



**The Institute of Electrical and Electronics Engineers
(IEEE)**



**Galveston Bay Section Meeting
Computer Society Chapter**

February 15th, 2018 (Thursday) Luncheon Meeting

TOPIC: “Rapid Implementation of Floating-Point Computations Using Phase-Coherent Dynamically Configurable Pipelines”

SPEAKER: Dr. David Rutishauser, Avionic Systems Division, Johnson Space Center

PRESENTATION:

The Phase-Coherent Dynamically Configurable Pipeline is a concept for the rapid implementation of pipelined computational algorithms in configurable hardware. The approach allows a high level of sharing of floating-point resources among multiple computations. The concept features a simple tag-based control scheme and a sparse-pipeline allocation approach that enables all the stages of an arithmetic pipeline to be processing simultaneously, with multiple computations allocated to the same pipeline. Thus the approach increases hardware resource utilization and reduces power consumption. A framework is presented that implements the concept. The current framework targets a Field-Programmable Gate Array (FPGA), and simplifies the coding phase of the algorithm and troubleshooting. The framework is demonstrated on a technology currently under development by NASA provide automatic hazard detection and avoidance for spacecraft landing systems.

SPEAKER:

Dr. David Rutishauser works at NASA Johnson Space Center (JSC) as Avionics Lead for the SPLICE project. SPLICE will conduct test flights on commercial rocket landers to develop precision navigation and landing technologies. He was previously an Assistant Deputy Chief Engineer for the Commercial Crew Program. In this role he supported human spaceflight certification of Boeing's CST-100 (Starliner) capsule, United Launch Alliance's Atlas/Centaur rocket, and Space X's Dragon capsule and Falcon rocket spacecraft systems. Prior to this role he served as Systems Engineering and Integration (SE&I) Lead for the Autonomous Landing and Hazard Avoidance Technology (ALHAT) project at NASA JSC. ALHAT successfully flew an autonomous landing demonstration on JSC's "Morpheus" rocket lander in 2014. Prior to the Space Shuttle Program retirement in 2011, Dr. Rutishauser served in the program's SE&I Flight Software Office, supporting 17 successful missions. Before coming to JSC Dr. Rutishauser worked at NASA Langley Research Center in aircraft wake vortex spacing research and at Raytheon Missile Systems Company as a software/simulation and digital design engineer. Dr. Rutishauser holds a Bachelor's degree in Electrical Engineering from the University of Dayton, a Master's degree in Electrical and Computer Engineering from the University of Arizona, and a Ph.D. in Computer Engineering from Virginia Polytechnic Institute and State University. His dissertation work was in the area of reconfigurable computing, specifically to develop a parametric, configurable vector processor to accelerate legacy codes

Reservations for lunch or to attend this meeting should be made by email to:

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written for vector supercomputers. Dr. Rutishauser completed NASA's Systems Engineering Leadership Development Program in 2017 and JSC's Space System's Engineering Development Program in 2012. He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE), secretary of the IEEE Galveston Bay Chapter, and chair of the IEEE Galveston Bay Computer Society. He is a member of the Association of Computing Machinery (ACM), Aircraft Owners and Pilots Association (AOPA), and the Planetary Society.

Gilruth Recreation Center NASA-JSC, Discovery Room (downstairs)

Free parking. No security processing required. Easy drive in off Space Center Blvd. See website below for map. Interested non-IEEE engineers, technicians, scientists, IEEE Members and guests alike are welcome!

12:00 PM – 1:00 PM - Program and Q&A

11:30 AM - Light Lunch with reservation (\$10.00 donation). Please RSVP Before Noon Tuesday, Feb. 13th, 2018

Number of lunches is limited. Please reserve early

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