

- 1. Name** Dr. Kalachand Sain
- 2. Position:** Director, Wadia Institute of Himalayan Geology-DST, Dehradun  
Hon. Outstanding Prof. at Academy of Scientific & Innovative Research, Ghaziabad  
Former Head, Seismic Group at CSIR-NGRI, Hyderabad
- 3. Specialization:** Inversion, Modelling, Processing and Interpretation of Geophysical Data  
Seismic Traveltime & Full Waveform Tomography, Rock Physics  
Artificial Intelligence/Machine Learning, Attribute Characterization

**4. Research Interests:**

- Delineation, Characterization and Appraisal of Marine Gas-hydrates
- Glacial Dynamics and Glaciers Lakes
- Evolution of Sedimentary basins and Geotectonics over Indian Provinces
- Imaging Sub-volcanic sediments (onshore and offshore)
- Seismotectonics and Geodynamics of Himalaya
- Assessment of Geothermal Energy resources
- Assessment of avalanches, GLOFs, landslides, flash floods, earthquakes
- Early warnings of Himalayan geo-hazards



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- 6. Date & Place of Birth:** 05-02-1964, Burdwan (West Bengal)

**7. Educational Qualifications:**

No.	Degree/Certificate	Year	University/Institute	Subjects
i.	B.Sc.(Hons)	1984	Burdwan University, Burdwan	Phys, Chem, Maths
ii.	M.Sc. (Tech)	1988	IIT(ISM), Dhanbad	Applied Geophysics
iii.	Ph.D.	1995	CSIR-NGRI (Osmania Univ.), Hyd.	Controlled Source Seismology
iv.	Post-doctoral	1997	Cambridge University, UK	Marine Seismics
v.	Post-doctoral	1999	Rice University, USA	Traveltime Tomography
vi.	Post-doctoral	2003	Rice University, USA	Waveform Tomography
vii.	Qualified GATE (1989) and CSIR/UGC Joint JRF (1989) Examination			

**8. Academic/Research Experience/Employment:**

No	From	To	Name of Organization	Positions held
I	1988	1989	IIT-Indian School of Mines, Dhanbad	Field Officer
II	1989	1994	CSIR-National Geophysical Res. Instt. Hyderabad	CSIR JRF & SRF
III	1994	1998	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist B
IV	1998	2002	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist C
V	2002	2006	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist E1
VI	2006	2010	CSIR-National Geophysical Res. Instt. Hyderabad	Principal Scientist (EII)
VII	2010	2015	CSIR-National Geophysical Res. Instt. Hyderabad	Sr. Principal Scientist (F)
VIII	2015	2019	CSIR-National Geophysical Res. Instt. Hyderabad	Chief Scientist (G)
IX	2019	Now	Wadia Institute of Himalayan Geology, Dehradun	Director (Scientist H)
X	2006	2018	University of Hyderabad, Hyderabad	Guest Faculty
XI	2013	2015	Rajasthan Technical University, Kota	Guest Faculty
XII	2010	2019	AcSIR, CSIR-National Geophys. Res. Instt. Hyderabad	Professor
XIII	2019	Now	Academy of Scientific & Innovative Research Ghaziabad	Outstanding Professor

**9. Supervision/Training/Teaching:**

- a. Supervision/Guidance to Ph.D. Students:** 13 awarded; 2 have submitted; 5 more are pursuing
- b. Training:** Imparted training & mentored for 70 Dissertations of Master students in App. Geophysics
- c. Teaching:**
- (i) Professor at the Academy of Scientific & Innovative Research (2012-2019)
  - (ii) Outstanding Professor at the Academy of Scientific & Innovative Research (2020- till date)
  - (iii) Guest Faculty at the University of Hyderabad (2006-2018)

- (iv) Guest Lecturer at Al-Habeeb College of Eng. & Tech, Hyderabad (2015-16)
- (v) Guest Faculty at the Rajasthan Technical University at Kota, Rajasthan (2013-2015)
- (vi) Explains to public and school-students about the mysteries of Solid Earth & Ocean

#### 10. Major Scientific Achievements

- **Provided first scientific perspective on 2021 ice-mass failure that caused flash flood in Chamoli district of UK Himalaya;** Identified precursory events for more than 3 hours' duration on seismological data from a nearby station, first of its kind, before the main detachment, which led to real-time monitoring by setting up seismological, hydrological and meteorological stations for developing an Early Warning System against glaciers/glacier-lakes related hazards.
- **Demonstrated subsurface hydrological imbalance to land sliding and surface cracks at Joshimath (2023)** in UK Himalaya and established a link between subsurface features/processes with the surface observations.
- **Explained scientific causes of recent (2022-2023) climate-induced flash floods and ice/snow avalanches** at Kedarnath temple town, Indo-Nepal border Dharchula village of Pithoragarh, Maldevta in Dehradun, Hemkund Sahib, Dhauliganga-Rishiganga catchment, Arakat village of Uttarkashi **in the UK**, McLeod Ganj in the **HP**, and Amarnath holy cave in the **J&K Himalayas**, and suggested for mitigation.
- **Mapped hot springs and evaluated their geothermal energy potential** in UK and HP Himalaya (2022), and **Initiated to tap Geothermal Green Energy into Electrical Energy** at Tapovan, UK state.
- **Projected hydrocarbon and renewable energy scenario as a measure of climate change mitigation and energy security of India** through an edited volume "Emerging Energy Resources in India", published by Geological Society of India.
- **Established Gas Hydrates Research Center with world-class facilities for processing, modeling and inversion of geophysical data at CSIR-NGRI, Hyderabad;** Delineated, characterized and evaluated gas-hydrates reservoirs in Krishna-Godavari, Mahanadi and Andaman offshore in eastern India through development of new approaches; Presence of gas-hydrates were later validated by drilling & coring; Showed a great promise of gas-hydrates to the energy security of India; Estimated critical parameters (porosity, permeability, pore pressure) that are pre-requisite for the development of geology-specific and viable production technology.
- **Delineated high-resolution crustal structures of Indian provinces:** Southern Granulite Terrain, Dharwar Craton, Eastern Ghat mobile belts, Narmada-Son Lineament, Kutch Peninsula, Saurashtra Peninsula, Hazara-Kashmir syntaxis, Kangra re-entrant, Kumaun-Garhwal Himalaya, Indo-Gangetic Plains, Bengal basin, Mahanadi delta, upper Assam basin, and Andaman subduction zone, **and shed light on Geotectonics and seismotectonics respectively;** Developed contemporary full waveform tomography of wide-angle seismic data, first time in India, and delineated fine-scale velocity-structures of sub-volcanic sediments in the Kerala-Konkan basin and gas-hydrates bearing sediments in Krishna-Godavari offshore.
- **Led Scientific Cruises** (i) off Goa and Cochin in 2007 **for heat-flow studies**, (ii) in KG and Mahanadi basins in 2010 **for gas-hydrates investigation**, and (iii) in Andaman subduction zone in 2017 **for comprehending seismotectonics, respectively;** **Participated Indo-Russian Joint Expedition** both in summer (2005) and winter (2006) **and found out attenuation attributes from known gas-hydrate reservoirs in Lake Baikal**, which was later applied **for gas-hydrate investigation in Indian offshore.**
- **Leading a Mission Project** on "Characterization and Assessment of surface and subsurface Processes in Himalaya (CAP-Himalaya) **for Geo-hazards, Natural resources & Geodynamics**

