

Curriculum Vitae

Dr. Neeraj Srivastava

Associate Professor

Head, Planetary Remote Sensing Section (PRSS)
Planetary Sciences Division, Physical Research Laboratory (PRL)
Department of Space, Govt. of India, Ahmedabad – 380 009
Contact: +91-79-26314416 (Office), +91-9429029353 (Mobile)
Email: sneeraj@prl.res.in, sneerajprl@gmail.com



Residence: D301, Sorrel, Applewoods, Ahmedabad, 380058

Research Interests:

- Geological evolution of the Moon & Mars using Remote Sensing data
- Planetary processes: Impact Cratering, Volcanism & Tectonism, Space Weathering
- Imaging spectroscopy for Remote Geochemical Analysis
- Reflectance spectroscopy of Planetary samples and their Terrestrial analogues under planetary simulated conditions. *I have established a first-of-its-kind laboratory in the country at PRL for conducting these experiments.*

Professional Experience:

- 20 years at PRL (Joined PLANEX program of ISRO at PRL in the year 2002)
- Visiting Researcher at Department of Geological Sciences, Brown University, USA – (1st March – 31st May, 2007)

Academic Record:

Examination/ Degree	Subjects/ Department	Institute/University	Year	Division
Ph. D. (Applied Geology)	Earth Sciences	IIT Roorkee, 2014 – Ph.D. Topic: Geology of Lowell Crater Region on the Moon: Analysis of Remote Sensing data		
M.Tech. (Applied Geology)	Earth Sciences	IIT Roorkee, Roorkee	2001	FIRST
B.Sc.	Geology, Maths, Physics	Lucknow University	1997	FIRST
Intermediate	Phy., Chem., Maths and others	B.N. Lal Voc. Inter College, Lucknow	1993	FIRST
I.C.S.E.	Math, Sci., and others	Little Flower High School, Gorakhpur	1991	FIRST

Awards & Honors:

- **Expert Member**, ISRO-KARI (Korea Aerospace Research Institute) Lunar Cooperation, 2021.
- Recognized as **PhD Guide** by Pondicherry University and Gujarat University.
- **Member**, ISRO-JAXA LuPEX mission Working Group 1.
- **Science PI & Member Secretary**, PRL-VSSC *Planetary Rock Sampling Technology* executive committee, *My Vision 2030*, DTDI, ISRO, 2020.
(*The project featured as one of the twenty-one selected projects from a total of 146 proposals received from various centers of ISRO*)
- **Member**, Review Committee, Chandrayaan-1 HySI & TMC project proposals.
- **Panel Judge**, Touch the Jovian Moon Contest, Pearl Jubilee Celebrations of Liquid Propulsion System Centre (LPSC), ISRO, Valiamala, Trivandrum.
- **External Examiner**, Ph. D. viva voce examination, Gujarat University, 2020.
- **“Career Development Award”** from Lunar & Planetary Institute, Houston, USA, March., 2013.
- **“COSPAR Outstanding Paper Award for Young Scientists”**, Scientific Commission B, Earth – Moon System, Planets and Small Bodies of the Solar System, 37th COSPAR Assembly, Montreal, Canada, 2008.
[First Indian COSPAR Award in the Young Scientist’s categories]
- COSPAR travel grant to attend 10th COSPAR Capacity Building Workshop on “Lunar and Planetary Surface Science”, Harbin, China, September 2009.
- **“Best Paper Award”**, for the paper entitled “*Spectral Reflectance Studies of Copernicus and Tycho craters on Moon*”, National Space Science Symposium XIV, Andhra Univ., Visakhapatnam, 2006.
- **“Best Poster Award”** for *PLANEX Newsletter: An outreach to nuances of Planetary Sciences*”, National Space Science Symposium XVII, S.V. Univ., Tirupati, 2012.

