

Cybersecurity issues in the Smart Grid

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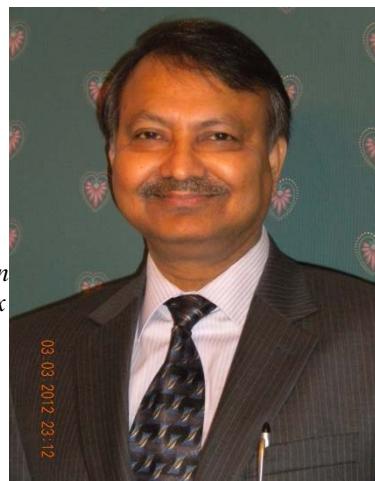
The electric grid and cyber infrastructure are now tightly coupled to facilitate the integration of time-varying energy sources and new dynamic loads, and amongst other things in order to offer better grid performance in terms of overall system efficiency and reliability. The term “smart grid” refers to modernization of the electric grid with emerging digital technologies for efficient and cost-effective power generation, distribution and delivery of electricity. Two way digital communications of data and signals are the heart of smart grid where both the utility and customers can participate into energy and load management. However, along with these potential benefits, smart grid also brings new challenges in ensuring security of the grid and the information infrastructure that connects and controls it. Both the physical and cyber infrastructure security become critical that include the protection of networks and servers from unauthorized accesses and malicious attacks to delay command and control signals.

This talk will present a brief survey of various essential components of the smart grid, its relationship with cyber and some of the security challenges that encompass different aspects of its operation. The talk will also cover security issues in SCADA (Supervisory Control And Data Acquisition) systems and various preventive measures.

Biographical Sketch of Prof. Dipankar Dasgupta

Prof. Dipankar Dasgupta is a professor of Computer Science at the University of Memphis. He has more than 200 publications which are widely being cited; a search with his name in Google Scholars indicates more than 3,800 citations and according to [Scholar indexing¹](#), Dipankar Dasgupta's [h-index](#): 51 and [g-index](#): 87 and an [academic search](#) at Microsoft shows that he collaborated with [106 co-authors](#)—extraordinary testimony to the broad influence of his contributions within the research community. His name is in the list of top computer scientists whose h-index is above 40 (maintained by UCLA: list here <http://www.cs.ucla.edu/~palsberg/h-number.html>).

Dr. Dasgupta is at the forefront of research in applying bio-inspired approaches to cyber defense. Some of his groundbreaking works, like digital immunity, negative authentication, Cloud Insurance model put his name in Computer World Magazine, and other News media. The quality and innovation of Professor Dasgupta's research has been widely recognized through receipt of grant awards nearly \$10.5 million



¹ NOTE: "The index h , defined as the number of papers with citation useful index to characterize the scientific output of a researcher". "The g -index that the top g articles received on average at least g citations".

from many funding agencies. Prof. Dasgupta is an Advisory Board member of Geospatial Data Center (GDC), Massachusetts Institute of Technology (MIT) (http://geospatial.mit.edu/ab_geocentric.html) since 2010, and worked on joint research projects with MIT.

Dr. Dasgupta has received Five Best Paper Awards at international conferences (1996, 2006, 2009, 2012 and 2013) and special recognitions from international organizations in which he is involved. He also received several prestigious awards at the University of Memphis. In 2007, the University's College of Arts and Sciences awarded Professor Dasgupta the Dunavant Professorship, a 3-year award for exceptional achievement in teaching, scholarship, service, and outreach. He has twice received the College of Arts & Sciences Distinguished Research Award (2002, 2006), the Sigma Xi Research Paper Award (2003), and the Early Career Research Award (1999). He was nominated for the Southeastern Universities Research Association (SURA) Distinguished Scientist Award. He is the recipient of 2012 Willard R. Sparks Eminent Faculty Award, the highest distinction and most prestigious honor given to a faculty member by the University of Memphis.

Due to his reputation as a top scholar, Dr. Dasgupta is frequently invited to speak (given more than 150 talks) at leading conferences and at other universities; he has been involved in the program organization and review structure of more than 85 international academic conferences, also serving as a speaker, panelist at many. Dr. Dasgupta is a senior member of IEEE and Life Member of ACM, and is the chair of IEEE Task Force on Artificial Immune Systems. He is currently the Associate Editor-in-Chief of [Immune Computation Journal](#) and the editorial board of 5 other journals.

In addition to Prof. Dasgupta's research and creative activities, he also spearheads the University of Memphis's education, training and outreach activities on Information Assurance (IA). He is the founding Director of the Center for Information Assurance (CfIA) (<http://cfia.memphis.edu>) which is a National Center for Academic Excellence in Information Assurance Education (CAE-IAE) and in Research (CAE-R). The Center has organized seven large outreach events during the past six years related to cyber security involving industry professionals, leading academics, and students.