Simanchal Padhy

Associate Professor, Dept. of Earth Sciences &
Joint Faculty, Mehta Family School of Data Science and Artificial Intelligence, IIT Roorkee
(Ex-Senior Principal Scientist/ Scientist-F, CSIR-NGRI, Hyderabad)
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Web: https://www.iitr.ac.in/~ES/Simanchal_Padhy
Phone no.: +91-133228-4968, 9701348255 (Mob.)
Date of birth: 24th May 1973

Areas of interest:

Seismic wave propagation & scattering; Seismic imaging with ambient noise; AI/ML for signal & image Processing; Earthquake ground motions; Scale invariance, Multi-fractals & Wavelets

Education:

- Ph.D., Geophysics (Seismology), Osmania University, 2005
- M.Sc.Tech., Applied Geophysics, IIT (ISM) Dhanbad, 1998
  (First class with Distinction)
- M.Sc., Electronics, Berhampur University, 1994 (First class)
- B.Sc. with Physics Honors, Berhampur University, 1992
  (First class with Distinction)

Professional Experience:

- Feb 2021-present Associate Professor, IIT Roorkee
- Nov 2015-Feb 2021 Senior Principal Scientist & Professor, CSIR-NGRI, Hyderabad
- Nov 2010-Nov 2015 Principal Scientist & Associate Professor, CSIR-NGRI, Hyderabad
- Nov 2006-Nov 2010 Senior Scientist & Assistant Professor, CSIR-NGRI, Hyderabad
- Nov 2003-Nov 2006 Scientist, CSIR-NGRI, Hyderabad
- Nov 1999-Nov 2003 Junior Scientist, CSIR-NGRI, Hyderabad
- Dec 1998-Nov 1999 Research Student, CSIR-NGRI, Hyderabad

Visiting and Sabbatical Appointments:

- Jun 2004-Sep 2005 DAAD Fellow, University of Leipzig, Germany
- Aug 2005 (3 weeks) Visiting Researcher, Universite Montpellier II, France
- Dec 2007-Feb 2008 Visiting Scientist, Tohoku University, Japan
- Jun 2010-Jun 2012 JSPS Postdoctoral Fellow, The University of Tokyo, Japan
- Oct 2012-Mar 2014 Postdoctoral Researcher, The University of Tokyo, Japan
- Jun 2015-Aug 2015 Visiting Scientist, The University of Tokyo, Japan
- Mar 2017-Jan 2018 JSPS Invitation Fellow, The University of Tokyo, Japan

Awards & Honors

- 2008 **CSIR Young Scientist Award** in Earth Sciences from Ministry of Science & Technology, Govt. of India
- 2014 **National Geosciences Award** (Formerly National Mineral Award) in Applied Geophysics from Ministry of Mines, Govt. of India
- Selected as **Assistant Professor** from Indian Institute of Technology, Kharagpur in 2010
- Member, **20th Indian Antarctica Expedition** (Dec 2000-Mar 2001)

Memberships & Services

- Member, Seismological Society of Japan (SSJ)
- Member, Japan Geoscience Union (JpGU)
- Member, CED-39, Earthquake Engineering, Bureau of Indian Standards, New Delhi

- Member, Indian Society of Earthquake Technology (ISET)
- Reviewer, Journal of Geophysical Research (JGR: Solid Earth), Bulletin of Seismological Society of America (BSSA), Geophysical Journal International (GJI), Physics of the Earth and Planetary Interiors (PEPI), Geophysics, Tectonophysics, Pure and applied Geophysics (PAGEOPH), Journal of Seismology, Journal of Earth System Sciences (JESS), Physica A: Statistical mechanics and its Applications, Geosystems & Geo-environment, PAMC Geosciences of MoES, New Delhi, among others
- Ex-Professor, Academy of Scientific & Innovative Research (AcSIR), CSIR-NGRI
- Reviewer, Doctoral Advisory Committee (DAC) of AcSIR, CSIR-NGRI
- Associate Editor, ISET Journal of Earthquake Technology