Key Scientific Achievements:

- Initiated “*Planetary Remote Sensing for Geological Studies*” in the country at PRL in 2002.
- Contributed to the framing of the Scientific Objectives of Chandrayaan-1 mission, India’s first Planetary Mission.
- My first research paper [*N. Srivastava, Advances in Space Research 42, 2, 2008*], received the inaugural “The Outstanding Paper Award for Young Scientists (Scientific Commission-B)” during 37th COSPAR Scientific Assembly, Montreal, Canada in July, 2008. *Also, this paper was one of the first two research publications (in the same issue) by Indian researchers in the field of Lunar Geology.*
- Discovered Recent Volcanism on the Moon. Earlier, the Moon was unanimously considered to be volcanically dead.
- Our approach for studying lunar volcanism using Chandrayaan-1 M³ data has been used by Chang’e-3 team to analyze *Yutu* rover data in one of the inaugural publications (Lieu et al., 2014, RAA).
- Established previously little known Lowell crater on the Moon as a site of prime geological importance for future exploration.
- Deciphered and exhumed geology of an obscured impact basin on the Moon for the first time. The basin termed Crüger – Sirsalis is pre-Nectarian in age. We have found that this basin uniquely showcases the volcanic history of the Moon.
- Discovered Recent volcanism (~700 Ma) and tectonism (~50 Ma) inside the Grimaldi Basin on the Moon.

Membership in Professional Bodies:

- Member, European Geosciences Union
- Member, COSPAR

Publications:

a. Peer-reviewed Journals

1. Tanu Singh, **Neeraj Srivastava**, Megha Bhatt, Anil Bhardwaj, Geology of the Crüger - Sirsalis Basin: Evidence for prolonged volcanism in the southwestern near side of the Moon. *Icarus*, 376, 2022 <https://doi.org/10.1016/j.icarus.2021.114875>
2. Rajiv R. Bharti, I.B. Smith, S.K. Mishra, **Neeraj Srivastava**, Shital H. Shukla, SHARAD detection of sedimentary infilling within an unnamed crater near Mangala Fossa region, Mars, *Icarus*, 2021, <https://doi.org/10.1016/j.icarus.2021.114713>
3. Tanu Singh and **Neeraj Srivastava**, Geology of Grimaldi Basin on the Moon: Evidence for volcanism and tectonism during the Copernican period, *Icarus*, 351, 2020, 113921, <https://doi.org/10.1016/j.icarus.2020.113921>
4. R. Sinha, S. Vijayan, M. Bhatt, Harish, N. Kumari, **Neeraj Srivastava**, I. Varatharajan, D. Ray, C. Woehler, A. Bhardwaj, Geological characterization of Chandrayan-2 landing site in the southern high latitudes of the Moon, *Icarus*, 337, 113449, 2020, <https://doi.org/10.1016/j.icarus.2019.113449>
5. R. Sharma, **N. Srivastava**, S.K. Yadav, Resource potential and planning for exploration of the Hebrus Valles, Mars, *Research in Astronomy and Astrophysics (RAA)*, 19, 8, 2019, doi: 10.1088/1674-4527/19/8/116
6. **Neeraj Srivastava**, I. Varatharajan, “Geomorphology of Lowell crater region on the Moon” *Icarus*, 266, 44–56, 2016, <https://doi.org/10.1016/j.icarus.2015.11.013>
7. P. Chauhan, P. Kaur, **Neeraj Srivastava**, R. Sinha, N. Jain, S.V.S. Murty, “Hyper-spectral remote sensing of planetary surfaces: an insight into composition of inner planets and small bodies in the solar system” *Current Science*, 108, 5, 1041- 1046, 2015.
8. N. Bhandari and **Neeraj Srivastava**, “Active moon: evidences from Chandrayaan-1 and the proposed Indian missions” *Geoscience letters* 2014, 1:11, 2014, <https://doi.org/10.1186/s40562-014-0011-y>
9. R. P. Gupta, **Neeraj Srivastava**, R. K. Tiwari, “Evidences for relatively new volcanic flows on the Moon” *Current Science*, 107, 3, 454-460, 2014.
10. I. Varatharajan, **Neeraj Srivastava**, and S.V.S. Murty, “Mineralogy of young lunar mare basalts: Assessment of temporal and spatial heterogeneity using M³ data from Chandrayaan-1” *Icarus*, 236, 56–71, 2014, [10.1016/j.icarus.2014.03.045](https://doi.org/10.1016/j.icarus.2014.03.045).

