MONTANA STATE UNIVERSITY

Physics Public Outreach Lecture on The Future of Computation

Friday, March 31, 2017
7:30 – 8:30 PM
Museum of the Rockies

The Future of Computation

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Mark received his B. S. in Physics from MSU in 1981

Abstract:

In the 20th century, computational power increased by a roughly 18 orders of magnitude, or a billion-billion times. Now the smart phone in your pocket is more powerful than the Cray-2 supercomputer built in 1985. This advance was predicted by Moore's law, which assumed that we could cram ever more transistors onto a computer chip. We will review why basic physical principles will soon end Moore's law, and why certain problems will remain forever intractable to conventional computers. What, if anything, can we do to improve our ability to compute? After appraising the singular achievement and physical limits of Moore's law, I will give an overview of two new approaches to computing: neuromorphic or cognitive computing and quantum computing. Cognitive computing seeks to create machines with "artificial intelligence," both by using new algorithms and technologies inspired by neuroscience. I will describe what we think we know about how the brain processes information, the status of this field (as opposed to the great hype in the press), and the outlook. I'll then review the mind-bending field of quantum computing, why it has the potential of vast speed-up for certain problems, and the status and outlook of real implementations of quantum computing.

Host: Rufus Cone and MSU Department of Physics