## 11. Chair Person / Member of National Committees/Research Advisory/Board of Studies

### a. Chair Person in National Committees

(i) **Expert Committee of Intensification of Research in High Priority Areas (IRHPA) for Earth & Atm. Sciences (E&AS)** under SERB-DST (2022-now); (ii) **Program Advisory Committee on Sustainable Habitat domain of Impacting Research Innovation & Tech. (IMPRINT)** in E&AS of MHRD-DST Scheme (2022-now); (iii) **Program Advisory Committee (PAC)** for Core Research Grant in E&AS of SERB-DST (2022-now); (iv) **Committee on 'SERB International Research Experience (SIRE)' Program** in E&AS of SERB-DST (2021-now); (v) **Screening Committee for Promoting Opportunities for Women in Exploratory Research (POWER)** in E&AS of SERB-DST (2022-now)

### b. Core Member of National Committees

(i) **PAC on Scientific & Useful Profound Research Advancement (SUPRA)** in E&AS of SERB-DST (2022-now); (ii) **Selection Committee of Visiting Advanced Joint Research (VAJRA) Faculty Scheme** in E&AS of SERB-DST (2022-now); (iii) **Scheme for Transformational & Advanced Research in Science (STARS)** of Min. of Edu. (2022-now); (iv) **DST Fund for Improvement of S&T Infrastructure (FIST) Program** (2019-now); **Expert Member of** (v) **Steering Committee for Sophisticated Analytical Instrument Facilities (SAIF)** of DST (2022-now); (vi) **PAC-DST for International Sci. & Tech. Cooperation** in area of Water, Ocean & Atm. Sciences (2021-2024); (vii) **National Committee** on coastal & deep sea mining, renewable offshore energy and R&D of MoES – promotion of **Blue Economy** (2022-now); (viii) **Expert Committee of Climate Change Program (CCP)** of DST (2021-now); (ix) **Steering Committee of UNFCCC** for adaptation (2021-now); (x) **Standing Committee on Geosciences** under Space Application Management System, PSA to Gol (2021-now); (xi) **National Review Committee – IODP India** (2022-now); (xii) **High Powered Committees** of CSIR, MoES, DST, Science Academies (INSA, IAS, NASI) (2020-now); (xiii) **NICES-Program Management Council** at Natl. Remote Sensing Center (2019-2022), Hyderabad; (xiv) **National Gas Hydrates Program** (2000 – till date)

### c. Member of Governing Body/Research Council/Board of Studies

(i) **Governing Council** of Indian Institute of Geomagnetism, Mumbai (2023-now); (ii) **Governing Body and Research Advisory Council** of ESSO-NCESS, Trivandrum (2022-now); (iii) **Mentor Cohort for Academic Framework** at NSB Univ. of Excellence, Sikkim (2021-2024); (iv) **Scientific Advisory Committee** (2020-2023) at GB Pant Natl. Inst. of Himalayan Env., Almora; (v) **Research Advisory Committee** (2020-2023) at Himalaya University, Dehradun; (vi) **Advisory Committee** (2020-2023) for Earth Sci. Dept. at Central Univ. of Jammu; (vii) **Board of Research Studies (Science)** at Assam University at Silchar, (2023-now); (viii) **Council Member** of Geol. Soc. of India (2019-2022-2025); (ix) **Board of Studies** for M.Sc. (Tech) in App. Geophys. at IIT-ISM (2006-2008); (x) **Board of Studies** for M.Sc. in Dept. of Geology at Aligarh Muslim University (2023-now); (xi) Member to prepare 15-years Vision Document of DOD (2000); (xii) Member to prepare 10th, 11th, 12th FYP of CSIR on Hydrocarbons & Gas-hydrates; (xiii) **Research Advisory Committee** of DOD (2002-2004).

