CAS Distinguished Lecture | 2016

RIGOROUS SYSTEM DESIGN

MARCH 9, 2016 3:30 p.m.* TSH-120

Joseph Sifakis

RISD Laboratory, EPFL
Turing Award, 2007
Commander of the French Legion of Honor
Leonardo da Vinci Medal, 2012

Today, the development costs of high confidence systems explode with their size. In my talk I will discuss rigorous system design as a formal and accountable process leading from requirements to correct-by-construction implementations. I will also discuss current limitations of the state of the art and advocate a coherent scientific foundation for system design based on four principles: 1) separation of concerns; 2) component-based construction; 3) semantic coherency; 4) correctness-by-construction. The combined application of these principles allows the definition of a methodology clearly identifying where human intervention and ingenuity are needed to resolve design choices, as well as activities that can be supported by tools to automate tedious and error-prone tasks.

The presented view for rigorous system design has been amply implemented in the BIP (Behavior, Interaction, Priority) component framework and substantiated by numerous experimental results showing both its relevance and feasibility. I will conclude with a discussion advocating a system-centric vision for computing, and a deeper interaction and cross-fertilization with other more mature scientific disciplines.

Joseph Sifakis is Emeritus Senior Researcher at CNRS, full professor at Ecole Polytechnique Fédérale de Lausanne (EPFL) and the director of "Centre de la Recherche Intégrative" (CRI) in Grenoble. He is a member of the French Academy of Sciences, a member of the French National Academy of Engineering and a member of Academia Europea and a member of the American Academy of Arts and Sciences.

***REFRESHMENTS TO FOLLOW**

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