Current Administrative Responsibilities at IITR:

Member (ESD, DRC), Member (DAC, ESD), In-Charge (ESD Computer Lab), Placement & Internships In-Charge (MFSDSAI, IITR), Member (Administrative Committee, MFSDSAI), Member (MFSDSAI, ScRC)

Teaching Experience

IIT Roorkee:

- Geophysical Signal Processing (ESN-224)
- Digital Image Processing (ESN-475, DA-430)
- Essential Mathematics for AI & DS (AID-501)
- Time Series Data Analysis (AID-555, DA-208)
- Geophysical Prospecting (ESN-223, ESN-532)
- Geophysical Field Theory (ESN-221)
- Advanced Techniques in Geophysical Exploration (ESN-577)
- Applications of AI/ML in Earth Sciences (DA-427)
- Fundamentals of AI/ML (ESC-351)
- Introduction to Data Science (DAI-101)

AcSIR, CSIR-NGRI, Hyderabad:

- Geophysical Signal Processing, Inverse Theory, and Seismology

Book chapters

- **Padhy, S**., 2020. High-frequency seismology. In: Gupta H.K. (eds) *Encyclopedia of Solid Earth Geophysics. Encyclopedia of Earth Sciences Series*. Springer, Cham. https://doi.org/10.1007/978-3-030-10475-7_273-1. 2.

- **Padhy, S**., Dimri, V.P., 2020. Fractal scaling of earthquakes. In: Gupta H.K. (eds) *Encyclopedia of Solid Earth Geophysics. Encyclopedia of Earth Sciences Series*. Springer, Cham. https://doi.org/10.1007/978-3-030-10475-7_274-1 2016 1.

- **Padhy S**., 2016. The Multi-fractal Scaling Behavior of Seismograms Based on the Detrended Fluctuation Analysis. In: Dimri V. (eds) *Fractal Solutions for Understanding Complex Systems in Earth Sciences. Springer Earth System Sciences. Springer, Cham*. https://doi.org/10.1007/978-3-319-24675-8_7

Publications (Peer-reviewed)

- Singh, S.P., **Padhy, S**. & Silwal, V., 2025. A high-resolution 3-D shear velocity model for Cameroon using ambient noise tomography: Constraints from the CPSO algorithm, *Geophysical Journal International*, 242(2), ggaf227.

- **Padhy, S**., 2025. Seismic Response of the Hi-Net Sites in Japan to Incident Teleseismic P-Waves from the 2008 Wenchuan Earthquake, *Jour. Geol. Soc. India*, 101 (6), 850– 854.

- Kumar, S., **Padhy, S**. & Kumar, N., 2025. Investigating 2D shear waves velocity (Vs) structure beneath Garhwal Himalaya, Uttarakhand, India, using microtremor H/V spectral ratios and surface wave dispersion measurements, *Journal of Seismology*, 29, 419–437.

