



भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद Physical Research Laboratory, Ahmedabad

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56_PRL Ka Amrut Vyakhyaan

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**“Seismological Research and
Gujarat’s Initiative”**

Dr. Sumer Chopra

Director,

Institute of Seismological Research (ISR), Gandhinagar.



<https://youtu.be/yHx2cfJv0vs>



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Title: “Seismological Research and Gujarat’s Initiative”

Speaker: Dr. Sumer Chopra

Director, Institute of Seismological Research, Gandhinagar

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Abstract

The Indian landmass is strained due to its collision with the Eurasian landmass since historical times, resulting in the formation of great Himalaya mountain chain. The strain accumulation is of the order of 100 nanostrain/year at the Himalaya plate boundary, ~10 at Indo-Gangetic plains and ~1 in peninsular India. The strain accumulation results in earthquakes in different parts of India. In the last 200 years, the Indian region has experienced many devastated earthquakes like 1819 Kachchh (M7.8), 1897 Shillong (M8.3), 1905 Kangra (M7.8), 1934 Bihar-Nepal (M8.0), 1950 Assam (M8.6) and 2001 Bhuj (M7.6). The total deaths due to the earthquakes in Indian peninsula is around 34,000 in last three decades. The earthquakes cannot be stopped but its affect can be mitigated through close monitoring of earthquake activity through a network of seismic stations to understand the physics of earthquakes, assessment of seismic hazard and building earthquake resistant infrastructure. It involves a multi-disciplinary initiative comprising of seismological, geological, geophysical and geotechnical studies.

The Speaker

Dr. Sumer Chopra has done M.Tech from IIT, Roorkee (formerly, University of Roorkee) with Honours and PhD from Kurukshetra University in Applied Geophysics. He joined Sardar Sarovar Narmada Nigam Limited, a wholly owned company of Govt. of Gujarat and worked for 15 years where he monitored the seismic activity in the environs of Narmada dam. After 2001 Bhuj earthquake, Govt. of Gujarat has established Institute of Seismological Research (ISR) at Gandhinagar. Dr. Chopra was deputed to ISR and later on absorbed as Scientist in ISR. He worked in ISR for 5 years and established a dense network of broadband seismographs, strong motion accelerographs and permanent GPS stations all over Gujarat state. At ISR, he has carried out site-specific response studies for critical structures like LNG terminals, nuclear power plants and special investment regions. He was the group head of seismic microzonation. Dr. Chopra joined seismology division of Ministry of Earth Sciences in 2010. He headed the Earthquake Hazard and Risk Analysis division of the newly established National Centre for Seismology, Ministry of Earth Sciences during 2011-2015. In 2015, he joined as Director, Institute of Seismological Research and since then working in ISR.

Dr. Chopra’s thrust areas of research are deterministic and probabilistic seismic hazard analysis, estimation of source parameters, site specific response studies, shallow crustal structure using RF approach, site characterization and attenuation characterization. He has more than 30 years of experience in seismological research. Has published more than 100 research papers in international peer-reviewed journals in the last 15 years and published more than 100 scientific/technical reports. He guided 5 PhD students and 8 students are currently undergoing PhD under him. He has been awarded certificate of merit in 2015 by Ministry of Earth Sciences for his outstanding contributions in Geosciences. He is a Member of the Research Advisory Committee of National Centre for Seismology, Ministry of Earth Sciences, Govt. of India, Member, Technical Committee for ground motion propagation and site amplification studies for Nuclear Power Plant Site at Gorakhpur, Haryana for AERB, BARC, Govt. of India, Member, Technical Committee for characterization of seismogenic zones around the site and evaluation of response of soil strata to vibratory ground motion AERB, BARC, Govt. of India, Member, BIS CED-39 committee for preparation of Probabilistic Seismic Hazard map of India and Member, Board of Studies, Changa University of Science and Technology, Anand.



About PRL

The Physical Research Laboratory (PRL), known as the “cradle of space science” in India, is one



of the premier research institutes founded in 1947 by Prof. Vikram Sarabhai, a renowned Cosmic Ray Scientist, a great visionary and institution builder. PRL played a seminal role in producing a highly motivated cadre of space scientists and the technologists of highest international repute. The first scientific rocket launched from Thumba on 21st November-1963 and many other rockets launched thereafter contained payloads developed at PRL. Dr. Sarabhai initiated many of these scientific and technical activities at PRL which eventually led to the formation of the Indian Space Research Organization (ISRO). Therefore, PRL is known as the “cradle of space science” in India. Further, the research in the area

of Plasma Physics expanded to the formation of the Institute of Plasma Research (IPR).

As an institution PRL is unique in that it conducts fundamental research in a wide range of research areas from the Earth to the cosmos, and comprising Astronomy and Astrophysics; Solar Physics; Space and Atmospheric Sciences; Theoretical Physics; Geosciences; Atomic, Molecular and Optical Physics, Astrochemistry; and Planetary Sciences and Space Exploration. PRL is one of the rare research institutes of international repute wherein research in such diverse fields of sciences is carried out using several state-of-the-art experimental facilities that exist under one umbrella.

Along with the ongoing research, several new initiatives have been taken up during the last few years. The Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory has been operationalized. PRL initiated scientific programmes in frontier areas of research, which include a search for exo-planets, laboratory studies of interstellar grains, laboratory synthesis of cold astro-molecules and experimental studies in the field of quantum optics. PRL is also developing several scientific payloads as a part of ISRO’s larger vision and contributing to roadmap for competitive scientific exploration of the solar system and beyond. In particular, PRL has been contributing significantly not only in building instruments for space missions, such as Chandrayaan-1, Chandrayaan-2, AstroSat and upcoming Aditya-L1, Chandrayaan-3 and planetary and space missions, but also by bringing out new and insightful science results.

PRL contributes to several national and international research programmes and to human resource development through its Doctoral and Post-Doctoral Programmes, capacity building programmes, such as UN Course on Space Science, and science and engineering internship programmes. PRL contributes significantly to society through its Outreach Programmes by periodically organizing science exhibitions and Open Houses, planned visits of students of various school and college to PRL, and popular talks at various institutions to not only share the excitements of the advancements of contemporary scientific findings but also to encourage students to take up sciences as their research career.