## 12. Awards/Fellowships/Honours/Memorial Lectures:

### a. Awards/Medals/Prizes:

(i) **Excellence in Research Award** (2023) by Dehradun International Science & Technology Festival (2023); (ii) **Best Paper Award** (2023) by WIHG-DST; (iii) **Uttarakhand Ratan Shree Award** (2022) by International Goodwill Society of India; (iv) **Best Paper Award** (2022) by WIHG-DST; (v) **National Award of Excellence in Geosciences** (2021) by MoES; (vi) **Best Paper Award** (2020) for ONGC Bulletin; (vii) **Sriram Srinivasan Award** (2019) by Association of Exploration Geophysicists; (viii) **Prof. Jagdeo Singh Memorial Best Paper Award** (2018) and **NN Chatterjee Award** (2010) by Geol. Soc. of India; (ix) **Distinguished Alumnus Award** (2017) by IIT(ISM); (x) **Decennial Award** (2016), **Anni Talwani Memorial Prize** (2014) and **Krishnan Medal** (1996) by IGU; (xi) **Best Paper Award** (2012) by International Association of Gondwana Research; (xii) **AP Scientist Award** (2011); (xiii); **Best Poster Award** (2007) by Petrotech Int. Conf. & Exp. on Oil & Gas; (xiv) **National Mineral Award** (2005) by Min. of Mines; (xv) **Best Paper Medal** (2002) by AP Academy of Sci.; (xvi) **Swarnajayanti Project Award** (2001) by DST; (xvii) **Young Scientist Award** (1998) by CSIR.

### b. Fellowships:

(i) **J.C. Bose National Fellowship** (2021) by SERB-DST; (ii) **Fellow of Indian National Science Academy, New Delhi** (2021); (iii) **Fellow of Indian Academy of Sciences, Bangalore** (2021); (iv) **Fellow of National Academy of Sciences, India, Allahabad** (2011); (v) **Fellow of Indian Social**

Science Academy (2021); (vi) **Founder Fellow of Telangana State Academy of Sciences** (2016); (vii) **Fellow of Andhra Pradesh Academy of Sciences** (2010); (viii) **Fellow of Geol. Soc. India** (2008); (ix) **Fellow of Indian Geophysical Union** (2002); (x) **Raman Fellow** (2003) by CSIR; (xi) **BOYSCAST Fellow** (1999) by DST; (xii) **National Scholarship** by Min. of Education & Social Welfare, Govt. of India.

#### c. Memorial Lectures:

(i) **Krishnanunni Memorial Lecture** (2023) of Natl. Instt. of Adv. Studies; (ii) **Foundation Day** (2023) at Assam University, Silchar; (iii) **V.V. Sastri Memorial Lecture** (2022) of Geol. Soc. of India; (iv) **Foundation Day Lecture** (2022) at GSI-Dehradun; (v) **Prof. K.N. Khatri Memorial Lecture** (2021) at IIT-Roorkee; (vi) **National Science Day Lecture** (2020) at CSIR-CBRI, Roorkee; (vii) **Prof. Jagdeo Singh Memorial Lecture** (2019) of IIT(ISM), Dhanbad; (viii) **Dr. M.N. Bose Memorial Lecture** (2019) of BSIP, Lucknow; (ix) **CSIR Foundation Day Lecture** (2019) at CSIR-IIP, Dehradun; (x) **Prem Bahadur Memorial Lecture** (2009) of Indian Geol. Congress.

#### d. Recognition/Honours:

(i) **Corona Warrior** title by UK State Govt. (2020); (ii) **Vice President** of Indian Geophysical Union (2020-2023); (iii) **Congress Director** of Federation of Indian Geosciences Association (2019-2022); (iv) **Secretary General** of Federation of Indian Geosciences Association (2022-2025); (v) **Alternate Delegate of Asia Pacific Region to AAPG House of Delegates** (2015-2017); (vi) **Hon. Secretary** of IGU (2014-2020); (vii) **Treasurer** of Federation of Indian Geosciences Association (2014-2019); (viii) **Vice President** for Soc. of Petroleum Geophysicists, Hyderabad Chapter (2011-2014); (ix) **Thesis Supervisor** at Univ. of Hyderabad (2011 onward), Andhra University (2011 onward) and Osmania University (2007 onward); (x) **Chief Scientist** for three cruises (2007, 2010 & 2017); (xi) **Bureau Member of Int. Lithosphere Program** under IUGG (2007-2015); (xii) **Among 50 Emerging Stars** (2003) by 'The Week' Magazine; (xiii) **1<sup>st</sup> Place** in 'Science Writing in Hindi' (2002) by CSIR.

### 13. Services

#### a. Membership of Professional Scientific Bodies:

(i) Active Member of **AAPG** (2012 -2020); (ii) Active Member of **SEG** (2015 - now); (iii) Member of **Asia Oceania Geosci. Soc.** (2003 – now); (iv) Member of **AGU** (2001-2004; 2013-2016); (v) Life member of **Indian Geophys. Union** (1996-now), (vi) Life member of **Indian Sci. Cong. Ass.** (1997-now); (vii) Member of **Indian Geological Congress** (2009-now).

#### b. Editorial Board:

(i) **Subject** (Earth & Planetary Sciences) **Editor Indian Jour. of INSA** (2024-2027); (ii) **Subject** (Applied Geology, Environment) **Editor Indian Jour. of Pure & App. Physics** (2022-2025); (iii) **Patron of Jour. of Himalayan Geology** (2019 onward); (iv) **Jour. Geol. Soc. India** (2011 onward); (v) **Int. Jour. Earth Sci. & Eng.** (2008 onward); (vi) Open Access **Jour. of Geophys. & Remote Sensing** (2013 onward); (vii) **Executive Editor** of Jour. of Indian Geophys. Union (2014 - 2016); (viii) **Episodes** (2007 - 2011); (ix) **Geohorizons** (2007 - 2011); (x) Open Access **Int. Jour. of Geosci. Res.** (2013 -)

#### c. Volume Editor:

(i) **1 Authored volume** on 'Analysis and Interpretation of Borehole logs', **Wiley and in progress (2024)**; (ii) **1 Authored volume** on 'Meta-Attributes' & Artificial Networking' (2022), **Wiley & AGU**, p.262; (iii) **1 Authored volume** on 'Active Seismic Tomography' (2023), **Wiley, P.124**; (iv) **2 Authored volumes** on (a) Evaluation of Gas-hydrates (2012) and (b) Attenuation characteristics of Gas-hydrates (2017), both by **Lambert Academic Publishing**; (v) **1 Edited volume** on 'AI/ML in Earth System Sciences', **JESS and in progress (2024)**; (vi) **1 Edited Volume** on 'Integrated Studies on Glacier Hydrology', **Frontiers in Earth Science and in progress (2024)**; (vii) **1 Edited volume** on Emerging Energy Resources in India (2022), **Geol. Soc. of India**, p.222; (viii) **3 Edited volumes** (2011, 2014, 2019) on 'Gas-hydrates', **Marine & Petroleum Geology, Elsevier**; (ix) **Section (Seismic) Editor** for the 1<sup>st</sup> (2011) & 2<sup>nd</sup> (2021) Edition of the Encyclopaedia of Solid Earth Geophysics, Springer.