- Akilan, A., Abdul Azeez, K. K., Kotluri, S. K., Satyanarayana, H.V.S., **Padhy**, **S**. & Pandey, O.P., 2025. Kinematics of the Capricorn microplate and its surrounding regions as inferred from the analyses of GPS data, *J. Ind. Geophys. Union*, 29(1), 56-63.
- Subhadra, N., **Padhy, S.**, Srinagesh, D., 2023. Regional variability in ground motion amplitude in Western Himalaya, *Journal of Seismology* 27 (3), 455-471.
- Malaimani, E.C., Ravikumar, N., Rao, S., **Padhy, S**., et al. 2022. Studies on seismotectonics and geodynamical processes between India and Antarctica: A review, *Geoscientific Investigations From the Indian Antarctic Program*, 138-159.
- **Padhy, S**, Subhadra, N., 2021. Frequency dependence of attenuation components including mantle leakage in Garhwal Himalaya based on a modified MLTWA method, *Geophysical Journal International* 227 (3), 2156-2179
- Akilan, A., **Padhy, S**., Dimri, V.P., et al., 2021. Co-seismic and Post-seismic Changes in ZTD and TEC of the 2015 Nepal Earthquake, *Pure and Applied Geophysics* 178 (9), 3339-3354.
- Dimri, V.P., **Padhy, S**., et al., 2021. The observed thermal anomaly as an earthquake Precursor: A case study from the 1993 Latur earthquake prone area in Western India. *The Journal of Indian Geophysical Union* 25(4), 4-6.
- Adimah, N.I., **Padhy, S**., 2020. Depth dependent azimuthal anisotropy in Madagascar island from ambient noise tomography, *Tectonophysics* 789, 228513.
- Kayal, J.R., **Padhy, S**., 2020. Seismicity and structure of the Indian subcontinent. *Episodes Journal of International Geoscience* 43 (1), 650-664.
- Adimah, N.I., **Padhy, S**., 2020. Ambient noise Rayleigh wave tomography across the Madagascar island. *Geophysical Journal International* 220 (3), 1657-1676.
- **Padhy, S.**, Dimri, V.P., 2020. Apparent scaling of virus surface roughness – An example from the pandemic SARS-nCoV. *Physica D: Nonlinear Phenomena* 414, 132704
- Akilan, A., Abdul Azeez, K., Schuh, H., **Padhy, S**., Kotluri, S.K., 2019. Perturbations in atmospheric gaseous components over coastal Antarctica detected in GPS signals and its natural origin to volcanic eruption, *Polar Science*, 19, 69-76.
- Subhadra, N., **Padhy, S**., Dimri, V.P., 2018. Characterizing spatial heterogeneity based on the b-value and fractal analyses of the 2015 Nepal earthquake sequence, *Tectonophysics* 722, 154-162.
- Subhadra, N., **Padhy, S**., et al., 2018. Evaluation of site effects on ground motions based one response equivalent-linear site response analysis and liquefaction potential in Chennai, south India, *Journal of Seismology*, 22 (4), 1075-1093.
- Subhadra, N., **Padhy, S**., et al., 2018. Evaluation of ground motion and site-specific response spectrum for different parts of India by the method of semi-empirical Green's function, Arabian Journal of Geosciences, 11:255.
- Akilan, A., Abdul Azeez, K., **Padhy, S**., Schuh, H., 2018. Temporal changes in atmospheric water content during the December 2004 Sumatra earthquake as estimated from GPS signals and its possible connection to the January 2005 California flash flood, *Annals of Geophysics*, 61(1), SE102.
- Boulanouar, A., El. Moudnib, L., **Padhy, S**., et al., 2018. Estimation of coda wave attenuation in northern Morocco, *Pure and Applied Geophysics*, 175 (3), 883-897.
- Furumura, T., Kennett, B.L.N., **Padhy, S**., 2016. Enhanced waveguide effect for deep- focus earthquakes in the subducting Pacific slab produced by a metastable olivine wedge, *Journal of Geophysical Research: Solid Earth* 121 (9), 6779-6796.

- **Padhy, S**., Subhadra, N., 2016. Spectral scaling and seismic efficiency for earthquakes in northeast India, *Bulletin of the Seismological Society of America* 106 (4), 1613-1627.

- Akilan, A., Azeez, KKA., Schuh, H., **Padhy, S**., et al., 2016. Changes in atmospheric water content associated with an unusual high snowfall during June 2004 at Maitri station (Schirmacher Oasis, East Antarctica) and the role of South West Indian ridge geodynamics, *Natural Hazards* 83 (1), 563-574.

- Akilan, A., Balaji, S., **Padhy, S**., et al., 2016. The plate kinematics of Burmese microplate relative to its surroundings, *Arabian Journal of Geosciences* 9 (5), 333.

- Subhadra, N., **Padhy, S**., Prasad, P.P., Seshunarayana, T., 2015. Site specific ground motion simulation and seismic response analysis for microzonation of Nanded city, India, *Natural Hazards* 78 (2), 915-938.

