. S.**, and Gupta, Sandeep Kumar : Self-similar behaviour for the pre and post-strong Nepal earthquake geodetic GNSS time series based on fractal scale-invariance analysis, 8th Annual Convention AES 2024, In: Advances in Earthquake Sciences entitled 'Natural Hazards and Build Better for risk mitigation', March 27-29, 2024 at CSIR-CBRI Roorkee, Uttarakhand, India.

4. Haritha Chandriyan and Roy, P. N. S.: A retrospective analysis of earthquakes in the North American plate using fractal characteristics and static stress distribution, International conference organized by JPGU (Japan Geoscience Union) on 21-26 May 2023, Chiba, Japan.

5. Haritha Chandriyan and Roy, P. N. S.: Pattern identification of strong earthquakes in North American- Puerto Rico region through Correlation fractal dimension and Coulomb stress, EGU General Assembly 2023, **Vienna, Austria, 23–28 April 2028, EGU23-19**

6. Tejaswani Mangalagiri and Roy, P. N. S.: New Insights Into the 2019 Puerto Rico Sequence - a Combined Study Based on Correlation Fractal Dimension and Static Stress Changes, Seismological Society of America Annual Meet, Puerto Rico, USA by on 18 April 2023.

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8. Pandey, A. K., Chingtham, P., and Roy, P. N. S.: Physics Based Seismicity Rate Computation For Northeast Himalaya, India, EGU General Assembly 2022, **Vienna, Austria, 23–27 May 2022, EGU22-9029**, https://doi.org/10.5194/egusphere-egu22-9029, 2022 .

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10. Somak Hajra, Devajit Hazarika Meena Bankhwal, Naresh Kumar, Sanjit K. Pal, **P.N.S. Roy**, 2018, AVERAGE CRUSTAL THICKNESS AND POISSON'S RATIO BENEATH A BROADBAND SEISMOLOGICAL PROFILE ALONG KALI RIVER VALLEY, KUMAON HIMALAYA, **AGU Fall meeting 2018**

11. Mondal, D., **Roy, P.N.S.,** Behera, P.K., 2018. **Application of Neural Network for identification of Stressed Zones within Under Ground Mines**. EXOCMING 2018, In: the International Seminar & Exhibition entitled 'Exploration of Oil, Gas, Coal, Minerals and Ground Water: Modern Techniques & Appliances', February 7-9, 2018 at Kolkata, West Bengal, India. 2018.

12. Mondal, D., **Roy, P.N.S.,**Behera, P.K., 2017. Application of Correlation Integral and Fractal dimension in Longwall Mine Safety. In: 79th EAGE Conference and Exhibition, 2017 (Extended Abstracts).

13. Sharma, Jyoti, Kumar, Ravi M., Singha Roy, Krtan, and **Roy, P. N. S.** 2016. Lithospheric Structure BeneathNorthwestern Deccan Volcanic Province from Rayleigh Wave Group Velocity Tomography. 1st Triennial Congress FIGA, 53rd IGU-2016, 34th AHI held at IIT(ISM), Dhanbad, India during8-10 November, 2016.

14. Ekka, M. S., **Roy, P. N. S.,**O P Mishra, and Vikas Kumar2016. Review of existing Seismic Structure beneath the Indian Ocean and preliminary estimate with new data is reported for its Seismogenic potential. 1st Triennial Congress FIGA, 53rd IGU-2016, 34th AHI held at IIT(ISM), Dhanbad, India during8-10 November, 2016.

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17. **Roy, P. N. S.** 2016. The precursory seismicity study for the May 12, 2008, Sichuan Earthquake: Using FRACTAL ANALYZER MATLAB based software" was delivered for the AOGS Meeting Beijing, China held during 1st August 2016 – 7th August 2016.

18. Pandey, Auchitya and **Roy, P. N. S.** 2015. Site Characterization of the North-East Region of India using H/V Technique on Earthquake Data. 52nd IGU-2015 held at NCAOR, Goa, India during3-5 November, 2015.

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22. **Roy, P. N. S.** 2014. Seismicity of the eastern Himalaya. IGC-2014 (19th Convention of IGC and Int. Conf.,)held at Itanagar, Arunachal Pradesh duringNov. 27-29, 2014.

23. **Roy, P. N. S.**andBhadauria, Nitesh. 2014. Detection of the Statistical precursor from Spatio-temporal pattern of earthquakes in the Eastern Indonesia Banda Sea region. 3rd Annual Convention"Earthquake Science – The Future Challenges"with Special theme on "Seismic Microzonation and Hazard Assessment" AES-2014 held at ISR, Gandhinagar, Gujarat, India during 04 - 06 January, 2014.

24. **Roy, P.N.S.** and Bhattacharjee, Raj. 2013. Phase Detection of Seismograms Using Fractal Dimension, Abstract Volume of AGM of GSI &International Conference on Future challenges in Earth Sciences for Energy & Mineral Resources ESEMR-2013 held at ISM, Dhanbad during 14th November'13 – 16th November'13.

25. **Roy, P.N.S.** and Bhattacharjee, Raj. 2013. Phase Detection of Seismograms Using Fractal Dimension, Abstract Volume of AGM of GSI &International Conference on Future challenges in Earth Sciences for Energy & Mineral Resources ESEMR-2013 held at ISM, Dhanbad during 14th November'13 – 16th November'13.

