One of the most pervasive applications of computing is information processing tightly integrated with physical processes. Embedded information processing rapidly takes over the role of being a universal integrator for physical systems. This trend is based on a fundamental technical reason: information processing is uniquely suitable for controlling and implementing complex interactions among physical system components. From the point of view of the surrounding physical processes, an embedded information system is "just another physical process" with physical characteristics such as dynamics, noise, fault behavior, reliability, size, power, etc. The embedded software provides the method for customizing a "programmable physical device" so as to satisfy the required physical characteristics. The talk will address the primary challenges facing designers of embedded software and systems: (1) the lack of composability for physical characteristics, (2) the difficulty of adapting embedded software to changes in the physical environments and (3) the lack of technology for designing networked embedded system applications with rapidly changing structure.

Brief bio:

Dr. Sztipanovits is a program manager at DARPA-ITO. He is responsible for the management of the Autonomous Negotiating Teams and Model-Based Integration of Embedded Software programs. Dr. Sztipanovits is an IPA from Vanderbilt University, where he is E. Bronson Ingram Distinguished Professor of Engineering and founding director of the Institute for Software Integrated Systems. His primary research interest is software and systems engineering issues of embedded information systems, structurally adaptive systems and model-integrated computing. His work has been applied and fielded in several major aerospace and manufacturing industry projects. He has published over 130 papers, he is the co-author of two books and seven international patents.