#### d. International/National Seminars/Workshop:

(i) Organized a Pre-Congress Workshop on 'Himalayan Hazards and Way Forward' on Nov. 24 at WIHG, convened a Special Session on the 'Joshimath Episode' on Nov. 29, and co-chaired a Plenary Session on 'Resilience & Sustainable Development in the Himalaya' on Nov. 30 during the 6th World Congress on Disaster Management in Dehradun (2023); (ii) **Organized the 42<sup>nd</sup> Annual Convention** of Ass. of Expl. Geophysicists (AEG) at WIHG during Dec. 2-3, 2021; (iii) **Organized 7<sup>th</sup>** (September 12-14, 2023), **6<sup>th</sup>** (June 7-9, 2022), **5<sup>th</sup>** (July 22-23, 2021), **4<sup>th</sup>** (June 23-24, 2020) and **3<sup>rd</sup>** (June 6-8, 2019) **National Geo-Research Scholars Meet**; (iv) **Organized the 3<sup>rd</sup>** (November 16-18, 2022 at WIHG, Dehradun), **2<sup>nd</sup>**

(October 13-16, 2019 at CSIR-NGRI, Hyderabad) and 1<sup>st</sup> (November 8-10, 2016 at IIT-ISM, Dhanbad) **Triennial Congress of Federation of Indian Geosciences Association (FIGA)**; (v) **Convened the 56<sup>th</sup>** (October 13-16, 2019 at CSIR-NGRI), **55<sup>th</sup>** (December 5-7, 2018 at RNTU, Bhopal), **54<sup>th</sup>** (December 3-7, 2017 at CSIR-NGRI), **53<sup>rd</sup>** (November 8-10, 2016 at IIT-ISM), **52<sup>nd</sup>** (November 3-5, 2015 at NCPOR), and **51<sup>st</sup>** (November 19-21, 2014 at Kurukshetra University) **Annual Convention of Indian Geophysical Union**; (vi) **Convened & Organized 9th International Methane Hydrates R&D Workshop** in Hyderabad during November 9-12, 2014; (vii) **Convened International Workshop on Exploration & Exploitation of Shale Gas** in Hyderabad during December 19-20, 2012; (viii) **Organized an Indo-Russian Seminar on Gas Hydrates** at NIOT, Chennai during February 4-5, 2007; (ix) **Organized/convened 25 sessions in International/ National Seminars/ Conferences**; (x) **Chaired 45 sessions**; (xi) **Delivered 80 offline & 40 online invited/ keynote/ plenary talks**; (xii) **Attended 122 conferences**; (xiii) **Taught Courses on 'Seismic Tomography' at International Conference & Exposition of SPG-India, 2015; 'Seismic Modeling' at International Conference & Exposition of SPG-India, 2017; 'Non-seismic techniques in hydrocarbon exploration' at International Conference & Exposition of GEO-India, (Oct, 12, 2022)**; (xiv) **Organized International Workshop on 'Assessment & Mitigation of Landslides' (Oct 28-29, 2020) at WIHG**; (xv) **Convened E-Workshop on 'Luminescence dating & New Applications' (Nov 25-27, 2020) at WIHG**; (xvi) **Conducted a pre-Convention Workshop on AI for advanced interpretation of 3D Seismic Data (Dec 1, 2021) at 42<sup>nd</sup> AEG; a pre-Congress Workshop on AI applications to Geosciences (Nov 15, 2022) at 3<sup>rd</sup> FIGA**; (xvii) **Organized One-Day Indo-Norwegian Webinar on Himalayan Geo-hazards & Georesources (June 1, 2022)**; (xviii) **Organized One-Day Indo-Russian Webinar on Seismic Forecasting (June 30, 2022)**.

#### e. External Research Fund received & Project Handled:

(i) **INR 68 Crores** worth 3D seismic data in fore deep and foothills of Himalaya **from DGH, Noida**; (ii) **INR 15 Lakhs from SERB-DST** under JC Bose National Fellowship every year for 5 years (2021-2025); (iii) **INR 21 Lakhs from Uttarakhand State Disaster Management Authority** for studying Vasudhara Tal, Purvi Kamet (Raykana) Glacier in Dhauliganga valley, Uttarakhand (2021-2022); (iv) **INR 184 Lakhs from Uttarakhand State Disaster Management Authority** for long-term monitoring of Gongotri glacier, Uttarakhand (2021-2024); (v) **INR 4886 Lakhs from MoES** for investigation of gas-hydrates (2007 - 2017) (PL); (vi) **INR 60 Lakhs from OIDB** for quantification on gas-hydrates (2007 - 2012) (PL); (vii) **INR 36 Lakhs** under **Swarnajayanti Project from DST** for delineation & assessment of gas-hydrates (2002 - 2006) (PL); (viii) **INR 25 Lakhs by MoES** for understanding petroleum system of gas hydrates in KG basin (2014-2017) (PL); (ix) **Procured INR 92 Crores** worth ocean bottom & multi-channel seismic data **from ONGC-Mumbai** in Kerala-Konkan offshore for the investigation of sub-volcanic sediments (2015-2018) (PL); (x) **PL of MLP Project on "Gas Hydrates & Conventional Hydrocarbons"**; (xi) **Nodal Officer** of GENIAS, and **PL** of SHORE & GEOSCAPE - important projects under 12th FYP of CSIR.

