



ABSTRACT

Model-based Design of Cyber-Physical Systems: Lessons Learned

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CPS design flows span physical and computational domains and incorporate software synthesis for cyber and manufacturability concerns for physical components. Heterogeneity is the norm as well as the main challenge: components and systems are modeled using multiple physical, logical, functional and non-functional modeling aspects.

Traditional design flows use the separation of concern principle to decompose the overall design problem into manageable problem sizes. However, the fundamental goal of model-based design - to move toward a correct-by-construction design technology - requires modeling and analyzing cross-domain interactions among physical and cyber domains and demands understanding the effects of heterogeneous abstraction layers in the design flow.

The talk will summarize progress and lessons learned during the development of a design tool chain for real-life applications in vehicle application domains.



Dr. Janos Sztipanovits is currently the E. Bronson Ingram Distinguished Professor of Engineering at Vanderbilt University and he also holds the Joe B. Wyatt Distinguished University Professor title in 2012/2013. He is founding director of the Institute for Software Integrated Systems (ISIS). His research areas are at the intersection of systems and computer science and engineering. His current research interest

includes the foundation and applications of Model-Integrated Computing for the design of Cyber Physical Systems. His other research contributions include structurally adaptive systems, autonomous systems, design space exploration and systems-security co-design technology. He was founding chair of the ACM Special Interest Group on Embedded Software (SIGBED). He served as program manager and acting deputy director of DARPA/ITO between 1999 and 2002 and he was member of the US Air Force Scientific Advisory Board between 2006-2010. He is member of the Academic Executive Board of Cyber-Physical Systems Virtual Organization and he is member of the national steering group. Dr. Sztipanovits was elected Fellow of the IEEE in 2000 and external member of the Hungarian Academy of Sciences in 2010. He won the National Prize in Hungary in 1985 and the Golden Ring of the Republic in 1982. He graduated (Summa Cum Laude) from the Technical University of Budapest in 1970 and received his doctorate from the Hungarian Academy of Sciences in 1980.