26. Paper entitled "Correlation fractal dimension approach for estimating temporal and spatial pattern of seismicity in the Himalayan region." presented at by P.N.S.Roy& S. K. Mondal" in the Abstract volume of **2012 Annual Meeting of Seismological Society of America held at Sandiego,California,USA** during 17th April'12 – 19th April'12.

27. Paper entitled "Identification of Seismicity Pattern for Some Destructive Earthquakes"by P.N.S.Roy& S. K. Mondal" in the proceedings of **AGU Chapman Conference** on

"Complexity and extreme events in Geosciences" held in Hyderabad, during 15-19 February, 2010.

28. Paper entitled "Multifractal perspective of the active seismicity in Northwest Himalayan Region" by P.N.S.Roy& S. K. Mondal" in the proceedings of 5th International Conference on Fractals and Dynamic Systems in Geoscience held at **Townsville, Australia**, during 13th August'09 – 14th August'09.

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33. Paper entitled "Study of Fractal Geometry With Reference To The Tectonics Of Kachchh Region in Gujarat,India" in the proceedings of **International Workshop** on "Earth System processes Related To Gujarat Earthquake Using Space Technology" held at I.I.T, Kanpur, India during January 27 – January 29, 2003.

34. Paper entitled " Analysis of Bhuj earthquake of January 26, 2001 Using Fractal Statistics" in the proceedings of **International Conference** on " Managing Seismic Risk in Developing Countries (MSRDC – 2004)", 2004 held at Disaster Management Institute, Bhopal, India, during 17th – 19th March, 2004.

35. Paper entitled **"**Spatio-temporal seismicity pattern in the Hindu Kush,Pamir and Karakorum region prior to October 8, 005 Muuzaffarabad earthquake" :Extended Abstract, by P. N. S. roy and V. K. Srivastava,National Seminar MTGST, ISMU, Dhnabad,44-49, during 12th – 14th November,2007.

36. Paper entitled "Identification of clustering pattern of seismicity around the vicinity of West Nerpal" byRoy. P. N. S. and Mondal. S. K., Proc. National workshop on Seismogenesis to PREDiction of earthquakes: Himalaya and Indian Shield Perspectives [SPRED 2009] held during Oct 22-24,2009. at Wadia Institute of Himalayan Geology, Dehradun.

37. Paper entitled "Seismic Hazard assessment of Kumaun Himalayan Region using Fractal dimension of the past Earthquake sequence", by P.N.S.Roy and S.K.Mondal held during , 4-6 November2009, **2nd India Disaster Management Congress** ,VigyanBhavan, New Delhi.

38. Paper entitled “A fractal perspective toward understanding the precursory phenomena leading to the 12th May, 2008 Sichuan earthquake” by VibhuGautam, P. N. S. Roy and Saroj K Mondal: National Seminar on “Recent Advances in theoretical and Applied Seismology”, Department of Applied Mathematics, March 27-28, 2009, ISMU, Dhnabad,Pg. 1.

39. Paper entitled “Development of convolution model for multiple generations and corresponding filter design for its removal” by P. N. S. Roy and Hari Om Singh.: National Seminar on “Drills & Drilling-An update”, Department of Mechanical Engg. & Mining Machinery Engg., Sept. 23-24, 2010, ISM, Dhnabad,Pg. 177.

Other conference papers and journal paper details can be seen from Google Scholar link given < https://scholar.google.co.in/citations?user=FVc5mWoAAAAJ&hl=en>

Book Published

1. P.N.S.Roy	Application of Nonlinear Geophysics for 2001Bhuj Earthquake,INDIA	Book Publisher:LAP **ISBN-10:** 3846546607	ISBN-13: 978-3-8465-4660-4	138	2011
2. Tandrila Sarkar, Abhishek Kumar Yadav, Suresh Kannaujiya, Paresh NS Roy, Charan Chaganti,(2022)	**Book Chapter Contributions:** Earth's Crust and its Evolution-From Pangea to the Present Continents, Editors: Dr. Mualla Cengiz and Dr. Savas Karabulut, Chapter: Unveiling the Evolution Journey from Pangea to Present Himalayan Orogeny with Relation to Seismic Hazard Assessment	Book Publisher: Intech open Publisher, London, UK, https://www.intechopen.com/chapters/80669	DOI: 10.5772/intechopen.102683	Online-web	2022
3. Debjeet Mondal, P.N.S Roy, Manoj Kumar	**Book Chapter Contributions:** Recent Developments in Using Seismic Waves as a Probe for Subsurface Investigations Theory and Practices Edited By Rajib Biswas	Book Publisher: CRC, taylor and Francis Group	DOI https://doi.org/10.1201/9781003177692	74 Pages 215-288	September 2022

	Chapter 10: Seismicity pattern during violent roof movements in longwall mines				

Seminar Delivered /Poster Presented

1. **Paresh Nath Singha Roy**, 2025. Delivered Poster on "Application of fractals in detecting unconformities within depositional sequences of the Krishna-Godavari basin", 15th Biennial International Conference SPG 2025: ROCK TO CLOUD: GEO EXPLORATION EMPOWERING ENERGY EVOLUTION, Jaipur, India (26-28, October, 2025).

2. **Paresh Nath Singha Roy**, 2025. Delivered Talk on "Investigation of Ionospheric Total Electron Content anomalies as Potential Precursors to the Mw 5.8 Lone Pine, California Earthquake", IUGG-IASPEI/IAGA, Lisbon Portugal, August 30 to September 5, 2025.