- **Padhy, S**., Mishra, O.P., Subhadra, N., Dimri, V.P., Singh, O.P., Chakrabortty, G.K., 2015. Effects of errors and biases on the scaling of earthquake spatial pattern: application to the 2004 Sumatra–Andaman sequence, *Natural Hazards* 77 (1), 75-96.

- **Padhy, S**., Furumura, T., Maeda, T., 2014. Decoupling of Pacific subduction zone guided waves beneath central Japan: Evidence for thin slab, *Journal Geophysical Research: Solid Earth,* 119 (11), 8478-8501.

- **Padhy, S**., Subhadra, N., 2013. Separation of intrinsic and scattering seismic wave attenuation in Northeast India, *Geophysical Journal International*, 195 (3), 1892-1903.

- **Padhy, S**., Takemura, S., Takemoto, T., Maeda, T., Furumura, T., 2013. Spatial and temporal variations in coda attenuation associated with the 2011 off the Pacific coast of Tohoku, Japan (Mw 9) earthquake, *Bulletin Seismological Society of America*, 103 (2B), 1411-1428.

- **Padhy, S**., Subhadra, N., Kayal, J.R., 2011. Frequency dependent attenuation of body and coda waves in the Andaman Sea basin, *Bulletin of the Seismological Society of America*, 101, 109-125.

- **Padhy, S**., Mishra, O.P., Zhao, D., Wei, W., 2011. Crustal heterogeneity in the 2007 Noto-Hanto earthquake area and its geodynamical implications, *Tectonophysics*, 509, 55- 68.

- Furumura, T., Takemura, S., Noguchi, S., Takemoto, T., Maeda, T., Iwai, K., **Padhy, S**., 2011. Strong ground motions from the 2011 off-the Pacific-Coast-of-Tohoku, Japan (Mw=9.0) earthquake obtained from a dense nationwide seismic network, *Landslides,* 8, 333–338.

- **Padhy, S**., Subhadra, N., 2010. Frequency dependent attenuation of P- and S-waves in the northeast India, *Geophysical Journal International*, 183, 1052-1060.

- **Padhy, S**., Subhadra, N., 2010. Attenuation of high-frequency seismic waves in northeast India, *Geophysical Journal International*, 181, 453-467.

- **Padhy, S.**, 2009. Inversion of seismogram envelopes using a multiple isotropic scattering model in Garhwal Himalaya. *Bulletin of the Seismological Society of America*, 99, 727-740.

- **Padhy, S**., 2009. Characteristics of body wave attenuation in the Bhuj crust, *Bulletin of the Seismological Society of America*, 99, 3300-3313.

- **Padhy, S**., Wegler, U., Korn, M., 2007. Seismogram Envelope Inversion using a multiple isotropic scattering model - Application to aftershocks of the 2001, Bhuj earthquake, *Bulletin of the Seismological Society of America*, 97, 222-233.

- **Padhy, S**., Crampin, S., 2006. High pore fluid pressures at Bhuj inferred from 90^0–flips in shear wave polarizations. *Geophysical Journal International*, 164, 370-376.

- **Padhy, S**., 2005. A Scattering model for seismic attenuation and its global applications. *Physics Earth Planetary Inter*. 148, 1-12.

- **Padhy, S.**, 2005. Rescaled range fractal analysis of a seismogram for identification of signals from an earthquake. *Current Science*, 87, 637-641.

- **Padhy, S**., 2004. Intermittent Criticality on regional scale in Bhuj. *Geophysical Journal International*, 158, 676-680.

- Mandal, P., **Padhy, S**., et al., 2001. Aftershock activity and frequency dependent low coda-Qc in the epicentral region of the 1999 Chamoli earthquake of Mw 6.4. *Pure and Applied Geophysics*, 158, 1719-1735.

Under Review

- Kumar, S. **Padhy, S**., Kumar, N. Near-surface 2D shear wave velocity structure beneath eastern Kumaon Himalaya, Uttarakhand, India from micro-tremor HVSR and surface wave analysis. *Journal of Asian Earth Sciences*.

