

Emerging technologies to tackle climate change - focus on oceans

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Abstract

India's approach to its oceans has evolved from viewing them as mere water bodies to recognizing them as a global stage for economic, social, and cultural dialogue. Oceans cover over 70 per cent of the Earth, sustaining life and influencing climate, provide nearly half of the world's oxygen, support biodiversity, and offer a vital protein source for over a billion people. The blue economy, aligned with Sustainable Development Goal 14, holds immense potential to uplift livelihoods with the broader inclusive and sustainable growth goal. Under the United Nations Decade of Ocean Sciences for Sustainable Development, there is an enhanced focus on developing science and technology for society to address the climate change risk and impacts from extreme weather events and sea level rise. Engineers play a vital role in sustainable development by designing and implementing nature-based solutions that meet people's needs without harming the environment. However, challenges such as marine pollution and the impact of global warming require relentless efforts.

India must focus on leveraging marine ICTs, Artificial Intelligence (AI), shipping, startups, and marine communication services. Striking the right balance between economic development and environmental preservation is crucial. Engineers can achieve sustainability in engineering into their designs by considering the project's entire lifecycle. It includes using sustainable materials, designing for energy efficiency, and finding ways to mitigate environmental impact. As the effects of climate change have become more apparent, Sustainable engineering is a way of designing and creating things that meet our needs without harming the environment or depleting natural resources. The importance of sustainable engineering comes from the industry's aim to create a better world. It is done by considering the well-being of both people and the planet in their engineering practices.

This lecture will cover technology development requirements for autonomous observing platforms, sensor technology, and data telemetry. For all the challenges we face, nature has a solution. Biomimicry offers an empathetic, interconnected understanding of how

life works and where we fit in. This talk will focus on practical experience in developing products that are working to collect real-time data (24x7) from the surface and deep ocean and transmit it through satellite telemetry. Such technology can be adopted to address many challenges faced in the hinterland, even in hilly regions. In this context, underwater robotics emerges as one of the emerging technologies that not only enhance data collection, helps in interpretation using modern artificial Intelligence procedures, environmental monitoring as well as maintenance of underwater structures and analysis for informed decision-making but also facilitate the restoration of marine habitats, thereby contributing to the sustainability of aquatic resources and the overall health of our planet. The success of new emerging sectors and the sustainability of traditional employment are contingent upon the health and long-term sustainability of the Earth System as a whole.

Modern artificial intelligence procedures and perform environmental monitoring as well as inspection and maintenance of underwater structure

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Venkatesan, having 42 years of experience in ocean science and technology and served in premier Indian Institutions (NIOT and NIO) and UNESCO-IOC-GOOS and UNEP Regional Seas and associated with UN Bodies WMO in various capacities including Vice Chair of SG OOIS and many committees in the World Meteorological Organisation Geneva and Vice Chair Asia, DBCP, and executive committee member of international working groups such as Ocean SITES, DOOS, OASIS, OBPS, SMART Cable and many more; He teaches Ocean policy at IIT, Polar Law at Dr Ambedkar Law University and Global Climate change and oceans as a Professor of Practice in Anna University. He is also Adjunct Professor at the University of Massachusetts Dartmouth USA. He is Fulbright Fellow and is associated with USIEF, US Embassy till date. Over 4 decades of his service he was honoured with 20 prestigious awards including Lockheed Martin award and Joint recognition by UN Bodies UNESCO IOC and WMO for his contribution outside India, National Geoscience award from

Hon ble Presieent of India; National award by Ministry of Earth Sciences; Tamil Nadu state scientist award, MTS Fellow to mention a few. He earned his Ph.D. from the Indian Institute of Science and completed courses on marine pollution and maritime law and International Business management. He visited Arctic designed and installed India s first underwater observatory which is collecting data for the past 10 years. He has travelled to 40 countries and delivered invited lectures in many Universities in USA and Europe. He established real time ocean data reception centre with instruments deployed at sea for monitoring cyclone tsunami and developed many products and awarded patents and published 190 + research articles and conducted student competitions Guinness World Record with schools' students and is a Guest Editor to IOT Journal of Computer Society of India and is Editorial board member of three international journals and contributing to the technical societies in various capacities in IEI,NACE, MTS and IEEE,