3. **Roy, P. N. S.** 2024. Delivered Talk on "Self-similar behaviour for the pre and post-strong Nepal earthquake geodetic GNSS time series based on fractal scale-invariance analysis" for the 8th Annual Convention AES 2024, In: Advances in Earthquake Sciences entitled 'Natural Hazards and Build Better for risk mitigation', March 27-29, 2024 at CSIR-CBRI Roorkee, Uttarakhand, India. 2024.

4. **Roy, P. N. S.** 2023. Delivered Invited Talk on "Applications of fractal methods to quantify the stress condition of underground mines" at Department of Mining and Petroleum Engineering, School of Chemical Engineering, University of Adelaide, August 16, 2023 at Adelaide, South Australia, Australia. 2023.

5. **Roy, P. N. S.** 2023. Delivered Invited Talk on "Mining Induced seismicity monitoring to mitigate roof collapse and associated Hazards" for the ISMAA-KC 2023, In: Workshop entitled 'Earthquakes and other Ground Movements: Disaster Assessment, Mitigation and Management', June 16-17, 2023 at Kolkata, West Bengal, India. 2023.

6. **Roy, P. N. S.** 2018. Delivered on "Application of Neural Network for identification of Stressed Zones within Under Ground Mines" for the EXOCMING 2018, In: the International Seminar & Exhibition entitled 'Exploration of Oil, Gas, Coal, Minerals and Ground Water: Modern Techniques & Appliances', February 7-9, 2018 at Kolkata, West Bengal, India. 2018.
7. **Roy, P. N. S.** 2016. Invited Talk on "The precursory seismicity study for the May 12, 2008, Sichuan Earthquake: Using FRACTAL ANALYZER MATLAB based software" was delivered for the AOGS Meeting Beijing, China held during 1st August 2016 – 7th August 2016.

8. **Roy, P. N. S.** 2014. Seismicity of the eastern Himalaya. IGC-2014 (19th Convention of IGC and Int. Conf.,)held at Itanagar, Arunachal Pradesh during Nov. 27-29, 2014.

9. **Roy, P. N. S.**andBhadauria, Nitesh. 2014. Detection of the Statistical precursor from Spatio-temporal pattern of earthquakes in the Eastern Indonesia Banda Sea region. 3rd Annual Convention"Earthquake Science – The Future Challenges"with Special theme on "Seismic

Microzonation and Hazard Assessment" AES-2014 held at ISR, Gandhinagar, Gujarat, India during 04 - 06 January, 2014.

10. **Roy, P.N.S.** and Bhattacharjee, Raj. 2013. Phase Detection of Seismograms Using Fractal Dimension, Abstract Volume of AGM of GSI &International Conference on Future challenges in Earth Sciences for Energy & Mineral Resources ESEMR-2013 held at ISM, Dhanbad during 14th November'13 – 16th November'13.

11. A paper entitled "Correlation fractal dimension approach for estimating temporal and spatial pattern of seismicity in the Himalayan region." presented at 2012 Annual Meeting of **Seismological Society of America** held at Sandiego,California,USA during 17thApril'12 – 19thApril'12.

12. A paper entitled "Depth estimation of nonstationary gravity profile by Fast Fourier Transform" presented at **17th Convention of International Geological Congress & International Conference NPESMD-2011** held at ISM, Dhanbad during 10th November'11 – 12th November'11.
13. Poster entitled "Scale Invariance of Seismicity pattern prior to some destructive earthquakes" presented at **International Workshop** on **"Advance Scaling Laws in Fluid Dynamics of Solid Earth"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during May 23 – June 3, 2011.
14. A paper entitled "Fractal Approach for Spatio-temporal pattern of earthquakes in Kobe, Japan"presented at **International Conference** on Geophysical Sciences- Energy, Climate Change and Evolution of Human Society (ICON GSECCES-2010) scheduled during December 21-23, 2010 at Department of Geophysics, Banaras Hindu University, Varanasi, India.
15. A paper entitled "Seismogenic hazard estimation of the Kumaun Himalaya and its surrounding region using different fractal approach" presented at **International Seminar** on "Recent Advances in Geosciences" held in ISM Dhanbad, during 11-13 January, 2011
16. A paper entitled "Fractal nature of earthquake occurrence in South Central Tibet" presented at **International Seminar** on "Recent Advances in Geosciences" held in ISM Dhanbad, during 11-13 January, 2011.
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19. A paper entitled "Multifractal perspective of the active seismicity in Northwest Himalayan Region" presented at **5th International Conference on Fractals and Dynamic Systems in Geoscience** held at Townsville, Australia, during 13th August'09 – 14th August'09.
20. Poster entitled "Application of fractals and chaotic dynamics for January 26, 2001 Bhuj earthquake" presented at **Eight International Workshop** on **"Non-linear Dynamics and Earthquake Prediction"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during October 3 - 15, 2005.

21. A paper entitled "Fractal Analysis of Bhuj Earthquake of January 26, 2001" presented at **International Conference** of **Asian Seismological Commission** held at Yerevan, Armenia during October 18 – October 21, 2004.

22. A paper entitled " Analysis of Bhuj earthquake of January 26, 2001 Using Fractal Statistics" presented at **International Conference** on " Managing Seismic Risk in Developing Countries (MSRDC – 2004)", 2004 held at Disaster Management Institute, Bhopal, India, during 17th – 19th March, 2004.

