

Dibakar Ghosal

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Education

Year	Degree	Subject	University/Institution	Division
2008-2013	PhD	Geophysics	Institut de Physique du Globe de Paris, France	Tres Bien
2004-2006	MSc	Geophysics	Indian Institute of Technology Kharagpur	First
2001-2004	BSc	Geology, Math., Physics	Jadavpur University	First

Professional/Research Experience

Year	Position held	Name of the Institute
2015-2023	Assistant Professor	Indian Institute of Technology Kanpur
2014-2015	Postdoctoral fellow	Uppsala University, Sweden
2013-2014	Visiting Faculty	Indian Institute of Technology Bhubaneswar
2013-2013	Postdoctoral scholar	Institut de Physique du Globe de Paris, France
2008-2013	PhD Scholar	Institut de Physique du Globe de Paris, France
2007-2008	Research Scholar	National Geophysical Research Institute, Hyderabad

Professional Recognition/Awards/Prize/Fellowship

2023	Scientific High Level Visiting Fellowship (SSHN) from French Institute in India (IFI)
2022	INSA visiting scientist fellowship
2019	Visiting Faculty at NTU Singapore
2019	Visiting Faculty at Institut de Physique du Globe de Paris, France
2014-2015	Postdoctoral fellowship, Geocentrum, Uppsala University, Sweden
2008-2012	PhD fellowship, IPG Paris, France
2008	Lectureship, CSIR NET qualified

Teaching

Courses (UG/PG) taught

PG course

2022	Seismic exploration and seismic imaging (ES682)
2018-19	Solid Earth Geophysics (ES 655)
2017-18	Mathematics for Earth Sciences (ES 651)
2016-21	Geophysical Methods (ES 656)
2016	Special topics in Earth Sciences (ES 650)

UG Course

2019-20	Geological evolution of Indian plate (ES417)&
2019-21	Exploration Geophysics (ES 416)
2020	Field Geology II (ES 414)
2016	Field Geology I (ES 312)

&Received appreciation letter from Director IIT Kanpur

Supervision of Bachelor's/Master's thesis

Supervision of BS-MS thesis/report:

Sl. No.	Year	Name	Title	Role
3	2021-2022	Mr. Kethavath Bhopaya Naik	H/V ratio analysis of ambient noise data from Himalaya foothills	Supervisor
2	2020-2021	Mr. Niraj Kumar	Improved seismic fault detection using an convolutional neural network (Semantic/Image segmentation)	Supervisor
1	2020-2021	Mr. Sudhanshu Pandey [#]	Two-dimensional seismic modeling using Finite Element Method	Supervisor

[#]secured Academic Excellence award

Supervision of MTech thesis:

Sl. No.	Year	Name	Title	Role
11	2023	Mr. Gourav Jaiswal	Seismic diffraction analysis	Supervisor
10	2022	Mr. Anubhav Mukherjee	Structural analysis of KG seismic data (ongoing)	Supervisor
9	2021-2022	Ms. Surbhi Nath	Interpretation of KG seismic 3D volume	Supervisor
8	2020-2021	Mr. Prabhakar Kumar [*]	Deciphering shear wave velocity profiles from Wide-Angle MASW using Swarm Intelligence-based optimization strategies	Supervisor
7	2019-2020	Mr. Subham Tiwari	Characterization of hydrocarbon bearing reservoir fluids using frequency dependent amplitude versus offset (FAVO)	Supervisor
6	2019-2020	Ms. Aashee Shukla	Deciphering neotectonism and associated gas venting in offshore KG basin India using high-resolution 3D seismic and well datasets	Supervisor
5	2018-2019	Mr. Animesh Pant ^{*§}	Frontier seismic spectral decomposition methods & new insights into offshore Nova Scotia using CLSSA and Weighted Spectral Blending	Supervisor
4	2018-2019	Mr. Vaibhav Jain	Super virtual interferometry (SVI): a seismic data processing technique for enhancement of far offset refracted phases	Supervisor
3	2018-2019	Mr. Saket Patidar	Integrated investigations of linear gravity anomalies on the Moon	Co-Supervisor
2	2017-2018	Mr. Akash Trivedi	Investigation of gas hydrate reservoirs at offshore N-W Sumatra using high-resolution marine seismic datasets	Supervisor
1	2015-2016	Mr. Gardar Gislason (from Uppsala University)	Effect of petrophysical parameters on seismic waveforms signatures-Review on theory with Case study from Frigg Delta oil field, Norway	Co-Supervisor

^{*}secured V.M. Bajpai Gold medal award for best MTech thesis

[§] best presentation award at 'Geo Youth 2019-9th all India student symposium on Geology'