11. **Neeraj Srivastava**, D. Kumar, R. P. Gupta, “Young viscous flows in the Lowell crater of Orientale basin, Moon: Impact melts or volcanic eruptions?” *Planetary and Space Science*, 87, 37-45, 2013, 10.1016/j.pss.2013.09.001
12. R. P. Gupta, R. K. Tiwari, V. Saini, **Neeraj Srivastava**, “A simplified approach for interpreting principle component images”, *Advances in Remote Sensing*, 2, 111 – 119, 2013.
13. P. Chauhan, P. Kaur, **Neeraj Srivastava**, S. Bhattacharya, Ajai, A.S. Kiran Kumar and J.N. Goswami, “Compositional and Morphological analysis of high resolution remote sensing data over central peak of Tycho crater on the Moon: Implications for understanding lunar interior”, *Current Science.*, 102, 7, 1041- 1046, 2012.
14. **Neeraj Srivastava**, “Titanium Estimates of the Central Peaks of Lunar Craters: Implications for Sub-Surface Lithology of Moon”, *Adv. Space Res.*, 42/2, 281-284, 2008.
15. N. Bhandari, V. Adimurthy, D. Banerjee, **Neeraj Srivastava** and D. Dhingra “Chandrayaan-1 Lunar Polar Orbiter: Science goals and Payloads”, American Astronautical Society, 33-42, 2004.

b. Book Chapters & Conference Proceedings:

1. **Neeraj Srivastava**, Tanmay Singhal, A. J. Verma, Aasik V., Nirbhay K. Upadhyay, R. R. Mahajan, Manu V. Unnithan, K. Durga Prasad, Varun Sheel, U.A. Subramanian, Anil Bhardwaj, Planetary Rock Sampling Technology, Proc. of DTDI Conclave 2021, Disruptive and Future Technologies, ISRO HQ, 22-26 Nov. 2021, <https://dtidi.isro.dos.gov.in/dtidi-conclave-2021>
2. **Neeraj Srivastava**, “Young volcanism on the Moon”, Encyclopedia of Lunar Science, Springer, Editor: Brian Cudnik, ISBN: 978-3-319-05546-6, doi:10.1007/978-3-319-05546-6_30-1, 2018.
3. **Neeraj Srivastava**, Chapter 5: Hyperspectral Remote Sensing in Planetary Exploration , Book: *Hyperspectral remote sensing and spectral signature applications*, eds. S. Rajendran, S. Aravindan, T. Jeyavel Rajkumar, R. Sivakumar, K.R. Murali Mohan, New India Publishing, ISBN: 9788189422349, 8189422341 Year: 2009.

c. Extended Abstracts in Conference Proceedings:

1. A. J. Verma and **N. Srivastava**, Automated Drilling and Coring of Planetary Sub-surfaces for sample return missions, “Indian Space Technology in 2030: My Vision” session of the 1st DTDI technology workshop, 14-15 Nov. 2019 ISRO HQ, Bengaluru

(our abstract featured among the 23 selected for presentation out of 146 abstracts received)

2. R. Sinha, S. Vijayan, M. Bhatt, H Nandal, N. Kumari, **N. Srivastava**, I. Varatharajan, D. Ray, C. Woehler, A. Bhardwaj, Geological insights into Chandrayaan-2 landing site in the southern high latitudes of the Moon, *Lunar & Planetary Sci. Conf.*, USA, 2019.
3. M. Bhatt, C. Woehler, **N. Srivastava**, V. V. Shevchenko, A. A. Berezhnoy, A. Grumpe, A. Bhardwaj, Regolith Alteration Processes at Reiner Gamma Shed Light on the Formation of Lunar Swirls, *Lunar & Planetary Sci. Conf.*, Houston, USA, 2018
4. **N. Srivastava**, “*Future scientific exploration of the Moon: Sample return from the Lowell crater, Orientale basin*”, Planetary Science Vision 2050 Workshop, LPI Contrib. No. 1989, 2017.
5. **N. Srivastava** and R. P. Gupta, “*Spatial distribution of spinel in the Orientale basin: new insights from M3 Data*”, 44th LPSC, Houston, 1509. pdf, 2013. (Oral Presentation).
6. **N. Srivastava** and R. P. Gupta, “*Compositional diversity inside Lowell crater, Orientale Basin: Evidences for extensive spinel rich deposits*”, 2nd Conf. on Lunar Highland Crust, Bojeman, Montana, 9016.pdf, 2012 (selected for Oral presentation).
7. **N. Srivastava**, D. Kumar, R.P. Gupta, “*Is the moon still active?*”, Conference on Planetary Sciences and Exploration, PRL, Ahmedabad, India, 97 – 98, Dec. 2011. (Oral presentation)
8. P. Chauhan, S. Bhattacharya., **N. Srivastava** et al., “*Study of compositional diversity of Tycho crater using multi-sensor hyperspectral data*”, Conference on Planetary Sciences and Exploration, PRL, Ahmedabad, 106 - 107, 12 – 14 Dec. 2011.
9. P. Chauhan, P. Kaur, **N. Srivastava**, S. Bhattacharya1, D. Lal, Ajai and A.S. Kiran Kumar “*Studies of lunar dark halo craters in northwestern mare nectaris using high resolution Chandrayaan-1 data*”, 42nd LPSC, 1338.pdf, 2011.
10. P. Chauhan, **N. Srivastava**, C.M. Pieters, Ajai, A.S. Kiran Kumar, R.R. Navalgund, J. W. Head, N. Petro, C. Runyon and J.N. Goswami, “*Integrated Analysis of topographically high mafic exposures at Apollo -17 landing site using data from imaging sensors on Chandrayaan -1*”, 41st LPSC, ,1606.pdf, 2010.
11. **N. Srivastava**, “*Spectral reflectance studies for maturation trends in a mare and highland swirl*”, 40th LPSC, Houston, 1577. PDF, 2009.