23. Presented a paper entitled "Study of Fractal Geometry With Reference To The Tectonics Of Kachchh Region in Gujarat,India" at **International Workshop** on "Earth System processes Related To Gujarat Earthquake Using Space Technology" held at I.I.T, Kanpur, India during January 27 – January 29, 2003.

24. Presented a paper entitled "Role of Fractals in Assessing the Vulnerability of Fault Regions" by Avadh Ram &P.N.S.Roy at **Workshop** on "Recent Earthquakes of Chamoli and Bhuj" held at Department of Earthquake Engineering, University of Roorkee, Roorkee during May 24-26, 2001.

25. Presented a paper entitled **"**Spatio-temporal seismicity pattern in the Hindu Kush,Pamir and Karakorum region prior to October 8, 005 Muuzaffarabad earthquake" :Extended Abstract, by

P. N. S. Roy and V. K. Srivastava,National Seminar MTGST, ISMU, Dhnabad,44-49, during 12th – 14th November,2007.

26. Presented a paper entitled **"**A fractal perspective toward understanding the precursory phenomena leading to the 12th May, 2008 Sichuan earthquake" : Abstract, by Gautam, Vibhu, Roy, P. N. S., and Mondal, Saroj K., National Seminar "Recent Advances in theoretical and Applied Seismology", Department of Applied Mathematics, March 27-28, 2009, ISMU, Dhnabad,Pg. 1.

M.Sc(Tech)Dissertation/PhD Thesis Title of Myself

- PhD: "**Application of fractals and chaotic dynamics in Seismology**" under supervision of Prof. Avadh Ram.
- M.Sc(Tech): "**Inversion of Magnetotelluric Data: For 1D & 2D inversion**" under supervision of Prof. T. Lal.

M.Sc(Tech)Dissertation/MTech/PhD Thesis Guided and under Guidance

- **PhD: 18(Completed- Single-7 and Joint-11):**
- Awarded on March, 2013, Title of PhD **"EVALUATION OF LARGE EARTHQUAKE POTENTIAL IN KUMAUN HIMALAYA AND ITS ADJACENT FAULT ZONE USING GPS STRAIN AND SEISMICITY ANALYSIS"** , Dr Saroj Kumar Mondal(Working in CSIR-NGRI, Hyderabad as Scientist(Permanent).
- Awarded on June 2016, Title of PhD **"TIME-DEPENDENT AND TIME-INDEPENDENT SEISMIC HAZARD ASSESSMENT IN NORTHWEST AND NEPAL HIMALAYA"** Dr CHINGTHAM PRASANTA SINGH (Working in MoES,New Delhi as Scientist(Contract)
- Awarded on March, 2017, Title of PhD **"INTEGRATED APPROACH TO STUDY THE HETEROGENEITY OF HYDROCARBON RESERVOIRS IN ASSAM-ARAKAN BASIN OF NORTH-EAST INDIA"** Student: Dr Bappa Mukherjee, Scientist(Permamnet), WIHG, Dehradun.
- Awarded on April, 2018, Title of PhD **"COAL BASED UNDERGROUND HETEROGENEITIES- AN APPROACH TOWARDS SAFER COAL PRACTICES"** Dr DebjeetMondal (Working in CMPDI, Ranchi as Deputy Manager(Permanent)
- Awarded on June, 2018, Title of PhD **"GRAVITY DATA INTERPRETATION IN MAPPING CONCEALED GEOLOGICAL STRUCTURES AND PROGNOSTICATE CONTROLS OF ORE DEPOSITS- AN ATTEMPT IN ODISHA AND ADJOINING REGIONS, INDIA"** Dr Arbind Kumar (Working in DMT, Kolkata as Senior Executive(Permanent)
- Awarded on May, 2019, Title of PhD **"ASSESSMENT OF SEISMIC HAZARD FOR THE NORTHEAST INDIA"** Student Dr Auchitya Kumar Pandey (Working as Project Officer NCS, MoES, Govt. of India)
- Awarded on May, 2019, Title of PhD **"DETECTION, ANALYSIS OF FIRE AND ITS EFFECTS ON ENVIRONMENT IN MINING AREA USING REMOTE SENSING AND GEOPHYSICAL TECHNIQUES"** Dr Rakesh Kumar Mishra (Working in CSIR-CIMFR, Dhanbad as Senior Technical Officer (Permanent)

- Awarded on July 2020, Title of PhD **"IMPRINTS OF PLUME-LITHOSPHERE INTERACTION BENEATH THE NORTHWESTERN DECCAN VOLCANIC PROVINCE FROM RAYLEIGH AND LOVE WAVE TOMOGRAPHY"** Dr Jyoti Sharma (Working in ISR, Gandhinagar as Scientist(Permanent)

- Awarded on December 2021, Title of PhD **"STRUCTURE OF CRUST AND UPPER MANTLE BENEATH THE KUMAON HIMALAYA"** Dr Somak Hajra (Working in University of Alberta, Edmonton, Alberta, Canada as Post-Doctoral Fellow.)

- Awarded on April 2022, Title of PhD **"MULTIPARAMETRIC GEODETIC AND GEOPHYSICAL APPROACHES TO UNVEIL THE LINKAGE OF CRUSTAL DEFORMATION AND SEASONAL VARIATION IN THE NORTHWEST HIMALAYA"** Dr Suresh Kannaujiya (Working in Geosciences Department, Indian Institute of Remote Sensing, Indian Space Research Organisation Department of Space, Government of India, Dehradun, 248001, Uttarakhand as Scientist(Permanent).

