## **TUTORIAL 1**

## **BEHAVIORAL SYNTHESIS: FROM RESEARCH TO PRODUCTION USE**

## Speakers:

**Reinaldo Bergamaschi**, IBM Corp., Yorktown Heights, NY, is the project leader for behavioral synthesis at the IBM Watson Research Center, where he is responsible for developing the methodology and algorithms for behavioral synthesis with the goal of making behavioral synthesis practical in industry.

**Raul Camposano**, Synopsys, Mountain View, CA, *is the director of design environments R&D at Synopsys, where he is responsible for the behavioral compiler. He has held positions at the University of Karlsruhe, the IBM Watson Research Center and GMD Bonn.* 

**Background:** This tutorial will benefit designers who are considering using behavioral synthesis, tool developers who would like to get an overview of the state of the art, and managers who need to become familiar with the scope of behavioral synthesis. Attendees should have a basic familiarity with hardware description languages, logic design, and the roles of synthesis and other computer-aided design tools.

**Description:** Behavioral synthesis is being touted as the technology that will enable designers to cross the next threshold of productivity. Is behavioral synthesis finally going to help designers, or is it still a research topic being hyped by vendors prematurely? Though behavioral synthesis has been studied for many years, it has recently evolved as a useful tool in a production environment. In order to fulfill the promises of behavioral synthesis, it is necessary to combine a new high-level design methodology with efficient algorithms and tools.

This tutorial will present an in-depth view of the methodology, algorithms, benefits and pitfalls to avoid in behavioral synthesis, allowing the attendees to decide how they can use behavioral synthesis effectively.

The first part of the tutorial will address the main problems involved in synthesizing hardware from behavioral hardware descriptions and the principal approaches for solving them. The second part will outline the behavioral synthesis methodology, and the advantages and the problems involved in using it in a production environment. Topics covered will include design methodology for behavioral synthesis, mapping from HDLs to hardware, behavioral synthesis algorithms (language translation for VHDL and Verilog, data-flow analysis, scheduling, allocation, and resource sharing), estimating and analyzing results, integration with other design tools, and making behavioral synthesis work in practice, with examples from industry.