12. **N. Srivastava** “*Geochemical estimates of iron and titanium for the central peaks of lunar craters*”, 38th LPSC, Houston, LPI Contribution No. 1338, 2188.PDF, 2007.

d. Abstracts in conference proceedings and/or Oral/Poster Presentations:

1. **N. Srivastava**, Abhishek J. Verma, Megha Bhatt, K. Durga Prasad, P.K.S. Reddy, K. Janmejaya, Varun Sheel, Anil Bhardwaj, *The bidirectional reflectance of a lunar highland and mare analogue: A comparative assessment*, NSSS 2022.
2. M. Bhatt, S. Narendranath, N. S Pillai, C. Wöhler, **N. Srivastava**, Anil Bhardwaj, *Mapping global lunar elemental abundance: A systematic study of CLASS and M³ data*, NSSS 2022.
3. R. R. Mahajan, K. K. Marhas, N. Upadhyay, A. Verma, J. Pabari, S. K. Goyal., M. Bhatta, A. D. Shukla, **N. Srivastava**, D. Panda, D. Ray, A. Basu Sarbadhikari, R. Sinha and Team, *Indian Sample curation and processing facility*, IPSC 2021, 25-26 Feb. 2021.
4. Neha Panwar, T. Singh, **N. Srivastava**, M. Bhatt, Anil Bhardwaj, *Hematite detection in lunar high latitudes using Chandrayaan-1 HySI data*, IPSC 2021, 25-26 Feb. 2021.
5. T. Singh and **N. Srivastava**, *Geology of the Grimaldi Basin on the Moon: shreds of evidence for volcanism and tectonism during the Copernican period*, Indian Planetary Sciences Conference, abs #IPSC0003, Feb 19-21 2020.
6. R. Sharma and **N. Srivastava**, *Discovery of Skylights on the flanks of Elysium Mons, Mars*. Indian Planetary Sciences Conference, abs# IPSC0115.pdf, Feb 19-21, 2020.
7. S. Chatterjee, T. Singh, N. Srivastava, M. Bhatt and B. Deshmukh, *The Geology of Moretus Crater on the Moon using Chandrayaan-1 and Lunar Reconnaissance Orbiter Data*, Indian Planetary Sciences Conference, Feb 19-21 2020.
8. T. Singh & **N. Srivastava**, *Geomorphology and mineralogy of Grimaldi basin on the Moon*, NSSS, S.P. University, Pune, 29-31 January 2019.
9. **N. Srivastava** et al., *Lunar Sample Return Missions: Next Logical step for planetary exploration*, NSSS, S.P. University, Pune, 29-31 January 2019. (Oral Presentation)
10. M. Bhatt, **N. Srivastava**, C. Wohler, S.K. Mishra, A. Bhardwaj, *Lunar Swirls: Linkage between Space Weathering, regolith compaction and formation mechanism*, NSSS, S.P. University, Pune, 29-31 January 2019.