- Awarded on August 2022, Title of PhD **"EVALUATION OF LARGE EARTHQUAKE POTENTIAL IN NORTH EAST HIMALAYAN FAULT ZONE USING GPS STRAIN AND SEISMICITY ANALYSIS"** Dr Partha Sarkar (Working in National Centre for Seismology, Ministry of Earth Sciences, New Delhi as Post-Doctoral Fellow.)

- Awarded on November 2022, Title of PhD **"SEISMIC STRUCTURE BENEATH THE INDIAN OCEAN AND ITS SEISMOGENIC POTENTIAL"** Dr Mamuni Sucheeta Ekka (Working in CSIR-National Geophysical Research Institute, Hyderabad as Post-Doctoral Fellow.)

- Awarded on February 2023, Title of PhD **"SEISMIC HAZARD ESTIMATION OF BIHAR-JHARKHAND USING GPS STRAIN"** Dr Sandeep Kumar Gupta (Working in ISRO, IIRS, Dehradun as Post-Doctoral Fellow.)

- Awarded on March 2024, Title of PhD **"SUBSURFACE STRUCTURE AND SEISMOTECTONIC INVESTIGATIONS OF KINNAUR HIMALAYA: CONSTRAINTS FROM WAVEFORM MODELING OF SEISMOLOGICAL DATA"** Dr Dhirendra Nath Yadav (Working in AMD, Scientist(Permanent)).

- Awarded on April 2024, Title of PhD **"A STUDY ON CRUSTAL STRUCTURE IN THE NORTHWEST HIMALAYA USING AMBIENT NOISE TOMOGRAPHY AND GRAVEST MODE OF FREE EARTH OSCILLATIONS BASED ON SUPERCONDUCTING GRAVIMETER DATA"** Dr Sanjay Kumar Verma (Working in WIHG, Dehradun as Post-Doctoral Fellow.)

IIT, Kharagpur:

- Awarded on November 2024, Title of PhD **"INSIGHTS INTO PRE-SEISMIC PATTERN RECOGNITION; AN INTEGRATED APPROACH"** Dr Haritha C.
- Defended on 17th October 2025, Title of PhD **"FRACTAL AND AI APPROACH FOR AUTOMATED 3D SEISMIC DATA INTERPRETATION"** Dr Pavel Karmanov.

- **PhD:15 (Under Guidance) (NB: eight are single guidance, seven joint guidance at IIT, KGP)**
- **M.Tech:15(Guided);**
- **M.Sc(Tech): 74(Guided);**
- **M.Sc :70(Guided) + 04(Under Guidance);**
- **BS:09+ 16 (Under Guidance);**

Outreach Program

Completed:

(i)Course of "**Earthquake Hazard Awareness for Real Estate Technical Personnel"** sponsored by MoES(Rs5.15Lakh)

Cons. No.(DST/18/AGP/2015-2016),During April 18-20, 2016; **Coordinator-Dr P N Singha Roy**

NB: This outreach program had participants from CPWD, PWD, Municipal Corporations at the level of Supptd. Engg., Executive Engg etc.

(ii)Course of "**Geophysical Software Practices for Subsurface Imaging"** sponsored by DST (Rs5. 5Lakh), held during December 12-17,2016(one week), **Coordinator-Dr P N Singha Roy**; Co-coordinator-Prof. Shalivahan

NB: This outreach program had participants from Academics (BHU, Kurukshetra University, Andhra University, Osmaina University, NIT, Silchar etc) MECL, AMD, and R& D Lab (Wadia Institute of Himalayan Geology, ISR, Gandhinagar) etc. **Other courses:**

- Imparted training to NTPC Executives-which includes Lectures, Practical and Field Training
- Imparted training to AMD Executives-which in the form of Lecture on the topic of Geophysical Inverse Theory.
- Imparted training to Electronics & Communication Engg. BTech, MTechstudents which includes Lectures and Practical on the topic of Digital Signal Processing for Geophysical Applications.
- Imparted training to Vedanta-HZL Executives-which includes Lectures, Practical and Lab. Training
- Imparted training to SECL Mining Engineering- Mines Seismicity- which includes lectures
- Imparted training to FDC Applied Physics course-which include lecture
- Imparted training to Applied Physics-Renewable Energy-which includes Lectures

Invited Talk

- Invited Talk on "APPLICATIONS OF FRACTALS TO UNDERSTAND SOME OF THE EARTH AND ATMOSPHERIC PATTERNS" 24th March 2025 EES Annual Meet IISER Bhopal, India.
- Invited Talk on "EARTHQUAKE FORECAST FOR TAIWAN REGION USING FRACTAL APPROACH AND COULOMB STRESS CHANGE" Centenary National Seminar on "Strong Motion Earthquake: Structural Response Modelling and Aided Designing" March 21-23, 2025, IIT(ISM), Dhanbad, India.
- Invited Talk on "CHALLENGES IN EARTHQUAKE PREDICTION" EPMM March 21, 2025, IIT(ISM), Dhanbad, India.