PhD Supervision

Supervision of PhD thesis: (Ongoing)

Sl.	Starting	Name	Title	Role
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No.	Year			
5	2022	Mr. Prabhakar Kumar	Elastic FWI of Andaman-Sumatra region	Supervisor
4	2020	Mr. Arindam Kundu	Imaging Himalayan foothills using an integrated study	Supervisor
3	2019	Mr. Vikas Vats [@]	Development of Acoustic Full waveform inversion and its application on Andaman offshore	Supervisor
2	2018	Mr. Harshad Srivastava	Imaging Offshore Narcondam volcanic set up using high-resolution seismic datasets	Supervisor
1	2017	Mr. Shashank Verma ⁺	Imaging Himalayan Frontal Thrust (HFT) near Ramnagar using controlled source seismology	Supervisor

[@]secured best presentation award in 2nd Triennial FIGA congress

⁺his work highlighted in 'National Geographic Press' and he received SEG-2022 travel grant

Knowledge Dissemination

- 2023- Delivered a talk on 'Seismic fault detection using an improved image segmentation technique' at IIT Bombay
2023- Delivered a talk on 'Imaging subsurface architecture using controlled source seismology' at GSI Mangalore
2021- Delivered talks on 'Imaging crustal details from controlled source seismology-a global perspective' and hands on in DST-Karyashala organized by IISER Pune
2020- Delivered a talk on 'Imaging northern offshore forearc Sumatra using high-resolution marine geophysical datasets' at IISER Pune
2020- Showcased activities of Department of ES, IIT Kanpur at SPG-ONGC conference at Cochin for 3 days
2018- Delivered talks at ONGC and Pan-IIT Consortium held at IIT Kharagpur

Publications

Communicated to Peer-Reviewed journals:						
Sr. No.	Year	Authors	Title	Journal	Volume	Page
22	2023	Srivastava H., Ghosal D.	Investigating Narcondam offshore using high-resolution reflection seismic data	Geo Marine Letters (communicated)	-	-
21	2023	Vats V., Ghosal D., Roy S.	SAVI: a GUI package for acoustic Full Waveform Inversion	Computers and Geosciences (communicated)	-	-
20	2023	Jacob J. Dymont J., Ghosal D., Carlier B.D., Dewangan P.	Stresses and rupture propagation on the Andaman-Sumatra-Java subduction zone: insights from normal fault earthquakes and background seismicity	Journal of Geophysical Research (communicated)	-	-
19	2023	Kumar P., Ghosal D., Verma SN.	Estimating variations in shear wave velocity using meta-heuristic approaches	Near Surface Geophysics (communicated)	-	-
18	2023	Kumar P., Singha P., Ghosal D., Jacob J.	Crustal architecture and upper mantle structure of Amsterdam-St Paul plateau, Southern Indian Ocean	Tectonophysics (communicated)	-	-
17	2023	Verma S., Ghosal D., Srivastava H.	Geometry of the active Himalayan Frontal Thrust system, Kumaon Himalaya,	Tectonophysics (communicated)	-	-

			analyzing high-resolution seismic data			
Accepted/Published in Peer-Reviewed journals:						
Sr. No.	Year	Authors	Title	Journal	Volume	Page
16	2023	Singha P., Dewangan P., Ghosal D. , Kamesh Raju K. A., Aswini K.K., Yatesh V., Mukhopadhyay R., Mandal S.	Crustal structure beneath the Alcock Seamount in the Andaman Sea	Tectonophysics	-	229979
15	2023	Pant A., Ghosal D. , Puryear C., Verma S.N.	Algorithms for time–frequency imaging and analysis: introduction to mixed-model spectral decomposition	Acta Geophysica	-	1-17
14	2023	Verma S. N., Ghosal D. , Vats V., Gupta A.	Shallow subsurface imaging across the Himalayan Frontal Thrust (HFT) analyzing ambient noise data from a riverine source	Journal of Applied Geophysics	210	104943
13	2022	Pant A., Ghosal D. , Puryear C.	Imaging of a possible isolated Carbonate build-up (ICB) in Penobscot Bay at anomalous low frequencies	Marine Geophysical Research	43	-
12	2022	Tiwari S., Ghosal D. , Singh R. K., Yelisetti S.	Mapping of hydrocarbon bearing reservoirs using frequency dependent amplitude versus offset (FAVO)	Journal of Earth System Science	131	-
11	2021	Ghosal D. , Mukti MM, Singh SC, Carton H., Deighton I	Fore-arc high and basin evolution offshore northern Sumatra using high-resolution marine geophysical datasets	Journal of Asian Earth Science	216	104814
10	2021	Jacob J., Dymant J., Ghosal D. , Dewangan P	Strike-slip seismicity at the Andaman-Sumatra Subduction Zone: Role of the fracture zones and age of the subducting lithosphere	Tectonophysics	811	228862
9	2021	Ghosal D. , Singh SC	A reliable velocity estimation in a complex deep-water environment using downward continued long offset multi-channel seismic (MCS) data	Journal of Earth System Science	130	
8	2020	Jain V., Ghosal D. , Verma S.	Enhancement of a thumper source far offset refracted phases using super virtual interferometry (SVI)	Journal of Earth System Science	129	
7	2019	Boral S., Sen IS., Ghosal D. ,	Stable water isotope modeling reveals spatio-temporal	Journal of Hydrology	577	