11. R. Sinha, S. Vijayan, M. Bhatt, H Nandal, N. Kumari, **N. Srivastava**, I. Varatharajan, D. Ray, C. Wohler, A. Bhardwaj Pre-Chandrayaan-2 understanding of lunar morphology, topography, mineralogy, and chronology at the Vikram Landing site, NSSS, S.P. University, January 2019.
12. R. Sharma, **N. Srivastava**, S.K. Yadav, “*Subsurface access candidates in the Hebrus Valles Human Exploration Zone, Mars*”, Brainstorming Session on “Vision & Explorations for Planetary Sciences” in decades 2020 -2060, PRL, Nov. 8-10, 2017.
13. S. Baliyan, **N. Srivastava**, “*Fresh Basalts on Moon: High Priority Sites for Sample Return in Future*”, Brainstorming Session on “Vision & Explorations for Planetary Sciences” in decades 2020 -2060, PRL, Nov. 8-10, 2017.
14. Naveen, **N. Srivastava**, D. Ray, A.D. Shukla, “*Laboratory Reflectance Spectroscopy of Martian analogues*”, Brainstorming Session on “Vision & Explorations for Planetary Sciences” in decades 2020 -2060, PRL, Nov. 8-10, 2017.
15. **N. Srivastava** et al., “*Scientific Rationale and Potential Targets for Future Lunar Sample Return*”, AOGS, Singapore, 2017 (Oral Presentation).
16. **N. Srivastava**, “*Lowell crater: A region of prime geological importance on the Moon*”, Geophys. Res. Abstracts Vol. 18, EGU 2016-12570, EGU General Assembly 2016.
17. **N. Srivastava**, “*Discovery of Lowell crater as region of prime geological importance on the Moon*”, XIX National Space Science Symposium, Space Physics Lab, VSSC, 9-12 Feb., 2016
18. **N. Srivastava** and R.P. Gupta, “*Origin of Fresh Resurfacing in Lunar Craters: A Case study from Lowell crater, Orientale Basin*”, Workshop on Lunar and Mars Geosciences, Space Application Centre, July 30-31, 2013. (Oral Presentation)
19. **N. Srivastava** and R.P. Gupta, “*Gabbroic flows associated with craters on the Moon: Impact melts or Volcanic flows*”, ISRS symposium, IARI, New Delhi, 2012. (Oral Presentation)
20. **N. Srivastava** and R.P. Gupta, “*High resolution geologic investigations of selected sites in the Orientale basin on Moon*”, National Space Science Symposium, S.V. Univ., Tirupati, 2012. (Oral Presentation)
21. **N. Srivastava**, “*Spectral Reflectance studies of Moscoviense Basin using HySI data from Chandrayaan -1*” National Space Science Symposium, Saurashtra Univ., Rajkot, 24 – 27 Feb., 2010.

22. P. Chauhan, **N. Srivastava**, Ajai and A.S. Kirankumar, “Compositional study of crater Le Monnier using Chandrayaan – 1 HySI data” Global Lunar Conference-2010, Beijing.
23. **N. Srivastava**, “*Space Weathering effects on Remote Sensing of Airless Planetary Bodies*” Indian Society of Remote Sensing Symposium, Nirma Univ., Ahmedabad, 2008. (*Oral Presentation*)
24. D. Dhingra and **N. Srivastava** “*Potential Landing Sites for Future Lunar Exploration*”, National Space Science Symposium, Ooty, India, 2008.
25. **N. Srivastava**, “*Spectral Reflectance Studies of Copernicus and Tycho craters on Moon*”, National Space Science Symposium, Vishakhapatnam, 2006.
26. **N. Srivastava**, D. Dhingra and N. Bhandari, “*Global iron mapping of Moon using X-ray Fluorescence and Reflectance Spectroscopy from Chandrayaan – 1*”, International Lunar Conference -6, Udaipur, India, 2004.
27. N. Bhandari, **N. Srivastava**, and D. Dhingra, “*Prime lunar targets for high resolution study by Chandrayaan- 1*”, International Lunar Conference - 6, Udaipur, India, 2004.
28. D. Dhingra, **N. Srivastava**, K. R. Murali, K. Kumar, and N. Bhandari, “*Reflectance Spectroscopic Studies of Planetary Analogues for mineral Mapping*”, National Space Science Symposium, Kerala, Feb. 17-20, 2004.

e. Popular articles

1. **N. Srivastava**, “*Pluto: No longer a Planet*” Centre for Space Science and Technology Education in Asia and Pacific (CSSTEAP) News Letter, 11, 1, 2008.
2. D. P. Karanam and **N. Srivastava**, “*Thirst for Water on Moon*” PLANEX Newsletter, Vol 1, Issue 1, 6-8 , 2011.
3. V. Indhu and **N. Srivastava**, “*Crater Chronology: A tool for dating planetary surfaces*”, PLANEX Newsletter, 3, 1, 18–22, 2012.
4. **N. Srivastava** “*Chandrayaan-1 (one more step one more giant leap), Mission Story*”, PLANEX Newsletter, 2, 1, 21-23, Jan., 2012.