- Invited Talk on “Applications of fractal methods to quantify the stress conditions of earthquake prone regions” GNS Science, New Zealand (15-07-2024 to 20-07-2024)

- Invited Talk on “Applications of fractal methods to quantify the stress condition of underground mines” Department of Mining and Petroleum Engineering, University of Adelaide, Australia, (16-08-2023 to 19-08-2023)
- Invited talk on “Mining Induced seismicity monitoring to mitigate roof collapse and associated Hazards” in the occasion of Workshop on: Earthquakes and other Ground Movements: Disaster Assessment, Mitigation and Management (June 16-17, 2023) Organised by: ISM Alumni Association, Kolkata Chapter, New Town, KOLKATA
- Invited talk on “Role of Passive Seismic in Hydrocarbon Exploration and Enhanced Oil Recovery” in the occasion of one-day workshop on "Low Frequency Passive Seismic - New Avenues & Solutions for Hydrocarbon Exploration" held on 03.03.2023 organized by Geophysical Services, Western Onshore Basin, ONGC Vadodara.
- Invited talk on “Shale Gas: A Key to Future Energy Security” to the International Conference on “Recent Advances in Earth Sciences”, organized by the Institute of Earth & Environmental Sciences, Dr. Rammanohar Lohia Avadh University, Ayodhya in association with International Academy of Physical Sciences, Prayagraj (CONIAPS-XXVII) was held from October 26th to 28th, 2021.
- Invited talk on “Shale Gas: A Key to Future Energy Security” & Special Guest" at National Level Workshop on "Innovative Approach & Recent Advances in Geology" organized by Geology Dept., PKRMC, BBMK University Dhanbad which is going to be held on 6th & 7th August-2021.
- Invited talk on “The precursory seismicity study for some of the worlds strong Earthquake" was delivered for ESP Section, ICTP, Trieste Italy on 31st May 2019.
- Invited talk on “Detection, analysis of fire and its effect on environment in mining area using remote sensing and geophysical techniques” was delivered for the Geological Survey of India, Kolkata, India held during 26th March 2019 – 27th March 2019.
- Invited talk on “The precursory seismicity study for the May 12, 2008, Sichuan Earthquake: Using FRACTAL ANALYZER MATLAB based software” was delivered for the AOGS Meeting Beijing, China held during 1st August 2016 – 7th August 2016.
- Invited two talks on “Nonlinear Dynamics and Chaos Application” was delivered for the Short Term training on “Earth Science applications” held during 11-15July 2016organised by Deptt. of Applied Physics, NIT, Durgapur
- Invited talk on “Geothermal Energy Exploration and Challenges in India as one of the promising Renewable Energy” was delivered for the Short Term training on “Renewable Energy Materials and Technology in Academia and Industry” held during 2-4March. 2016organised by Deptt. of Applied Physics, ISM, Dhanbad
- Invited talk on “Seismicity of the Northern India” was delivered for the 1storientation program on “Teaching skill quality improvement” held during 9-29Feb. 2016organised by Faculty development centre, ISM, Dhanbad
- Invited talk or Key note speaker on “Seismicity of the eastern Himalaya” was delivered for the 19th Convention and international Conference IGC-2014 on“Climate Change and Natural Resources Development Strategies: Mountain Risk Management and Governance” held during 27-29Nov. 2014organisedJointly by Indian Geological Congress and Deptt. of Geography, Rajiv Gandhi University, Itanagar
- Invited talk on “Digital Signal Processing” was delivered for the Symposium on “Digital Signal Processing Applications” held during 20-24 Jan. 2013organised by Deptt. of Electronic Engg., ISM, Dhanbad
- Invited talk on “MATLAB-Signal Processing” was deliverd for the Symposium on “Engineering Application of MATLAB” held during 9-17 Jan. 2010 organised by Mineral Engineering Society, ISM, Dhanbad

- Invited talk on "Basic of GPS" was delivered for the SRIJAN 2K10 Techincal activity) on "GEOPHYSICA" held on 25 Feb. 2010 organised by Srijan Team, ISS, ISM, Dhanbad

Other Scientific Jobs

- SEG, USA DISC Member
- Editorial Board Member of nature Scientific Reports for Geosciences
- Reviewer for SCI journals.
- Chaired a session in the 8th Annual Convention AES 2024, In: Advances in Earthquake Sciences entitled 'Natural Hazards and Build Better for risk mitigation', March 27-29, 2024 at CSIR-CBRI Roorkee, Uttarakhand, India. 2024
- Attended SPG Biennial International Convention in Kochi, Kerala, India, during November 3-5, 2023 as student coordinator to lead student team from IIT, Kharagpur
- Oil India Limited, India (Collaborator(s) : CoEES, OIL Chairman), Type: MoU, Duration: (12-04-2023 to 15- 08-2026)
- Former Member of Editorial Board of Journal of Indian Geophysical Union.

Subject Taught/Teaching

- **Geophysical Signal Processing - Theory (Presently- Spring Semester)**
- **Borehole Geophysics - Theory (Presently- Autumn Semester).**
- **Borehole Geophysics - Practical (Presently- Autumn Semester).**
- **Physics of the Solid Earth (Jointly) – Theory (Presently- Autumn Semester).**
- **Pattern Recognition in Geophysics - Theory (Presently- Spring Semester).**
- Mathematical Modelling in Geophysics – Theory (2018- 2024).
- Geophysical Signal Processing-Theory (Spring-Semester 2020)
- Seismic Prospecting - Practical (Autumn Semester (2018-2019).
- Geophysical Field Theory.
- Geophysical Inverse Theory
- Signal Analysis Theory **(11 years-2007-2018)**
- Geophysical Signal Processing **(12Years-2006-2018 + One semester 2021)**.
- Pattern recognition in Geophysics and geosciences.
- Signal Processing for Applied Physics(5Years-2012-2017)
- Seismic Prospecting.
- Solid Earth Geophysics.
- Geophysical Prospecting (9years-2007-2016).
- Reflection Seismology.
- Engineering Geophysics
- Petroleum Geophysics
- Earthquake Forecasting and Prediction
- Earthquake Hazard Exposer, Vulnerability and Risk.
- Signal Processng(for Physics/App. Physics students)
- Practical-Earthquake Hazard Exposer, Vulnerability and Risk.
- Practical –Computational Geophysics, Geophysical signal processing, Geophysical Prospecting, Earthquake Forecasting and PredictionPractical- Geophysical Inverse Theory, Engineering Geophysics.

