Keynote Talk

Deciphering the brain, cousin to the chip

Lou Scheffer
Howard Hughes Medical Institute

Abstract
At a very fundamental level, VLSI chips and animal nervous systems are closely related. They both process information via a large and complex network of relatively simple components. We understand exactly how chips work, and how they are built, because we design them ourselves. Nervous systems, on the other hand, are poorly understood, both in overall design and details of implementation. Biological technology has now advanced to the point where we can begin to investigate these issues, using methods conceptually similar to those used to analyze and reverse engineer chips. This talk will introduce discuss the methods that are now being used and prospects for further understanding. The current state of the art in this endeavor might be compared to that of VLSI design at the time when only individual circuits could be implemented. As with VLSI, a similar long and intensive effort lies ahead until the full potential of this technology is known. The fruit of this understanding will be huge, however - the talk will close with a some potential benefits, both intellectual and commercial, that such an understanding will provide.

Speaker Biography
Lou Scheffer is a fellow at the Janelia Farm Research Campus of the Howard Hughes Medical Institute. His research focuses on deducing the structure and operation of the nervous system by reverse engineering existing biological systems. His group uses electron microscopy and custom-built software to reconstruct the details of neural operation, starting with the optical lobes of the fruit fly. Before
switching to biology, Lou spent about 30 years in EDA, mostly with Cadence Design Systems, and before that was a chip designer. His main outside interest is in SETI, the search for extraterrestrial intelligence. He graduated from Caltech and Stanford, and is the author of the usual books, papers, and patents.