Embedded Electronics for the Solar Power Industry

Presented by Dr. Patrick Chapman
Co-Founder, Chief Technology Officer, and Vice President of Advanced Development
SolarBridge Technologies, Inc., Austin, TX

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Lecture at Noon with Reception to Follow

Abstract
There is a rapidly growing trend of integrating power electronics with photovoltaic (PV) modules. In this talk, we will discuss this trend and the types of power converter circuits and system architectures that are now becoming mainstream. We will discuss how this trend is impacting the net energy harvested and the cost of energy for PV systems. We will also focus more specifically on two technologies currently being developed and marketed at SolarBridge Technologies. The first is microinverter technology, in which small dc-ac power converters are used for grid connection of a single PV module. Microinverters form the basis of “ACPV” modules, which substantially simplify PV system installation. The second technology is differential power processing (DPP) dc-dc converters, which are a low-cost alternative to microinverters for large, utility-scale systems. Throughout the talk we will briefly touch on the presenter’s experiences with cofounding a university-based startup company.

Patrick Chapman (S ’94, M ’00, SM ’05) is a co-founder and the Chief Technology Officer and Vice President of Advanced Development of SolarBridge Technologies, Inc. Prior to that, he was Willett Faculty Scholar, Grainger Associate, and Associate Professor at the University of Illinois at Urbana-Champaign. He received a Ph.D. from Purdue University in 2000, and the Bachelor’s and Master’s degrees in electrical engineering from the University of Missouri-Rolla in 1996 and 1997. He is a Senior Member of the IEEE and a Member-at-Large for the IEEE PELS Administrative Committee. He has served as the General Chair for the 2011 IEEE APEC. He has received the National Science Foundation CAREER Award and the Office of Naval Research Young Investigator Award. He was named the Richard M. Bass Outstanding Young Power Electronics Engineer in 2006. His research interests within power electronics include applications to integrated design, renewable energy, electromechanics, automated modeling, hybrid energy systems, and energy harvesting.