Laboratory developed

- Mathematical Geophysics, IIT, Kharagpur

- Geophysical signal processing Lab developed where eight node parallel computing facility has been developed. Here in this laboratory practical's for Geophysical signal processing, Seismic processing, gravity magnetic and Geophysical Inverse Theory is carried out (at IIT(ISM), Dhanbad).
- Advance GPS (GNSS) data processing Laboratory(at IIT(ISM), Dhanbad) and IIT, KGP.

Administrative Responsibility

- **Member of Board of Studies (BoS), Department of Geology, School of Natural Resource Management (SNRM) Central University of Jharkhand (CUJ), Ranchi.**
- **Advisory Member for** GROUP **3: GROUND MOTION MODELING' in NSHM initiation by ICED, IIT Roorkee**
- **Chairman for National level committee, National Centre for Seismology, Ministry of Earth Sciences, Government of India, New Delhi to evaluate the proposed technical specifications for 100 new Seismological Observatories with the state-of-the-art seismic and GPS equipment to be set as a part to strengthen the Indian National Seismological Network**
- **Steering Committee member of Oil India Ltd and IIT, Kharagpur MoU- Project Monitoring**
- **Coordinator of Oil India Ltd and IIT, Kharagpur MoU**
- **Former Chairperson/Head of Deysarkar Centre of Excellence in Petroleum Engineering, Indian Institute of Technology, Kharagpur**
- **Undergraduate Coordinator for Department of Geology and Geophysics, IIT, KGP.**
- **Professor Representative for Departmental Placement CDC (Career Development Center), IIT, KGP.**
- **Departmental SAIP coordinator.**
- Former Faculty advisor for Department of Geology and Geophysics IIT-JEE- 2018.
- **Faculty Advisor for SPG (Society of Petroleum Geophysics) student chapter of Department of Geology and Geophysics, IIT, Kharagpur**
- **Faculty Advisor for EAGE (European Association of Geoscientist and Engineer) student chapter of Department of Geology and Geophysics, IIT, Kharagpur**
- Former UG course revamp core committee
- **Confidential Committee Member at National Level**
- Former Vice Chairman of IIT, JEE(Advanced) 2017, IIT(ISM), Dhanbad
- Former Team Member for Innovation Committee for IIT(ISM), Dhanbad
- Former Faculty in Charge for Training and Placement for all Geophysical students in all discipline.
- Former Team Member for M.Sc/MS.c(Tech) Admission committee(2009-2011) for IIT(ISM), Dhanbad
- Former In-charge of Geophysical Signal Processing Laboratory & Departmental Computer Centre.
- Former In-charge for website of Department of Applied Geophysics ISM, Dhanbad.

- Former Team Member for DST-FIST program for Department of Applied Geophysics ISM, Dhanbad.
- Former Responsibility for renovation and upgradation of teaching facility/classroom facility for Department of Applied Geophysics ISM, Dhanbad.
- Former Team Member for CAS program for Department of Applied Geophysics ISM, Dhanbad.
- Former Treasurer for International Conference RAG-2011 at Indian School of Mines Dhanbad, during January 2011.
- Former Faculty Advisor for all Geophysical students in all discipline Applied Geophysics, IIT(ISM).
- Former Team member of several committees including confidential works.
- Convener for Geoconfluence–2015, All India Students Meet held during January 24-27, 2015.
- Convener for National Seminar on "Recent Developments in Geoelectromagnetism for Crustal Investigation" under AGP Deppt. UGC CAS program during March 30, 2015.
- Convenor for Geoconfluence–2016, All India Students Meet held during January 21-24, 2016. (NB: Reputed speaker from National and International organisation)
- Convenor for Geoconfluence–2017, All India Students Meet held during January 27-29, 2017
- Co-Convener of Basant 2018, Reunion February 4, 2018.
- Former Invited Member for ISM New Journal "Natural Resources and Engineering"of Taylor and Francis.
- Geophysical Winter Field(two weeks) In-charge for 2014 Pre-Final year Bhuli, Dhanbad, India
- Geophysical Winter Field(two weeks) In-charge for 2017 Pre-Final year Simultala, Bihar,India
- Organising Secretary ETGRMI 2018, Diamond Jubilee Celebration, March 9-11, 2018.
- Former Team Member of QS world ranking and other national ranking of IIT(ISM), Dhanbad

Professional Visits Abroad

IUGG-IASPEI/IAGA, Lisbon, Portugal, August 30 to September 5, 2025.

Empress Catherine II Saint Petersburg Mining University during October 15-20, 2024 – (1) the International Forum "Mineral Resources as the Basis of National Sovereignty – Personnel and Innovation Environment" and (2) the Youth Forum-Contest of Young Researchers from the BRICS countries "Topical Issues of Rational Use of Natural Resources"

GNS Science, New Zealand (15-07-2024 to 20-07-2024), Purpose: Invited Talk and Collaboration. University of Adelaide, Australia, (16-08-2023 to 19-08-2023), Purpose: Invited Talk and Collaboration.