- **Padhy, S**. Attenuation mechanism in Bhuj estimated with a modified MLTWA approach – Effect of velocity gradient on coda envelopes. *Geophysical Journal International*.

- Nicholas, I.A., **Padhy, S**. Lithospheric discontinuities beneath Madagascar Island from auto-correlation of teleseismic events. *Journal of Seismology*.

- Panigrahi, B., Srivastava, D.C., Bhadani, V., **Padhy, S**., Paleostress estimation from faultslip observations; a critical evaluation of the three methods. *Journal of Structural Geology*.

- **Padhy, S**. Scattering attenuation of seismic body waves in a self-affine band-limited fractal medium. *Physica D: Nonlinear Phenomena*.

Abstract (Conference Proceedings)

- **Padhy, S**., Imaging sub-surface structures across the Madagascar Islands with ambient seismic noise, *In: P.K. Khan, S. Sahoo, U.K. Borah, N. Jana, G. Yellalacheruvu (Eds.), Strong Motion Earthquake: Structural Response Modelling and Aided Designing*, KP Kolkata Press Books, India, 190-192, IIT (ISM) Dhanbad, 2025.

- **Padhy, S**., A theoretical model of scattering of seismic waves in a band-limited fractal medium. *National seminar on Natural Hazards & Build better for Risk Mitigation and 8th Annual convention on "Advances in Earthquake Science"*, March 28-29, 2024, CSIR-CBRI, Roorkee.

- **Padhy, S**., Nicholas, I.A., Lithospheric discontinuities beneath Madagascar Island from auto-correlation of teleseismic events. *8th International Conference On Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics* (8ICRAGEE), December 11-14, 2024.

- Singh, S.P., **Padhy, S**., Crustal structure beneath the Cameroon volcanic line and surrounding area: Insights from Markov Chain Monte Carlo and evolutionary algorithm-based shear wave velocity inversion. AGU Conference, December 2023, USA (S23C-0383).

- **Padhy, S.,** Variation of teleseismic P-wave spectra of the 2008 Wenchuan earthquake observed at Hi-net seismic array in Japan, 17th Symposium on Earthquake Engineering (17SEE), 17-19 November 2022, IIT Roorkee.

- **Padhy, S.,** Subhadra N., Evaluation of frequency-dependent attenuation mechanisms in Garhwal Himalaya based on a modified MLTWA for a layered model. *IAGA IASPEI JSA,* 21-27 August 2021, Hyderabad.

- Subhadra, N., **Padhy, S**., Martin, M., Gok, R., Mayeda, K., Apparent-stress scaling of the 2016 Kumamoto earthquake sequence in SW Japan from coda-derived source spectra. *IAGA IASPEI JSA,* 21-27 August 2021, Hyderabad.

- **Padhy, S.,** Dimri, V.P., Multiscale multifractal analysis of earthquakes in the Himalayas: Insights into the dynamics of the system. *C2E2 Himalaya 2019, International workshop on climate change and extreme events in the Himalayan region*, IIT Mandi, India, 18-20 April, 2019.

- **Padhy, S**, Furumura, T., Maeda, T., Strong scattering of seismic waves in back- arc beneath Okinawa Trough in Ryukyu subduction zone with implications for the source of rifting, *Meeting on Seismic wave scattering*, The University of Tokyo, Japan, 2018.

- Dimri, V.P., Padhi, S., **Padhy**, **S.,** Rangarajan, R., Evaluating fractal scaling behavior in groundwater level fluctuations in semi-confined aquifer in Punjab, North India, *AGU Fall Meeting Abstracts*, Washington, USA, 2018.

- **Padhy, S.**, Furumura, T., Modeling waveform anomaly across central Japan with scattered seismic waves as inferred from high-frequency simulations. *IASPEI Symposia*, August 2017, Kobe, Japan.