Organization of Conferences/Schools, Sessions/meetings:

1. Member, Local Organizing Committee, IPSC 2022, 14-16 March 2021, PRL.
2. Session Chair, Venus Science Conference 2021, 23-24 Sept. 2021, PRL.
3. Session Chair, IPSC 2021, Session 3: Terrestrial planets – Geology and Surface

Processes, 25-26 Feb. 2021.

4. As a Member, contributing to PSDN Internal Review Committee (IRC).
5. As a Local SOC member, contributed to Indian Planetary Science Conference (IPSC – 2021) organized at PRL between 25-26 Feb. 2021.
6. Member, Coordination committee for ISRO induction training programme (IITP-33).
7. Convener, BDR Committee, Planetary Rock Sampling Technology, MyVision 2030, ISRO.
8. Secretariat Member, Indian Planetary Science Conference (IPSC-2020), PRL, 19-21 Feb 2020.
9. Member, Structured Training Programme (STP) of ISRO, on the theme “*Scientific satellite missions: payload definition, development, data utilization*” jointly organized by SAC and PRL Ahmedabad during 22-28 January, 2020.
10. Member, 10th Structured Training Programme (STP) of ISRO on the theme “*Recent Advances in Scientific Research in the Earth, Planetary and Space Sciences using Ground and Space based data: Global Perspectives*” organized at PRL, Ahmedabad during 4-8 Feb 2019.
11. Session Chair, Indian Planetary Sciences Conference (IPSC) 2020, held at PRL – Theme: Lunar Science: Present Understanding & Outstanding Questions
12. Session Chair, Structured Training Programme (STP) of ISRO, on the theme *Scientific satellite missions: payload definition, development, data utilization*, jointly organized by SAC and PRL Ahmedabad during 22-28 January, 2020.
13. Session Co-chair, PS-5, Theme - Lunar Geology, National Space Science Symposium (NSSS-2019), Pune, 29-31 Jan., 2019.
14. Convener, 15th PLANEX Workshop on “*Mars and Moon: Remote Sensing and Analogue Studies*” Jan. 4-10, 2015 at PRL, Ahmedabad.
15. Co-convener, Session PS-5 (The Solar system bodies including Planetary system) of National Space Science Symposium – 2016, SPL, VSSC, 2016.

Invited Lectures and Short term Projects Mentored:

1. *Lunar Volcanism and its flavors*, Lunar Science meet (Web Event) jointly organized by IIT Kanpur and Space Science Programme Office (SSPO), ISRO HQ on 16th May 2020.
2. *Science and Technical aspects of Lunar Sample Return*, Session: Vision and Opportunities for Future Planetary Exploration, Indian Planetary Sciences Conference (IPSC), PRL, 19-21 Feb. 2020.
3. *Planetary Remote Sensing*, Structured Training Programme (STP) of ISRO, on the theme *Scientific satellite missions: payload definition, development, data utilization*, jointly organized by SAC and PRL Ahmedabad during 22-28 January, 2020.
4. *Lunar Polar Regions – significance*, Discussion on Chandrayaan-2 data analysis methods and Second Lunar Science Meet, ISRO HQ, 13th – 14th June 2019.
5. *Lunar Volcanism & Tectonism*, Lunar Science Meet, ISRO HQ, 27th Sept., 2018 (By Neeraj Srivastava & Megha Bhatt – the talk was delivered by Megha Bhatt).
6. Delivered a lecture on “*Remote Sensing of the Moon*” & provided tutorial on “*Planetary Remote Sensing*” during a course on Challenges and Advances in Planetary Science (CAPS) at Indian Institute of Science (IISC), Bengaluru, 18-22, Sept. 2017.
7. “*Lunar Sample Return Mission*”, Brainstorming Session on “Vision & Explorations for Planetary Sciences” in decades 2020 -2060, PRL, Nov. 8-10, 2017.
8. Delivered a lecture on “*Remote Sensing of the Moon*” & provided tutorial on “*Planetary Remote Sensing*” during a course on Challenges and Advances in Planetary Science (CAPS) at Indian Institute of Science (IISC), Bengaluru, 18-22, Sept. 2017.
9. “*Recent volcanism on Moon and Mars*”, 16th PLANEX Workshop on “Exploration of inner solar system objects”, PRL, Ahmedabad, March 7-10, 2016.
10. “*Hyperspectral remote sensing of Moon and Mars*”, IEEE GRSS workshop on Hyper Spectral Remote Sensing, CEPT university, Ahmedabad, March 1st, 2016.
11. Delivered lecture & Mentored a project on “*Geologically active Moon: Evidences from recent missions*”, Structured Training Programme (STP) on Planetary

Exploration for Senior Scientists and Engineers from ISRO, PRL, Ahmedabad, Jan. 27-30, 2015.