ICTP, TREISTE, ITALY (FOUR WEEKS), Purpose: As Regular Associate of ICTP,TRIESTE, ITALY and to attend the International Workshop on "Ionospheric Forecasting for GNSS Operations in Developing Countries: Findings and Challenges" **(2019)** .

Beijing, China(ONE WEEK) Purpose to deliver Invited talk and Chair a sessionfor the AOGS Meeting held during 1st August 2016 – 7th August 2016.

ICTP,TREISTE,ITALY (SIX WEEKS), Purpose: As Junior Associate of ICTP,TRIESTE, ITALY(2014).

ICTP,TREISTE,ITALY (THREE WEEKS), Purpose: As Junior Associate of ICTP,TRIESTE, ITALY and to attend the International Workshop on "Earthquake Tectonics and Hazards on the Continents" (2013).

Sandiego,California,USA 17th April'12 – 19th April'12, Purpose: To attend and present oral paper at "2012 Annual Meeting of Seismological Society of America" (2012).

ICTP,TREISTE,ITALY (SIX WEEKS), Purpose:as Junior Associate of ICTP,TRIESTE, ITALY and to attend the International Workshop on "Advance Scaling Laws in Fluid Dynamics of Solid Earth" (2011).

ICTP,TREISTE,ITALY (SIX WEEKS), Purpose: As Junior Associate of ICTP,TRIESTE, ITALY(2010).

Townsville, Australia(Four Days), Purpose: Participated in the one day International Workshop on "Fractals and natural hazard"and presented paper in 5th International Conference on Fractals and Dynamic Systems in Geoscience(2009).

YEREVAN,ARMENIA (21 days), Purpose:Participated in the two-week International Training Course and presented paper in 5th ASC Assembly(2004).

ICTP,TREISTE,ITALY (TWO WEEKS), Purpose:Participated in the Eight International Workshop on "Non-linear Dynamics and Earthquake Prediction"(2005).

Field Training

- **Geophysical field training** like well site visit was conducted during every winter at various ONGC well sites.
- **Geophysical field training** like Seismic refraction, reflection, Time and frequency domain Electromagnetic,MT,Gravity,Magnetic,GPS,Induced Polarisation, SP, Multi electrode Resistivity and Resistivity survey are provided to undergraduate students for three weeks in around Dhanbad, Bakreshwar(West Bengal, India), Jaduguda(Jharkhand,India), Simultala(Bihar), Well Site training at Ahmedabad and Mehsana for IIT, KGP students.
- **Participated for the two-week** International Training Course **on** Recent Trends in Seismic Networks Data Processing & Exchange, Hazard and Risk Assessment **of Asian Seismological Commission on October 4-17, 2004 held at Yerevan, Armenia.**

Training

- Participated in the International Workshop on **"Ionospheric Forecasting for GNSS Operations in Developing Countries: Findings and Challenges"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during 27 May 2019 to 31 May 2019.
- Participated **industry academia interaction jointly organized by KDMIPE, ONGC and FIPI,** 13th Programme Course on***" Modern Practices in Petroleum Exploration"*** held during 8-10 October, 2018, at ONGC, Dehradun.
- Participated in the International Workshop on **" Earthquake Tectonics and Hazards on the Continents"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during June16 – July 3, 2013.
- Participated **industry academia interaction jointly organized by ONGC and PETROTECH society,** 8th Proficiency Course on***" Modern Practices in Petroleum Exploration"***held during 3-7 September, 2012, at ONGC, Dehardun.
- Participated in the International Workshop on **"Advance Scaling Laws in Fluid Dynamics of Solid Earth"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during May 23 – June 3, 2011.

- Participated in the International Workshop on **"Fractals and natural hazard"** held at **Townsville, Australia** on August 15, 2009.
- Participated in the International Workshop on **"GAMIT/GLOBK Advanced Users Workshop"** held **at C-MMACS, Bangalore** during 7-10 March 2009.
- **Participated** industry academia interaction **jointly organized by** ONGC and PETROTECH society**, 3rd Proficiency Course on** *" Modern Practices in Petroleum Exploration"* held during 24-28 September, 2007, at ONGC,Dehradun.
- Participated in the Eight International Workshop on **"Non-linear Dynamics and Earthquake Prediction"** held at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during October 3 - 15, 2005.
- **Participated for the two-week** International Training Course **on** Recent Trends in Seismic Networks Data Processing & Exchange, Hazard and Risk Assessment **of Asian Seismological Commission on October 4-17, 2004 held at Yerevan, Armenia.**
- Participated in the CEP short term course under NPEEE on **"ENGINEERING SEISMOLOGY"** held at Indian Institute of Technology, Kharagpur during August 4 - 8, 2003.
- Participated in the CEP Training course on **"The Global Positioning System and its Applications"** held at I.I.T., Bombay, November 12 – November 16, 2002.
- Participated in the Workshop/Lecture course on **"Geoinformatics"** held at Department of Civil Engineering, I.T., B.H.U., Varanasi, India during January 24, 2002.
- Participated in the Workshop/Lecture course on"**Broad Band Seismology**"held atNational Geophysical Research Institute, Hyderabad, India during September 3 – September 22, 2001.

Dated: 22.04.2026

(P. N. Singha Roy)
Professor, Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur