

Cordially Invites you to the
INSTITUTE COLLOQUIUM
(Divn. Of Mechanical Sciences)

by
Professor Pradip Dutta
Department of Mechanical Engineering

**“Next Generation Solar Thermal Technologies:
Sustainability in the Indian Context”**

Date :Monday, 8th December 2014
Venue :Faculty Hall, Main Building
Time : 4-00 p.m.

Prof Anurag Kumar, Director
will preside

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Abstract:

Concentrating solar power (CSP) uses a large array of mirrors to focus sunlight onto a receiver containing a heat-transfer fluid, which absorbs the high heat flux (~100 – 1000 times the sun’s irradiance). A heat engine (e.g., Rankine cycle, Stirling cycle) then converts the heat to mechanical work to generate electricity. CSP systems can produce utility-scale power (hundreds of megawatts) and can store excess thermal energy for energy production at night or when the sun is not shining. The ability to store large amounts of energy cheaply and reliably gives CSP a significant advantage over other intermittent renewable energy sources such as wind and photovoltaics. This presentation will provide an overview of various CSP technologies at various scales generally practiced throughout the world, a comparative analysis of advantages and disadvantages of various systems, and assessment of some of these technologies in the Indian context. New generation CSP technologies for scalable and distributed systems relevant to India and possible ways for lowering levelized cost of electricity (LCOE) will be highlighted. In addition, the presentation will cover non-power-generation applications of solar thermal technology. In particular, it will be shown how solar energy can be effectively utilized for process heating and space cooling, and how significant savings of electrical power can be

achieved. An overview of the activities and initiatives taken at IISc in the above fields will also be given.

About the Speaker:



Prof. Pradip Dutta received his bachelor's degree in Mechanical Engineering from IIT Kharagpur, his master's degree from IIT Madras and Ph.D. from Columbia University. After his PhD, he worked as a National Research Council (NRC) Fellow at the Naval Postgraduate School, California. He held faculty positions at Columbia University and at the Tennessee Tech. University, before joining the Indian Institute of Science as a faculty member in 1996.

Prof. Dutta's research group focuses on development of advanced energy technologies related to solar energy, cooling of electronics, spacecraft thermal management, and on thermal technologies related to solidification and advanced casting processes for light weighting.

Prof. Dutta is a Fellow of the American Society of Mechanical Engineers (ASME), and Fellow of the all the four Indian Academies (i.e. of the Indian National Academy of Engineering, of the Indian Academy of Sciences, of the National Academy of Sciences and of the Indian National Science Academy). Among several other awards, Prof. Dutta has recently received the VASVIK Award for Industrial Research (2013), IISc Alumni Award for Excellence in Engineering Research (2013), INAE Chair Professorship Award (2012-2014), and INAE Outstanding Teacher Award (2014). He is serving as Associate Editor of IEEE Transactions on Components and Packaging Technology, and of ASME Journal of Electronic Packaging. At IISc, he has been a co-founder of the National Facility for Semisolid Forming, co-Director of the General-Motors-IISc Collaborative Research Lab, and Convener of the Solar Energy Programme under the Energy Initiative. Currently, he is also the Managing Deputy Director of the Solar Energy Research Institute for India and the United States (SERIUS), under the Indo-US Joint Clean Energy Research and Development Center (JCERDC) programme.

Tea : 5-00 p.m.

ALL ARE WELCOME