#### f. Institutional Committee Member at CSIR-NGRI (before Lien):

(i) **Chairman**, Students' Academic Committee (2016-2018); (ii) **Chairman**, House Allotment Committee (2013-2018); (iii) **Chairman**, Purchase Committee - upto 25 Lakhs (2013-2018); (iv) **Member**, Honorarium Distribution Committee (2011-2018); (v) **Member**, 'Standing Committee' to share ECF earned (2012-2018); (vi) **Member**, 'E-classroom Committee' to monitor work-progress (2012-2014); (vii) **Member**, Collegium for Assessment of Scientists (2011-2018); (viii) **Member**, Selection Committee for PA/PF/SRF/RA/PS (2011-2018); (ix) **Member**, Compassionate Appointments Committee (2012-2018); (x) **Chairman**, OB Committee (2011-2014); (xi) **Member**, Medical Committee (2007-2010).

#### g. Interviews/Conversations in Media, Lectures, and Articles in Newspapers/Magazines: > 125

(*available in websites and YouTube* on diversified topics: climate change and consequences; geo-hazards due to landslides, avalanches, lakes outbursts, flash floods, earthquakes, etc.; early warnings and disaster risk reduction; seismotectonics, geotectonic and basin evolution; hydrocarbons in Himalayan thrust fold belts; unconventional gas-hydrates; geothermal energy resources; imaging sub-volcanics; advancement of geophysical tools; application of AI/ML to Geosciences.

#### 14. Countries Visited

UK, USA, Germany, Canada, Russia, Italy, Armenia, Thailand, Taiwan, South Korea, Norway, Austria, Singapore, France, Malaysia, New Zealand, Japan, Australia, China, Czech Republic, South Africa.

#### 15. National and International Collaboration:

(i) Indo-UK (2018 -2022): Dr. K. Sain & Prof. Tiago M. Alves, Cardiff University, UK; (ii) CSIR-NGRI & ONGC Joint Study (2013-2018): Dr. K. Sain & Mr. N. Chandrasekhar, ONGC, Mumbai; (iii) Indo-China (2011-2013): Dr. K. Sain & Dr. Xiujuan Wang, Chinese Academy of Sciences, China; (iv) Indo-Italian

(2009): Dr. K. Sain & Dr. Umberta Tinivella, OGS, Italy; (v) Indo-US (2007): Dr. K. Sain & Dr. Richard Coffin, Naval Research Laboratory, USA; (vi) Indo-Russia (2005-2006): Dr. K. Sain & Dr. G.A. Cherkashov, IGMRO at St. Petersburg, Russia; (vii) Indo-US (1999): Dr. K. Sain & Dr. Colin A. Zelt at Rice University, Houston, USA; (viii) Indo-US (2003): Dr. K. Sain & Dr. Colin A. Zelt at Rice University, Houston, USA; (ix) Indo-Canada (2003): Dr. K. Sain & Dr. Gerhard A. Pratt at Queen's University at Kingston, Canada; (x) Indo-US (2001): Drs. P.R. Reddy and K. Sain & Dr. Walter D. Mooney at USGS at Menlo Park, USA; (xi) Indo-UK (1998): Dr. K. Sain & Dr. Satish C. Singh at Cambridge University, UK

## 16. Patent Granted:

A patent on 'Borehole Acoustic Televiewer Probe' (Design No. 6318405) by Bappa Mukherjee and Kalachand Sain, granted by the UK Intellectual Property Office on October 18, 2023 [<https://www.registered-design.service.gov.uk/find/>]

A patent on 'Borehole AI Televiewer Probe' (Design No. 6323496) by Bappa Mukherjee and Kalachand Sain, granted by the UK Intellectual Property Office on November 14, 2023 [<https://www.registered-design.service.gov.uk/find/>]

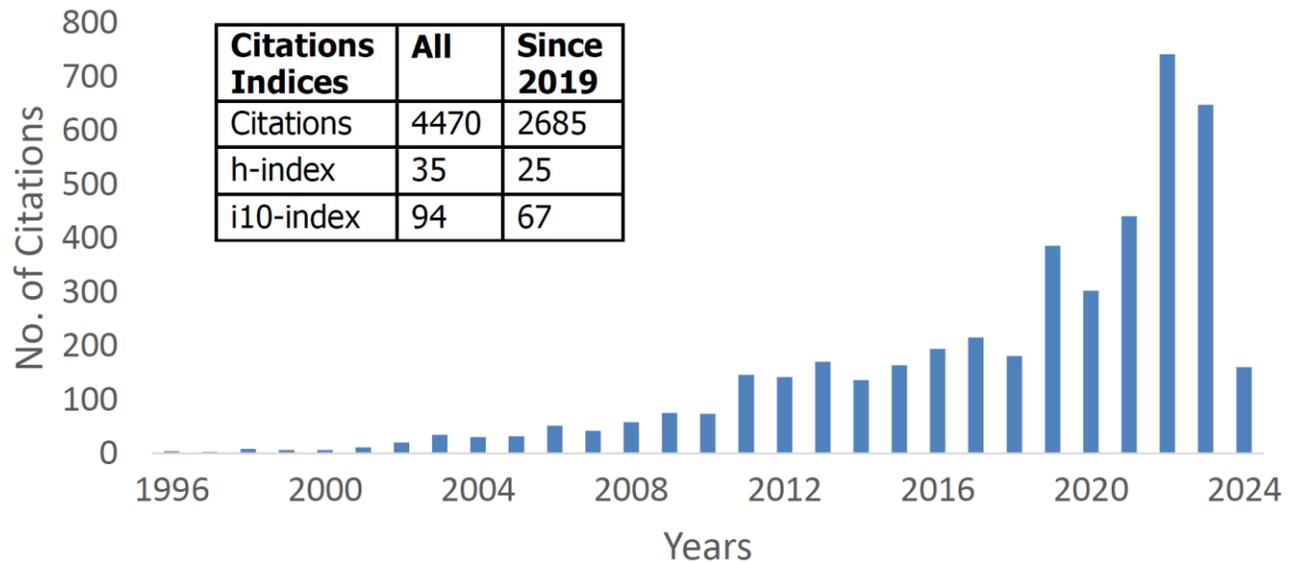
A document on "Semi-automated Lithological Edge Recognition Method from Geophysical Logs Assisted by Synergistic Implementation Multi-resolution Analysis and Hampel Filter" has been filed by Bappa Mukherjee and Kalachand Sain for US patent at the United States Patent and Trademark Office (USPTO) on 08.09.2023 (Application Number 18/243,698)