12. “*Geological evolution of the Moon*”, 15th PLANEX Workshop on “Mars and Moon: Remote Sensing and Analogue Studies”, PRL, Jan. 4-10, 2015.
13. “*Chandrayaan-1: India’s first planetary exploration endeavor*”, 9th Space & Atmospheric Science Course, CSSTEAP, Bopal Campus, Space Applications Centre – ISRO, Jan. 19, 2015.
14. Delivered lecture & Mentored a project on “*Lunar Impact and Crater Chronology*”, during 13th PLANEX Workshop on “*Impacts on Solar System objects*”, NGRI, Jan.6-12, 2013
15. Delivered a lecture on “*Space Weathering*” & Mentored a project on “*Reflectance Spectroscopy for Mineral Mapping*” during 12th PLANEX Workshop on “Exploration of Asteroids and Comets” at Mt. Abu, Jan. 2-6, Rajasthan, 2012.
16. Delivered a lecture on “*Remote sensing of Moon by TMC and HySI onboard Chandrayaan -1*” & Mentored a project on “*Reflectance Spectroscopy for Mineral Mapping*” during 11th PLANEX Workshop on “Exploration of Asteroids and Comets” at PRL, Jan. 3-7, 2011.
17. Delivered a lecture on “*Space Weathering*” & Mentored a project on “*TMC/HySI data analysis for Mare Orientale*”, during a workshop on “Chandrayaan-1 data analysis”, jointly organized by PLANEX, PRL and SAC, Nov. 28 – 30, 2010.
18. “*Hyperspectral Remote Sensing in Planetary Exploration*”, HYPERSPACTRA 2010 at DST Sponsored short term course on “Emerging Trends in Remote Sensing: Imaging Spectroscopy and Natural Resource Mapping”, Dept. of Earth Sciences, Indian Institute of Technology, Mumbai, Jan. 12 -16, 2010.
19. “*Chandrayaan – 1 data analysis*” 10th PLANEX Workshop on “Planetary Sciences and Space Instrumentation” at Punjab University, Chandigarh, Feb. 2010.
20. “*Remote Sensing of Moon: Clementine Examples*” 9th PLANEX Workshop, Jaipur University, Jaipur, 08 – 11 Jan. 2009.
21. “*Space Weathering*” 9th PLANEX Workshop, Jaipur Univ., Jaipur, 08-11 Jan. 2009

22. “*A Scientific Assessment of probable landing sites on near side of the Moon*” Discussion meeting on "Future Planetary Lunar Missions", PRL, Sept. 13-14, 2007.
23. “*The Moon: Present understanding and Open Question*”, 8th PLANEX Workshop on “Exploration of Solar System Objects”, Pondicherry University, Dec. 2007.
24. “*Remote Sensing of Moon*”, 7th PLANEX Workshop, PRL, Jan. 2007.
25. “*Demonstration of Ref. Spectrometer*” 7th PLANEX Workshop, PRL, 2007.
26. “*Analysis of Clementine Data for Chemical Mapping: Implications to Lunar Science*” Workshop on “Remote Sensing and Ch – 1 Data Analysis, PRL, Ahmedabad, Mar. 2006.
27. “*Elemental mapping of planetary surfaces*”, 6th PLANEX Workshop, NRSA, 2005.
28. “*Hands on training on data processing of Clementine VISNIR data*” and “*Demonstration of “Reflectance Spectrometer”*”, 6th PLANEX Workshop, NRSA, Hyderabad, 2005.
29. “*Remote Sensing of Moon*”, 5th PLANEX Workshop, PRL, 2004.
30. “*Cratering history of Moon*” 5th PLANEX Workshop, PRL during Nov. 2004
31. “*Chandrayaan–1: India’s first mission to the Moon*”, Kolhapur University, National Science Day Celebrations, 2004.

