



भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

Physical Research Laboratory, Ahmedabad

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PRL Ka Amrut Vyakhyaan-07

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**“GREEN ENERGY AND CLEAN
WATER FROM THE OCEANS”**

Dr. Purnima Jaliha

Scientist G & Head, Energy and Fresh Water,
National Institute of Ocean Technology,
Chennai, India



<https://youtu.be/4h6KFtEWE74>

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Title: “Green Energy and Clean Water from the Oceans”

Speaker: Dr. Purnima Jaliha

Scientist G & Head, Energy and Fresh Water,
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Abstract

In today's world the need for electricity and water needs no emphasis. Rapid industrialization, population growth coupled with human failures in managing the scenario have led to severe power and water stress. Fossil fuels are known to be depleting and new sources of power are being explored. Another important factor to look for in new sustainable energy sources is linked with the impending disaster of climate change and global warming. While solar, wind, biomass and other forms are already being tapped across the globe, energies which can be harnessed from the vast ocean have yet to move from the research arena. The oceans offer huge opportunities to try new technologies without affecting human settlements or the environment. The current efforts are therefore directed in developing technologies for harnessing marine renewable energies. In particular, ocean energy can be harnessed in the form of waves, currents, tides and temperature gradient.

The other prime need today is for water. While purification, storage, distribution of the water are all part of the scenario, in order to increase water availability, desalination in coastal areas is a possible solution. Various methods of desalination are being used although some may not be environmentally friendly when brine formation results or disposal of used components like membranes becomes necessary. Further, the difference in temperature between the sea surface and at a greater depth can be utilized to harness energy. This is called Ocean Thermal Energy Conversion or OTEC. Thermal desalination is a spin-off from the OTEC cycle.

Today NIOT has developed expertise in the design, assembly and running of low temperature thermal desalination (LTTD) plant in islands, coastal power plants and offshore in deep waters. The thermal desalination technology developed by NIOT has improved the health of the islanders and six more plants are now being installed. Scaling up of this technology in coastal power plants is being taken up with a project underway for the Tuticorin Thermal Power Station. Another flagship project is an OTEC powered LTTD plant being set up in Kavaratti, Lakshadweep which will be self-powered and will not require to use diesel generators. The need of the hour is to develop and scale up viable environmentally friendly renewable ocean energy forms and power thermal desalination systems with clean and green renewable energy.

The Speaker

Dr. Purnima Jaliha is a senior scientist who heads the Energy and Fresh Water group in the National Institute of Ocean Technology, India. She has a PhD in Civil Engineering from Duke University, USA. She has coordinated many first – ever projects in ocean energy and desalination. She has made outstanding contribution in the setting up of the first ever ocean thermal gradient based desalination plant at Kavaratti island in the Lakshadweep group in the Arabian Sea. For this work, she was awarded the Vishwakarma Medal in 2006 by the Indian National Science Academy. Dr. Jaliha led device developments for harnessing ocean energy from waves, marine currents and ocean thermal gradient (OTEC). The wave energy powered navigational buoy for use in ports, has been demonstrated successfully and has now been transferred to industry. The marine hydrokinetic turbine was successfully demonstrated in Andaman and the first ever wave energy powered desalination system was also demonstrated at Vizhinjam, Kerala. Currently she is focusing on scaling up and is also leading the first ever OTEC powered desalination plant in Lakshadweep. Dr. Jaliha is on many committees of Indian Government organizations, related to water and renewable energy. She has also been the Chairperson of the Indian Desalination Association – South Zone. She was awarded the Uehara Prize for the year 2019 by the International OTEC community for Contribution to the development of Ocean Thermal Energy Conversion. She is the EU led Clean Energy Mission Innovation Champion for India, 2020. She is currently the Vice Chair of the Executive Committee of the Ocean Energy Systems (OES) Technology Collaboration Program (TCP) under the International Energy Agency (IEA).



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 astromolecules 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.