		Peucker-Ehrenbrink B., Hemingway JD.	variability of glacier meltwater contributions to Ganges River headwaters			
6	2018	Hananto N., Boudarine A., Carton H., Singh S., Avianto P., Dymont J., Qin Y., Ghosal D. , Zuraida R., Tapponnier P., Deplus C., Sieh K.,	Evidence of conjugate Riedel shears, thrusting and re-activation of fracture zones in the 2012 Wharton Basin Earthquake Rupture Zone	Earth and Planetary Science Letters	502	174-186
5	2018	Ghosal D. , Ganguli S. S., Singh R. N., Sain K.	Simulating the gas hydrate behavior at equilibrium dissociation: A case study from Mahanadi basin offshore eastern India	Journal of Marine and Petroleum Geology	98	802-814
4	2018	Ghosal D. , Juhlin, C.	Estimation of dispersion attributes at seismic frequency - a case study from Frigg-Delta reservoir, North sea	Journal of Geophysics and Engineering	15	1799
3	2014	Ghosal D. , Singh S.C, Martin J	Shallow subsurface morphotectonics of the NW Sumatra subduction system using an integrated seismic imaging technique	Geophysical Journal International	198	1818-1831
2	2012	Ghosal D. , Singh S.C., Chauhan A.P.S, Hananto N.D.	New insights on the offshore extension of the Great Sumatran fault, NW Sumatra, from marine geophysical studies	Geochemistry Geophysics Geosystems	13	
1	2012	Singh. S.C, Chauhan A.P.S, Calvert A. J., Hananto N.D., Ghosal D. , Rai A., Carton H.	Seismic evidence of bending and unbending of subducting oceanic crust and the presence of mantle megathrust	Earth and Planetary Science Letters	301	166-176

(Extended) Abstracts in International Conferences:

Sr. No.	Year	Authors	Title	Name of conference
29	2023	Pant A., Ghosal D. , Puryear C., Akaba PA., Quansah AD	Wavelet Assisted Constrained Least Squares Spectral Analysis Algorithm for Time-Frequency Analysis: Hybrid/Mixed-Model Wavelet-Fourier basis approach	84th EAGE Annual Conference & Exhibition
28	2022	Sen A., Ghosal D. , Chakraborty P.	1D poroelastic Full Waveform Inversion (FWI) for the estimation of pore fluid pressure distribution in KG basin, India	IIOE-2
27	2022	Srivastava H., Ghosal D. , Sai Kumar A.	Anatomy of a submarine volcano near narcondam island using high-resolution seismic reflection data	IIOE-2
26	2022	Nath S., Ghosal D. , Sai Kumar S.	Detection of faults and high amplitude reflections in Krishna Godavari basin using Machine learning	IIOE-2

