

**DANIEL J. EPSTEIN DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING**

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**EPSTEIN INSTITUTE SEMINAR • ISE 651 SEMINAR**

***Crystalline Silicon Photovoltaic  
Manufacturing: Issues, Solutions  
and Challenges***

**Dr. Shreyes N. Melkote**

**Morris M. Bryan, Jr., Professor for Advanced Manufacturing Systems  
The George W. Woodruff School of Mechanical Engineering  
Georgia Institute of Technology**

**ABSTRACT**

There is a great deal of interest today in developing renewable energy sources at a scale large enough to reduce our dependence on fossil fuel based energy while also positively impacting the environment. Of the various renewable energy sources, photovoltaic (PV) or solar energy based technologies are at the forefront of the recent renewable energy boom. Among the PV technologies, crystalline silicon (c-Si) solar cells and modules, although the most established, continue to be an important technology for addressing our energy problems because of their high energy conversion efficiency relative to other PV technologies available in the market today. This talk will present an overview of c-Si PV manufacturing with an emphasis on ongoing research in the Georgia Tech Manufacturing Research Center on mechanical yield related issues and challenges. Specifically, the talk will focus on thin wafer stresses and breakage during handling operations, and investigation of crack-free wafering processes. The talk will conclude with comments on other open issues and challenges facing the scale up of c-Si PV manufacturing.

**TUESDAY, FEBRUARY 21, 2012  
ANDRUS GERONTOLOGY BLDG (GER) ROOM 309  
3:30 – 4:50 PM**

## Bio Sketch



### **Shreyes N. Melkote**

Dr. Shreyes N. Melkote is the Morris M. Bryan, Jr., Professor for Advanced Manufacturing Systems in the George W. Woodruff School of Mechanical Engineering at Georgia Tech. He served as the Interim Director of the Manufacturing Research Center (MaRC) from August 2010-December 2011 and is presently an Associate Director of MaRC. Dr. Melkote's current research activities are in photovoltaic manufacturing, hybrid micromanufacturing processes, surface integrity, and thin film sensors for manufacturing. He received his B.Tech. (Hons.) degree from I.I.T. Kharagpur in India and his Ph.D. in Mechanical Engineering from Michigan Technological University in 1993. He did post-doctoral work at the University of Illinois at Urbana-Champaign prior to joining the Georgia Tech faculty in 1995. Dr. Melkote is a recipient of several honors including the ASME Blackall Machine Tool and Gage Award, the SME Dell K. Allen Outstanding Young Manufacturing Engineer Award and several Best Paper Awards at leading ASME and SME conferences. He is an ASME Fellow and is the Scientific Committee Chair of the North American Manufacturing Research Institution of the SME (NAMRI/SME).