- **Padhy, S.,** Furumura, T., Maeda, T., Waveform anomaly caused by strong attenuation in the crust and upper mantle in the Okinawa Trough region. *AGU Fall Meeting*, New Orleans, USA, December, 2017.

- **Padhy, S.,** Furumura, T., High-resolution Imaging of the Philippine Sea Plate subducting beneath Central Japan. *AGU Fall Meeting*, San Francisco, USA, December, 2016.

- **Padhy, S.**, Subhadra, N., Seshunarayana, T., Srinagesh, D., Site-specific ground-motion simulation and seismic response analysis in northeast and peninsular India, *International Symposium on Reducing Earthquake Losses and 4th Annual Convention on Advances in Earthquake Science*. Institute of Seismological Research, Gandhinagar, India, January 2015.

- **Padhy, S.**, Furumura, T., Maeda, T., Anti-waveguide effects in Pacific slab: evidence from high-frequency waveform analysis and numerical modeling. *CIG/QUEST/IRIS Joint workshop on seismic imaging of structure and source*, University of Alaska Fairbanks, July 14-17, 2013.

- **Padhy, S.,** Furumura, T., Maeda, T., A split in the subducting Philippine Sea slab beneath the Izu-western Nankai collision zone – Implications for tear within the subducting slab. *Japan Geoscience Union Meeting*, Makuhari Messe, Tokyo, Japan, 19-24 May, 2013.

- **Padhy, S.,** Furumura, T., Maeda, T., High-frequency shear wave propagation across the Honshu slab subducting beneath NE Japan. *Workshop on seismic wave scattering*, Earthquake Research Institute, The University of Tokyo, Japan, 09-10 July, 2013.

- **Padhy, S.**, Furumura, T., Maeda, T., Decoupling of Pacific subduction zone guided waves beneath central Japan: Evidence for thin slab. *Seismological Society of Japan (SSJ) Fall Meeting*, Yokohama City, Japan, 7-9 October, 2013.

- **Padhy, S.,** Furumura, T., Maeda, T., Lateral structural change of the subducting Pacific plate beneath Japan inferred from high-frequency body wave analysis. *IPGP-ERI Workshop on Imaging and monitoring active subduction zones and volcanoes II*, Earthquake Research Institute, The University of Tokyo, Japan, 11-13 March 2013.

- **Padhy, S.**, Furumura, T., Maeda, T., Takemura, S., Lateral structure beneath the Izu-Nankai collision zone: Implication of a plate split in the subducting Philippine slab, *Japan Geoscience Union* Meeting, May 22-27, 2012.

- **Padhy, S.**, Furumura, T., Maeda, T., Anti-waveguide effects in Pacific slab: evidence from high-frequency waveform analysis and numerical modeling. *QUEST 3rd Workshop*, Slovak Republic, May 20-26, 2012.

- **Padhy, S.**, Furumura, T., Maeda, T., Lateral structural change of the subducting Pacific plate beneath Japan inferred from high-frequency body wave analysis. *AGU Fall Meeting*, San Francisco, 5-9 December, 2011.

- **Padhy, S.**, Furumura, T., Maeda, T., Waveform effects of the thinning or tearing of the subducting Pacific slab beneath Japan. *Japan Geoscience Union Meeting*, May 22-27, 2011.

- **Padhy, S.**, Furumura, T., Maeda, T., Lateral structure of the subducting Pacific plate beneath Japan inferred from high-frequency body wave analysis. *Imaging in Wave International workshop on Passive Physics: from Seismology to Ultrasound*, Corsica, France, May 09-13, 2011.

- **Padhy, S.**, Takamura, S., Takemoto, T., Maeda, T., Furumura, T., Temporal changes in coda attenuation associated with the 2011 Off the Pacific Coast of Tohoku earthquake. *AOGS*, Taipei, August 08-12, 2011.

- **Padhy, S.**, Furumura, T., Maeda, T., Lateral structure of the subducting Pacific plate beneath Japan inferred from high-frequency body wave analysis. *AOGS*, Taipei, August 08-12, 2011.