Role as Supervisor/ Mentor:

1. Ph. D. Students:

- Mr. Ravi Sharma, JJT University, Rajasthan: Potential resources for exploration of Hebrus Valles and Elysium Mons of Mars (Thesis submitted)
- Rajiv R. Bharti (Gujarat University)
- Neha Panwar (SRF, PRL)

2. PRL Summer trainees:

- Ms. Aliza Arora, Akal University, Bathinda, Punjab: *Chandrayaan-2 landing site: Likely sources of surface material* (2019)

- Mr. Soyeb Alam (IIT Roorkee): *Spectral Reflectance Study of Orientale Basin using Chandrayaan-1 M³ data* (2017)
- Mr. Dinesh Singh Bhati (Rajasthan University): *Geomorphology of Sirenum Tholus Region on Mars* (2017)
- Ms. Nandita Kumari (Anna University): *Crater chronology of selected Lunar Basalts on the Moon* (Co-supervisor) (2017)

3. Engineering Trainees:

- Ms. Diksha Dhakde, a M.Sc. Physics student of Institute for Excellence in Higher Education, Bhopal, for her MSc (Final) project on *Reflectance spectroscopy - a powerful tool for studying planetary surface composition* (Jan – May 2020)
- Guided 3 students of Gujarat Technical University (GTU), Ahmedabad Yash Sheth, Aishwarya Bhatt & Ronit Patel for their final semester project on *Digital Image Processing & Analysis of Planetary Datasets* (2018)
- Ms. Rachana Patel, a ME student of SAL Institute of Technology & Engineering Research, GTU, for her final year project on *Automatic detection of Minerals on the Moon using Hyperspectral data from Moon Mineral Mapper on board Chandrayaan-1, India's first Extraterrestrial Mission* (2016-2017)
- Mr. Vivek Chudasama, a ME student of Atmiya Institute of Technology and Science, Rajkot, GTU for final year project on *Reflectance Spectroscopy for Planetary Exploration* (22nd Sept 2015 – 16th May 2016)
- Guided two MCA students of GTU, Ahmedabad Mr. L. Harpal Vadher and Mr. R. Dhaval Patel for their final year project (2011- 2012).

4. Project Associates:

Guided Mr. Diganta Kumar and Ms. Indhu Varatharajan (2010 - 2014) towards the intricacies of planetary sciences.

International Conferences/ Workshops/ Symposia & Major Meetings attended:

1. 14th Asia Oceania Geosciences Society (AOGS), Singapore, August, 2017.
2. European Geosciences Union (EGU) General Assembly, Vienna, April, 2016.
3. 44th LPSC & Micro-symposium 54, LPI, Houston Texas, USA, March, 2013.

4. Chandrayaan - 1 Science Team Meeting at PRL, Ahmedabad, Feb., 2010.
5. ISRO-NASA-JAXA Lunar Target Calibration meeting, SAC, July, 2009.
6. 10th COSPAR Capacity Building Workshop on “Lunar and Planetary Surface Science”, Harbin, China, Sept., 2009.
7. 40th Lunar and Planetary Sci. Conf. (LPSC), the Woodlands, Texas, USA, March, 2009.
8. Chandrayaan -1 Science Team Meeting at PRL, ISRO HQ Bangalore, Sept., 2008.
9. 38th LPSC, Vernadsky-Brown Microsymposium 45 & Workshop on “Extraterrestrial Mapping”, LPI, USA, March, 2007.
10. 4th Moon Mineralogy Mapper (M³) Science Team meeting, Maryland, 2007.
11. International Lunar Conference- 6, Udaipur, 2004.

Training Received:

ASCI: DST sponsored training program on “General Management Programme for scientists”, Jan 18-29, 2021(online)

Outreach Activities:

1. Represented Planetary Sciences Division (PSDN) and won *First Prize in Hamara Karya (Our Work) competition* held at PRL on 23rd September 2019.
2. Member, Chandrayaan-2 Outreach Committee, provided a write-up entitled “*Are lunar rocks different from those on the Earth?*” to the SSPO, ISRO HQ, 2019.
3. Lead the Planetary Remote Sensing Exhibit during NSD-2018 at PRL.
4. Member, editorial team, *PRL News-The Spectrum*.
5. PLANEX Newsletter (ISSN: 2320-7108): As the Founder Editor of PLANEX Newsletter, I brought out 21 issues since Jan, 2011. The Newsletter received widespread popularity in the Planetary Sciences & Exploration community.