## 17. Publications at a glance – 343 Peer-reviewed articles – 246

**SCI Papers – 205; Authored Books – 5; Edited Volumes: – 7; Book Chapters – 26; Non-SCI Papers/Reports – 100; Papers submitted – 17**

- |   |  |
|---|--|
| (i) Science (IF=47.73) – 1                            | (xxxvi) Pure & Applied Geophysics (IF=2.34) – 6          |
| (ii) Science of the Total Env. (IF=10.75) – 1         | (xxxvii) Acta Geophysica (IF=2.29) – 1                   |
| (iii) Renewable Energy (IF=8.63) – 1                  | (xxxviii) Geological Journal (IF=2.13) – 2               |
| (iv) Sustbl. Enrgy Tech. Assmt. (IF=8.00) – 1         | (xxxix) Jour. of Applied Geophysics (IF=2.12) – 5        |
| (v) Geology (IF=6.32) – 1                             | (xl) Jour. of Earth System Science (IF=1.95) – 6         |
| (vi) Gondwana Research (IF=6.15) – 1                  | (xli) Environmental Geotechnics (IF=1.93) – 1            |
| (vii) Jour. of Hydrology: Reg. Study (IF=5.44) – 1    | (xlii) Petrol. & Petrochem. Eng. Jour. (IF=1.87) - 1     |
| (viii) Earth & Planetary Science Letter (IF=5.26) – 1 | (xliii) Arabian Jour. of Geosciences (IF=1.83) – 3       |
| (ix) Env. Sci. & Pollution Res. (IF=5.19) – 1         | (xliv) Geophysics (IF=1.80) – 3                          |
| (x) Precambrian Research (IF=5.09) – 1                | (xlv) Advances in Geosciences (IF=1.70) – 1              |
| (xi) Scientific Reports (IF=4.98) – 4                 | (xlvi) J. of Acoustic Soc. of America (IF=1.57) – 1      |
| (xii) Jour. of Natural Gas Sci. & Eng. (IF=4.97) – 8  | (xlvii) Jour. of Geol. Soc. of India (IF=1.46) – 39      |
| (xiii) Geocarto International (IF=4.90) – 1           | (xlviii) Himalayan Geology (IF=1.29) – 7                 |
| (xiv) Geological Society of America (IF=4.5) – 1      | (xlix) Carbonates & Evaporites (IF=1.30) – 1             |
| (xv) Jour. of Petrol. Sci & Engg. (IF=4.35) – 2       | (l) Current Science (IF=1.10) – 17                       |
| (xvi) Mar. & Petrol. Geology (IF=4.35) – 16           | (li) Exploration Geophysics (IF=0.94) – 3                |
| (xvii) Basin Research (IF=4.31) – 1                   | (lii) Chinese Journal of Geophysics (IF=0.85) – 1        |
| (xviii) Geothermics (IF=4.28) – 1                     | (liii) Interpretation (IF=0.61) – 1                      |
| (xix) Earth Surface Process & Landform (IF=3.96) - 1  | (liv) Jour. of Seismic Exploration (IF=1.83) – 2         |
| (xx) Sustainability (IF=3.89) – 1                     | (lv) Proceedings of INSA (IF=0.87) – 6                   |
| (xxi) Am. Assoc. of Petrol. Geol. Bull. (IF=3.86) – 1 | (lvi) Environmental Process (IF=0.57) – 1                |
| (xxii) Jour. of Geophys. Research (SE) (IF=3.85) – 2  | (lvii) Indian Jour. of Geo-Marine Sci. (IF=0.49) – 1     |
| (xxiii) Tectonophysics (IF=3.66) – 1                  | (lviii) Geosystems and Geoenvironment – 2                |
| (xxiv) Marine Geology (IF=3.55) – 2                   | (lix) Int. Jour. of Earth Sci. & Engg. – 2               |
| (xxv) Jour. of Asian Earth Sciences (IF=3.45) – 5     | (lx) Results in Geophysical Sciences – 2                 |
| (xxvi) Tectonophysics (IF=3.93) – 1                   | (lxi) Artificial Intelligence in Geosciences – 2         |
| (xxvii) Geo-mech-phys-energy resources(IF=3.7) – 15   | (lxii) Memoir Geol. Soc. of India – 3                    |
| (xxviii) Royal Soc. of Chem. Adv. (IF=3.25) – 1       | (lxiii) Jour. of Indian Geophys. Union – 7               |
| (xxix) Frontiers in Earth Science (IF=3.23) – 1       | (lxiv) Jour. of Earth Sci. & Engineering – 1             |
| (xxx) Env. Monitoring & Assessment (IF=3.21) – 1      | (lxv) Encyclopedia of Solid Earth Geophys. – 4 Ch        |
| (xxxi) Geophysical Jour. International (IF=2.93) – 12 | (lxvi) Encyclopedia of Natural Hazard – 1 Ch             |
| (xxxii) Marine Geophys. Researches (IF=2.69) – 11     | (lxvii) Geological Soc. of America, Sp. Paper – 1 Ch     |
| (xxxiii) Mar. Georesources & Geotech. (IF=2.67) – 1   | (lxviii) Earth's Magnetic Interior, Springer Book – 1 Ch |
| (xxxiv) Episodes (IF=2.49) – 2                        | (lxix) Earth's System Process, Springer Book – 1 Ch      |
| (xxxv) Jour. of Geodynamics (IF=2.35) – 2             | (lxx) Memoir, geol. Soc. of India – 3 Ch                 |