- **Padhy, S**., Scattering and anelastic attenuation of seismic energy in northeast India using the multiple lapse time window analysis. *AGU Fall Meeting*, San Francisco, California, 13-17 December, 2010.

- **Padhy, S.,** Subhadra, N., Attenuation characteristics of high-frequency seismic waves in Northeast India. *7th ACES International Workshop*, Otaru, Japan, October 3-8, 2010.

- **Padhy, S.,** Dimri, V.P., Fractal clustering of reservoir induced seismicity in the Koyna Warna reservoir area. *Chapman Conference on Complexity and Extreme Events in Geosciences*, CSIR-NGRI, Hyderabad, India, 15-19 February 2010.

- **Padhy, S.,** Crampin, S., Characteristics of shear wave polarizations in Garhwal Himalaya. *12th International Workshop on Seismic Anisotropy (12IWSA)*, Beijing, China, 22-27 October, 2006**.**

- **Padhy, S.,** Wegler, U., Korn, M., Scattering of seismic waves in the crust beneath Bhuj, NW India. *Workshop meeting on seismic waves in laterally inhomogeneous media VI*, (*SWLIM – VI*), Hruba Skala, Czech Republic, June 20-25, 2005.

- **Padhy, S.,** Scaling of displacement spectra of Bhuj aftershocks. *AOGS*, 2004, Singapore, 57-ONL-645.

- **Padhy, S.,** Spectral decay parameter, *kappa* in Bhuj. *IUGG, 2003, Sapporo, Japan* [SS01/01P/A09-012].

Mentoring experience
Ph.D. (Completed):

(1) Title: Attenuation Characteristics of body waves and computed ground motion in north-east India and adjoining areas
Year Awarded: 2013
Name of the Scholar: **Subhadra Nampally**
Supervisor: **Dr. Simanchal Padhy**
Co-supervisor (if any): Prof. N.L. Mohan, Professor (Retd.), Osmania University, Hyderabad

(2) Title: Plate motion and seismo-tectonics in and around Indian Ocean using GPS-Geodesy
Year Awarded:2017
Name of the Scholar: **A. Akilan**
Supervisor: **Dr. Simanchal Padhy**
Co-supervisor (if any): Prof. S. Balaji from Pondichery University

(3) Title: Crust and uppermost mantle structure of the Madagascar Islands from ambient noise tomography
Year Awarded: 2020
Name of the Scholar: **Nicholas Irabor Adimah** (TWAS Fellow)
Supervisor: **Dr. Simanchal Padhy**
Co-supervisor (if any): Nil

(4) Title: Investigating shallow sub-surface velocity and attenuation structure beneath Garhwal-Kumaon Himalaya
Year Awarded: 2023
Name of the Scholar: **Sanjay Kumar**
Supervisor: **Dr. Simanchal Padhy**
Co-supervisor (if any): Nil

Ph.D. (Ongoing):

1. Adityam Rai (Geophysics): Monitoring of heterogeneous media using Passive Seismic Interferometry
2. Arpit Maurya (Geophysics): Broad-band earthquake ground motion modeling in north-west Himalayas
3. Puja Rani (Geophysics): Investigating crust and upper mantle structure with teleseismic wave attenuation in NW Himalayas
4. Ekta Yadav (DS/AI in MFSDSAI): Seismic imaging with deep learning-guided full waveform inversion of seismic data

M.Tech (AI/DS) students in MFSDSAI, IITR (Last 4 years, 2021 - Till date):

1. Pilli Vishnuvardhan: Seismic waveform denoising with Generative Diffusion models
2. Pratik P. Singh: Denoising of seismic signals using Deep Neural Networks
3. Banwari Lal: Detecting Causality in Time Series Modeling in the Deep Learning Framework
4. Ravindra Samria: Denoising and Reconstruction of Cryo-SEM Images with Weiner Filtering
5. Gaurav Ranjan: Automated classification of seismic signals with Continuous Random Forests
6. Mohit Kumar Bhati: Deep convolutional neural network for inverse problems in imaging
7. Gaveesh Nama: Deep preconditioners and their application to seismic wavefield processing
8. Himalaya Sharma: The importance of transfer learning in seismic modeling and imaging
9. Margan Raj Manu: Denoising Prestack Random Noise using Unsupervised DL Method

