

**Dr. LEONID I. PERLOVSKY**

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Wednesday, February 8, 11:00 AM  
Science Bldg., room 101

**COMPUTATIONAL INTELLIGENCE  
and  
HIGHER COGNITIVE FUNCTIONS**

**ABSTRACT**

Computational intelligence comes close to understanding higher cognitive functions, including concepts, emotions, instincts, imagination, intuition. Soon we will explain the role of beautiful, music, sublime in the mind and evolution. The knowledge instinct drives the mind to understand the world. This instinct is even more important than sex or food. A knowledge instinct theory connects computers and the mind. It relates aesthetic emotions and perception of beauty to 'everyday' functioning of the mind. I will describe mechanisms for joint learning of cognition and language. Due to language, people learn cognitive models accumulated in culture over thousands of years. It is possible that developing a similar joint learning capability in human-computer systems is an 'easier' scientific and engineering approach than the 'direct coding' of the human mind into a computer. Computers will learn from humans in a collaborative human-computer environment. I will review mathematical difficulties faced since the 1950s by developers of cognitive algorithms (for detection, recognition, tracking, fusion, language understanding); describe new breakthroughs; show some examples; explain mathematically why mysteries will remain forever; and outline future directions.

**BIO**

Dr. Leonid Perlovsky is Principal Research Physicist & Technical Advisor at the Air Force Research Laboratory. Previously, from 1985 to 1999, as Chief Scientist at Nichols Research, a \$0.5 B high-tech organization, he led the corporate research in information science, intelligent systems, neural networks, sensor fusion, and algorithm development. He published more than 250 papers, delivered invited keynote plenary talks, tutorial lectures, and authored a book "Neural Networks and Intellect," Oxford University Press, 2001 (currently in the 3<sup>rd</sup> printing). A popular book "The Knowledge Instinct" is coming in 2006 in Basic Books. Dr. Perlovsky organizes conferences on Computational Intelligence, Chairs IEEE Boston Computational Intelligence Chapter, and received the Distinguished Member of the IEEE Award. He serves as Editor-at-large for "Natural Computations" journal and as Editor-in-Chief for "Physics of Life Reviews."