(lxxi) Basics of Computational Geophysics – 2 Ch



(Source: <http://scholar.google.co.in/citations?hl=en&user=9nhStVcAAAAJ>)

## 18. Full List of Publications:

### (a) SCI Papers

- 1) A. Tiwari, **K. Sain**, N. Kumar, A. Paul, A. Kumar & V. Shukla, 2024. Seismic and Radon signatures: A multi-disciplinary approach to monitor surface dynamics of a hazardous 2021 rock-ice avalanche, Chamoli Himalaya, ***Earth Surface Processes and Landforms***, accepted.
- 2) S. Kumar, S Chowdhuri, S. Mohanty, **K. Sain**, M. Mukherjee, P. Kumar, A.K. Gupta, & A.K. Bhaumik, 2024. Accumulation of gas-hydrates in mass transport deposit at Krishna-Godavari basin, Bay of Bengal: Foraminiferal, Sedimentological, and Seismic Evidence, ***American Association of Petroleum Geology Bulletin***, accepted.
- 3) **K. Sain**, D. Hazarika, K. Sen & RJG Perumal, 2024. Status of Geo-scientific research at Wadia Institute of Himalayan Geology, Dehradun during 2020-2023, ***Proceedings of the Indian National Science Academy***, accepted.
- 4) J. Kumar, B. Mukherjee & **K. Sain**, 2024. Porosity prediction using ensemble machine learning approaches: A case-study from Upper-Assam basin, ***Jour. of Earth System Sci.***, accepted.
- 5) A. Kumar, **K. Sain**, K. Kumar, P. Patidar, Meenakshi, A. Reza, A. Verma & A. Mishra, 2024. Anticipating impact of glaciers, landslides and extreme climatic events on vulnerable hydropower projects and the development of an integrated multi-hazard warning system (IMWS), ***Sustainable Energy Technologies and Assessments***, accepted.
- 6) **K. Sain**, 2024. Disasters in Himalaya: Landslides, Avalanches, Flash-floods, Earthquakes, and their Plausible Mitigation with reference to the UK Himalaya, ***Jour. Geol. Soc. of India***, accepted.
- 7) B. Mukherjee & **K. Sain**, 2024. Semi-automated rock layer recognition from borehole log data using combined wavelet and Fourier transform: A case study in the KG basin, India, ***Jour. Geol. Soc. of India***, in press.
- 8) A. Mishra, A. Kumar, **K. Sain**, A. Verma & P. Patidar, 2024. Glacier changes and fragmentation in Birahi Ganga Basin, Garhwal Himalaya: Implications for water resources, ***Jour. Geol. Soc. of India***, in press.
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- 10) P. Chauhan, M. E. Akiner & **K. Sain**, 2024. Forecast future disasters from hydro-meteorological datasets in the Yamuna river basin, western Himalaya using Markov Chain and LSTM approach, ***Artificial Intelligence in Geosciences***, 5:100069, 1-23.

