Gregory L Snider, J Nanomed Nanotechnol 2014, 5:5
http://dx.doi.org/10.4172/2157-7439.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

What Landauer LImit? Ultra-low power electronics and the minimum energy for computation

Gregory L Snider
University of Notre Dame, USA

Is there a minimum energy required to compute a bit of information? Does the choice of state variable used to represent information affect the energy dissipated in computation? These questions are taking on more than mere academic importance, as evidenced by the heat produced by modern laptop computers. In CMOS logic the energy used to represent the bit of information is dissipated to heat at each logic transition. This way of processing information is very wasteful of energy and does not scale well as devices shrink to nanoscale dimensions. How low can dissipation be pushed? This presentation will examine the fundamental issues involved in computation, including the Landauer Principle and the use of charge as a state variable. Experimental results testing theoretical predictions will be presented. Will new device paradigms be required to achieve ultra-low power computation? An examination of the device requirements will be presented, along with preliminary experimental results, and a discussion of possible paths beyond Moore's Law.

Biography

Gregory L Snider received his PhD in Electrical Engineering from the University of California, Santa Barbara, in 1991. He has been at the University of Notre Dame since 1994, and currently holds the rank of Professor and is the Director of Graduate Studies for the Department of Electrical Engineering. His research interests are in the areas of device physics, nanoelectronics, and nanofabrication. He has authored or co-authored over 100 journal papers, and over 140 conference presentations, and serves as an associate editor for IEEE Transactions on Electronic Devices.

gsnider@nd.edu