25	2021	Sen A., Chakraborty P., Ghosal D.	Single parameter Full Waveform Inversion in Poroelastic media using damped inertia coefficient PSO	Near Surface Geoscience & Engineering
24	2021	Kumar P. and Ghosal D.	Comparative study of stochastic Nature Inspired Optimization Algorithms to estimate Shear wave velocity using Ground rolls	EAGE extended abstract
23	2021	Verma S. and Ghosal D.	High-resolution velocity structure across HFT, Kumaon Himalaya using controlled source seismic datasets	SEG extended abstract, USA
22	2021	Kumar P and Ghosal D.	Delineation of S-wave velocity profiles across the Himalayan Frontal Thrust (HFT) using metaheuristic approaches	EGU General Assembly 2021, Austria
21	2021	Verma S., Ghosal D. , Vikas, Pandey S., Anand P., Srivastava H.	Crustal structure across Himalayan Frontal Thrust (HFT) using high-resolution <i>seismic datasets</i>	EGU General Assembly 2021, Austria
20	2021	Verma S., Ghosal D. , Vikas, Pandey S., Anand P., Srivastava H.	Crustal structure across Himalayan Frontal Thrust (HFT) using high-resolution <i>seismic datasets</i>	EGU General Assembly 2021
19	2021	Kumar P., Anand P., Ghosal D. , Singha P.	Crustal architecture of Amsterdam-St. Paul Island from an integrated geophysical approach	EGU General Assembly 2021, Austria
18	2020	Yeliseti S., Ghosal D. , Sanchez V.	Seismic structure and gas hydrate study on the southern Cascadia margin using multichannel seismic data	AGU Fall Meeting, USA
17	2020	Shukla A., Ghosal D. , Singh S.K.	Neotectonism and its effect on gas migrating features in offshore KG basin India	EAGE extended abstract
16	2020	Pant A., Ghosal D. , Puryear C	Comparative study of Wavelet-based recent spectral decomposition algorithms for seismic signals	EAGE extended abstract
15	2019	Pant A., Ghosal D. , Puryear C.	Highlighting Reservoirs Through RGB Blended Frequency Imaging using Constrained Least Squares Spectral Analysis (CLSSA)-A Case Study from Penobscot Bay, Offshore Nova Scotia	American Association of Petroleum Geologists (AAPG)
14	2019	Pant A., Ghosal D. , Puryear C	Improved reservoir delineation in complex geological settings using CLSSA: a case study from offshore Nova Scotia	EAGE extended abstract
13	2019	Verma, S. N., Gupta, A., Ghosal D.	Velocity-depth modeling across the main frontal thrust (MFT), in the central seismic gap Himalaya, using ambient noise tomography	SEG extended abstract, USA

12	2019	Dhingra, D., Patidar, S., Ghosal D.	Near surface expression of linear gravity anomalies (LGAs): Potential Clues and implications for emplacement	Lunar and Planetary Science Conference, USA
11	2018	Perkins, L.D., Yelisetti, S., Ghosal, D.	Fluid flow and BSR distribution of Oregon	AGU fall meeting, OS51F01370, USA
10	2017	Yelisetti S., Ghosal D.	Shallow subsurface imaging of northern Cascadia margin using downward continued short streamer data	AGU fall meeting, USA
9	2017	Gislason G., Ghosal D. , Juhlin C.	Effect of petrophysical parameters on dispersion from Frigg- Delta reservoir, North Sea	SEG extended abstract, USA
8	2017	Ghosal D. , Juhlin C	Evaluation of poroelastic properties at seismic frequency range from Frigg- Delta reservoir, North sea	SEG extended abstract, USA
7	2016	Boral S, Sen I, Sinha R, Peucker-Ehrenbrink B and Ghosal D.	Hydrological Dependence of Ganges River on Himalayan Cryosphere	Goldschmidt at Yokohama, Japan
6	2012	Wang, H., Singh S.C., Ghosal D.	A combined full wave equation tomography-full waveform inversion and its application to 12 km long streamer data from offshore western Sumatra	AGU Fall meeting, USA
5	2012	Ghosal D. , Singh S.C., Chauhan A.P.S, Carton H, Hananto N.D.	State of the art seismic processing and structure of the Sumatra margin	Penrose conference, Il ciacco, Italy
4	2011	Ghosal D. , Singh S.C., Chauhan A.P.S, Hananto N.D.	Shallow subsurface morphotectonics at the Northern offshore Sumatra subduction system using high resolution reflection and refraction seismic	Amer. Geophy. Union, San Francisco, USA
3	2011	Ghosal D. , Singh S.C., Chauhan A.P.S, Hananto N.D.	High resolution tomography and seismic image of the Northern Sumatra subduction system	British Geophy. Assoc. London, UK
2	2011	Mukti M.M., Singh S.C. , Hananto N. , Ghosal D. , Deighton I.	Structural style and evolution of the Sumatran forearc basins	Indonesian Petroleum Association
1	2009	Ghosal D. , Singh S.C., Chauhan A.P.S, Hananto N.D.	New insights on the Great Sumatra fault, NW offshore Sumatra, from marine data	AGU fall meeting, USA

Development

List development / demonstration of technologies, products

Since joining IIT Kanpur, Dr. Ghosal has invested a significant amount of time in developing the ‘Crustal Imaging laboratory (CIL)’ which is equipped with state-of-art seismic data acquisition setups and data processing software, most of which are donated by hydrocarbon industries. The main contributions of his group are as follows:

- **Imaging across Himalayan Frontal Thrust (HFT):** Dr. Ghosal and his team were actively involved in acquiring seismic datasets with the seismic thumper and RAUs from the Pawalgarh and Mohand regions. The datasets were further processed at IIT Kanpur independently and revealed the geometry of HFT and other buried faults below the study area.
- **Ambient noise and Receiver function analysis:** Dr. Ghosal and his team recorded the ambient noise from Himalayas and estimated the group and shear wave velocity structures and also carried out the H/V ratio studies. They also carried out receiver function analysis of St. Paul and Amsterdam islands and discovered evidence of magmatic underplating.
- **Development of algorithms:** Dr. Ghosal and his team are also involved in developing algorithms for advanced processing of the seismic datasets and therefore they have developed a number of codes inhouse including

- (a) Super-Virtual Interferometry (SVI) to enhance refracted arrivals at far offset in a seismic gather from Himalaya
- (b) Advanced Spectral decomposition tools for instance TFCWT, SFMPD, and CLSSA algorithms for seismic signal analysis and their implementation on Penobscot datasets
- (c) Acoustic and Poroelastic Full Waveform Inversion (FWI) algorithms and their GUIs to obtain details of subsurface physical parameters
- (d) 1D shear wave analysis from ground rolls using Swarm optimization techniques and its implementation on Himalayan datasets

Funding

Ongoing Projects:					
Sr. No.	Years	Sponsoring Organisation	Title of Project	Budget (Lakhs)	Role
5	2021-2024	DST-SERB (SUPRA)	Himalayan metamorphic CO ₂ fluxes to the atmosphere: Solving the mystery behind a long-standing problem	~166	Co-PI
Completed Projects					
4	2017-2021	ONGC	Modeling of Gas hydrate reservoir using integrated techniques	~ 66	PI
3	2017-2021	ONGC	Estimation of poroelastic properties of hydrocarbon reservoirs using frequency dependent amplitude variation with offset (AVO) analysis	~ 44	PI
2	2017-2021	SERB	Delineation of shallow subsurface morphotectonics below the central seismic	~ 53	PI

			gap-Himalaya using an integration of passive and controlled source seismology		
1	2016-2018	IIT Kanpur	Shallow subsurface seismic imaging of NE Himalayan foothills near Shillong plateau	25	PI

Consultancy

2021 – Mn ore delineation using seismic method, funded by Naslax Geoservices

Peer Recognition

Awards, Fellowships, other recognitions

2023 Scientific High Level Visiting Fellowship (SSHN) from French Institute in India (IFI)
 2022 INSA visiting scientist fellowship
 2019 Visiting Faculty at NTU Singapore
 2019 Visiting Faculty at Institut de Physique du Globe de Paris, France
 2014 – 2015 Postdoctoral fellowship, Geocentrum, Uppsala University, Sweden
 2008-2012 PhD fellowship, IPG Paris, France
 2008 Lectureship, CSIR NET qualified

Contributions to the institute

Academic and non-academic administration

2023 - Liaison between DORA office and ES Department, and IRDC
 2022 - Coordinator of Earth Science Society (ESS)
 2021-2022 – Member of Departmental Post Graduate Committee (DPGC)
 2021 - Chairman of PhD admission committee, Department of ES
 2020-2021 - Department Placement Coordinator (DPC)
 2017-2021 – IR for GATE duties
 2019-2020 - Departmental Under Graduate Committee (DUGC)
 2019-2020 - Department Website coordinator
 2018-2020 - Department Placement Coordinator (DPC)
 2017-2018 - Department Library Committee (DLC) representative
 2016-2017 – Institute Research and Development Committee (IRDC)

Setting up of Laboratories:

2016-2019- I have developed ‘Crustal Imaging Laboratory’ at IIT Kanpur
 It is equipped with high-end work stations, seismic thumper (ESS1000), Remotely Acquisition Unites (RAUs) and Tromino for data acquisition, Paradigm product FOCUS 15.5, Promax, Kingdom, Landmark and Hampson-Russel software for processing and interpretation of seismic data for near (< 100m) to crustal (<10 km) scale structures.

Contributions outside the Institute

Short-term training courses/workshop

2023 -Conducted workshop on 'Petroleum Seismics' delivered by Dr. D.M. Nathniel
 2021 -Organized a 2 days seminar series on ‘Special lectures on Well Logging’ by ONGC geoscientists
 2018-2019 -Organized ‘Schlumberger day’ at IIT Kanpur
 2016 -Participated in MIRAGE geophysical expedition and led a floating summer school for a month

Reviewership

2018–2022 - Reviewer of Tectonophysics, Nature Scientific Report, National Science Foundation, Journal of Earth System Science, Marine Geophysical Research, Journal of Marine and Petroleum Geology, Oceanography, Ministry of Earth Science

Membership

2022 –2023 Member, Society of Exploration Geophysicists



12/07/2023

Signature and date