- 11) B. Mukherjee, P.K.R. Gautam & **K. Sain**, 2024. Machine learning assisted GPS velocity proxy: A case study over the Tibetan Plateau and its surroundings, *Jour. of Asian Earth Sciences*, 262, 106004: 1-16.
- 12) S. Konar, B. Mukherjee & **K. Sain**, 2024. Machine learning assisted gas hydrate saturation proxy: A case study from KG basin, India, *Himalayan Geology*, 45(1), 89-107.
- 13) G. Rawat, K. Mohan, S. Damodaran, H. Dadhich, P. Chingtham, **K. Sain** & O.P. Mishra, 2023. Geoelectric characterization of the junction of seismically active Delhi-Hardwar ridge and Delhi Sargoda ridge, *Scientific Reports*, 13:18488, 1-11.
- 14) A.K. Gupta, P. Mandal, D. Srinagesh, A. Tiwari, **K. Sain** & A. Paul, 2023. One dimensional regional shear velocity structure from joint inversion of fundamental mode group velocity dispersion measurements of Love and Raleigh waves – application to the Uttarakhand Himalaya, *Acta Geophysica*, 71(12), 2619–2632.
- 15) S.K. Tiwari, **K. Sain**, S. Kaur, J.S. Yadav, A. Baiswar, 2023. Degassed versus consumed flux of CO<sub>2</sub> from the third pole, *Jour. Geol. Soc. of India*, 99, 1305-1308.
- 16) M. Biswas & **K. Sain**, 2023. Surin-Mastgarh Anticline in NW Himalaya from 2D seismic data, and its Implication on Geotectonics and Hydrocarbon Exploration, *Jour. of Asian Earth Sciences*, 257:105840,1-15.
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- 19) P. Yadav, D.K. Singha & **K. Sain**, 2023. Rock physics modeling for estimation of gas hydrate saturation using NGHP-02 well data in the Krishna-Godavari basin, *Pure & App. Geophys.*, 180(8):1-20.
- 20) A. Kumar, A. Verma, S.K. Tiwari, R. Bhambri, **K. Sain**, S.K. Rai, P. Patidar, 2023. Heterogeneity in glacio-hydrological processes and estimation of different components in streamflow from central Himalayan glaciers, *Jour. of Hydrology: Regional Studies*, 49, 101495: 1-25.
- 21) J. Kumar, P.C. Kumar & **K. Sain**, 2023. Appraisal of reservoir porosity using a machine learning approach: A study from the Eocene-Miocene interval of Upper Assam Basin, NE India, *Geological Journal*, 58:4181–4193.
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- 27) J. Kumar, P.C. Kumar & **K. Sain**, 2023. Identification of oil-water contact from 3D seismic reflection data of the Upper Assam Basin, NE India, *Geological Journal*, Published Online, DOI: 10.1002/gj.4789, 1-11.
- 28) A. Verma, **K. Sain** & A. Kumar, 2023. Environmental changes in Antarctica using a shallow ice core from Dronning Maud Land (DML), East Antarctica, *Environmental Process*, 10:22,1-21.
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- 41) **K. Sain**, M. Mehta & V. Kumar, 2023. Avalanche hazards in Kedarnath temple town, Mandakini river valley, UK state of India – a case study, *Jour. of Geol. Soc. of India*, 99:173-176.
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- 43) Laxmi Pandey & **K. Sain**, 2022. Porosity mapping of shallow subsurface sediments: a case study from the offshore Mahanadi basin, India, *Exploration Geophysics*, 53(5), 517-531.
- 44) A. Baiswar, J.S. Yadav, **K. Sain**, R. Bhambri, A. Pandey, S.K. Tiwari, 2022. Emission of greenhouse gases due to anthropogenic activities: an environmental assessment from paddy rice fields, *Env. Sci. & Pollution Res.*, 30:37039–37054.
- 45) P. Chauhan, D. Malviya, **K. Sain**, R.L. Ray, S.K. Singh & D. Singh, 2022. Assessing the vulnerability of watersheds to environmental degradation in the Lesser Himalaya using a series of models, *Jour. of Geocarto Int.*, 37(27), 18372-18399.
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- 49) L. Pandey & **K. Sain**, 2022. Joint inversion of resistivity and sonic velocity logs using gradient descent method for estimates of gas hydrate saturation in the Krishna Godavari offshore basin, India, *Mar. Geophys. Res.*, 43:29, 1-12.
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- 52) L. Montagnani, N. Singh, M. Shekhar, B. R. Parida, A. K. Gupta, **K. Sain**, S. K Rai, A. Braeuning, J. Singh Charkaborty, V. Sharma, R. K. Tiwari, P. Chauhan, 2022. Tree-ring isotopic records suggest seasonal importance of moisture dynamics over glacial valleys of the Central Himalaya, *Frontiers in Earth Science*, 10:868357, 1-18.
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#### (h) Papers Submitted/Under Revision/Preparation in SCI Journals

- 1) **K. Sain**, P. Chauhan, P. Bisht, & S. Vaideswaran, 2024. Cloudburst-caused flash floods in Lasko valley, Pithoragarh district at India-Nepal border, submitted.
- 2) N. Singh, B.R. Parida, M. Shekhar, **K. Sain**, A. Bräuning, J.S. Chakraborty, M. Aquib, & S. Kanjilal, 2024. Pronounced Increase in Carbon Sequestration at the Cost of Water Cycle in Central Himalayan Glacial Valleys, submitted.
- 3) Rowtu Ramu, **K. Sain** & M. Abioui, 2024. Fault analysis based on similarity attribute using Neural Network Application “a case study from offshore Taranaki basin, New Zealand, submitted.
- 4) J. Kumar & **K. Sain**, 2024. Seismic attributes for elucidation of subsurface structures: A case study from Upper Assam Basin, NE India, submitted.
- 5) **K. Sain**, 2024. Geo-hazards in the Uttarakhand Himalaya and plausible mitigation, submitted.
- 6) M. Biswas & **K. Sain**, 2024. Terminated MHT, Evidence of Pre-Sivalik Tertiary rocks beneath and Evolution of NW Himalayan Foreland Basin, submitted.
- 7) A. Verma, **K. Sain** & A. Kumar, 2023. Environmental changes in Antarctica using a shallow ice core from Dronning Maud Land (DML), East Antarctica, submitted.

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- 9) T. Gogoi, S. Sahu, R. Chatterjee & **K. Sain**, 2023. Fracture identification and porosity estimation of subsurface reservoirs in parts of Upper Assam Basin, NE India, submitted.
- 10) J.S. Yadav, S.K. Tiwari, R. Bhambri, **K. Sain**, P. Patidar & A. Baiswar, 2023. Inter-intra-seasonality of meteorological drivers of Chorabari Glacier, central Himalaya: a multi-proxy assessment of glacier-induced hazards, submitted.
- 11) S.K. Tiwari, **K. Sain**, J.S. Yadav, S.K. Rai, A. Kharya, V. Kumar & P. Sethy, 2023. Rejuvenation of Upper Ganga and Upper Yamuna Indian river systems during COVID-19 pandemic-induced lockdown, submitted.
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- 13) P. Chauhan, N. Singh, **K. Sain**, R. Ahmad, J. R. Yadav & S.K. Rai, 2023. Hydrologic behavior and biophysical controls in Pindar-Kafni glacier valleys, central Indian Himalaya, submitted.
- 14) P. C. Kumar, Nicolas Waldmann & **K. Sain**, 2023. Structural illumination of a submarine buried stratovolcano: a case study from offshore Taranaki Basin, New Zealand, submitted.
- 15) A. Verma, A. Kumar, S.K. Tiwari, R. Bhambri, **K. Sain** & S.K. Rai, 2023. Defining hydrological processes using meteorology and stable water isotopes from glacierized basins in Garhwal Himalaya, India, submitted.
- 16) Sushil Kumar, M. Parija, **K. Sain**, A. Biswas, A. Tiwari, N. Kumar, P. Kumar, S. Biswal, R. Singh, R. Sushil, 2023. Source parameters and moment tensor of the February 06 2017 Mw5.7 Garhwal earthquake: Emphasis on the Seismotectonics of the Garhwal Himalayan Region, India, submitted.

