

Solar Photovoltaic Research: Challenges and Opportunities

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The quest for economically viable solar photovoltaic (PV) conversion technologies has accelerated with the imperative to become far less reliant on fossil fuels. An innovative way to reduce its cost is through the utilisation of concentrating solar energy into smaller area. This lecture will outline the diverse range and scale of potential implementation of photovoltaic concentrators. Key technical challenges and advances in solar photovoltaic concentrator research will be discussed. An overview of promising current research directions that should lead to economically viable photovoltaic systems will be presented. The development of novel low concentrating PV suitable for innovative building components and high concentrating point focus system for power generation will also be discussed.

Dr. Tapas Kumar Mallick PhD, MInstP

Dr. Tapas Kumar Mallick, currently lecture and 'Director of Studies – MSc Renewable Energy Engineering' at Mechanical Engineering, Heriot-Watt University, has been working in the field of solar energy in particular solar photovoltaic concentrators for last nine years. After completing his BSc (Physics), Master of Science (Physics) and Master of Technology in Energy Sc. & Tech. in India, He completed his PhD from University of Ulster, UK in 2003. He has received the '*best PhD thesis*' award-2003 at the University of Ulster and he was also nominated for the '*Britain's Younger Engineer-2003*' at House of Commons. Dr. Mallick, has been in the field of photovoltaics (PV) for the past nine years since he started his PhD career at University of Ulster. Dr Mallick has carried out post-doctoral research in the area of concentrating PV funded by EPSRC; EU and optical and thermal simulation of both low concentrating PV concentrators and high concentration point focus PV concentrators funded by DTI at the University of Warwick. Since starting at HWU in September 2007, Dr Mallick has secured funding from: i) EPSRC First Grant (EP/G030820/1); ii) EU FP7 (Grant agreement no: 226267) co-ordinated by IPA Fraunhofer; iii) UK-India joint Education Research programme (Ref No. SA08-061) with IIT Madras, India; and iv) is a co-investigator of a "Royal Society Wolfson Laboratory Refurbishment Grant" awarded to the renewable energy group at HWU. Dr Mallick's research has been internationally recognised as demonstrated by, 1 book chapter and over 32 papers including eight in learned journals. In addition, he is reviewer of seven international renewable energy journals, and is a member of the Institute of Physics and International Solar Energy Society. He is also regular reviewer of EPSRC proposals in the area of renewable energy systems.