Lab-Based Project in MFSDSAI, IITR (DS/AI) (Last 4 years, 2021 - Till date):

1. Abhishek Baghel and Sachin Gupta (May 2025): Cold Diffusion Models for Enhanced Seismic Denoising
2. Sajal Singh and Vedant Vardhan (May 2025): Deep Learning for Seismic Velocity Inversion
3. Samyak Ajmera and Pratham Patel (Ongoing): Physics-inspired machine learning for seismic modelling and imaging in complex media

Interns from outside of IIT Roorkee:

1. **Title**: Kinematic earthquake ground-motion simulations in 1-5 Hz with 3-D stochastic velocity perturbations: Example from the 2019 Ridgecrest earthquake
   Month & Year: May 2025
   Name of the scholar: Soham Biswas, ***IISER, Kolkata***
2. **Title**: Estimation of the source parameters of the 2019 Ridgecrest earthquake from body wave spectral decomposition
   Month & Year: May 2025
   Name of the scholar: Sidharth Sagar, ***IISER, Kolkata***
3. **Title**: Estimation of surface-wave attenuation from seismic ambient noise recordings in volcanic regions
   Month & Year: May 2025
   Name of the scholar: M. Arvind, ***IISER, Kolkata***
4. **Title**: Reducing noise from seismic time series using nonlinear thresholding and scale-time windowing of continuous wavelet transforms
   Month & Year: May 2025
   Name of the scholar: Swati Chaudhary, ***IIT-ISM, Dhanbad***
5. **Title**: Wavelet-based denoising of seismograms based on unsupervised learning model
   Month & Year: June 2025
   Names of the scholars: Anjali Parihar, Nishesh Joshi, Anjali Pandey, Aryan Gautam, and Mayank Jain (***Madhav Institute of Technology & Science MITS, Gwalior)***
6. **Title**: Seismic signal denoising and reconstruction via Self-Supervised Res2-Unet
   Month & Year: January 2025
   Names of the scholars: Jay Jain, Ananya Jain, Priyanshu Kumar, Abhijeet Singh, Dev Gokha, Chitransh Tomar, Divyanshi Raghuwanshi, and Himanshu Jha (***Madhav Institute of Technology & Science MITS, Gwalior)***

Grants

Completed:

1. Seismic hazard studies of Northeast and Peninsular India (Main Lab Project of CSIR-NGRI) (Role: Co-PI).
2. Evaluation of strong ground motions in the Indo-Gangetic Plains (Fast Track Project of NGRI-CSIR) (Role: Co-PI).
3. Strong ground motion studies for the design of engineering structures (Nuclear Power Plants) (Sponsored Project by NPCIL) (Role: Co-PI).
4. Western India school earthquake lab programme (Funded by MoES) (Role: Co-PI).
5. Landslide potential of Vatada hill due to seismic activity (Varsha Project sponsored by Ministry of Defence, GoI) (Role: Co-PI).
6. Seismic hazard analysis for Mumbai Trans Harbour Link (Sponsored by MMRDA, Govt. of Maharastra) (Role: Co-PI).
7. Sandal-wood imaging and analysis of oil estimates (Sponsored by Dharampal Satyapal Group) (Role: Co-PI).

Ongoing:

1. Investigating subsurface scattering structure of the Moon near the Chandrayaan-3 landing site with seismic data set (Granted by ISRO-IITR) (Role: PI; Rs. 43,07,524/-).
2. Seismic ambient noise and P-wave coda correlation imaging in the Bikaner-Nagaur basin, Rajasthan for detailed crustal structure (Granted by ANRF ARG) (Role: PI; Rs. 98,73,040/-).

(Simanchal Padhy)