IEEE Rebooting Computing Summit 4 (RCS 4)

Roadmapping the Future of Computing:
Discovering How We May Compute

9-11 December 2015, Washington Hilton, Washington DC
Follows the end of International Electronic Devices Meeting (IEDM 2015)

RCS 4 is by invitation only, but spots for qualified attendees may still be available. Please contact Bichlien Hoang (b.hoang@ieee.org) if you are interested in attending.

IEEE 2015 RCS 4 Co-Chairs
Erik DeBenedictis, IEEE Computer Society and Sandia National Laboratory
David Mountain, IEEE Electron Device Society and National Security Agency

IEEE Rebooting Computing Initiative Co-Chairs
Tom Conte, Ph.D - President, IEEE Computer Society
Elie Track, Ph.D - Past President, IEEE Council on Superconductivity

Rebooting Computing Summit 4 – Preliminary agenda as of Dec 2, 2015

Workshop activities start 6 PM Wednesday November 9 with a reception. The workshop is at the same hotel as the IEDM conference (Washington Hilton) and begins about the time IEDM ends.

The first full day Thursday begins at 8:30 AM with an overview of the Rebooting Computing initiative.

A principal purpose of the workshop is to establish an understanding amongst participants of new approaches to computing, key research questions, and pertinent timescales. The technology and timescales are expected to become the basis of new computer-level road mapping that should succeed the Moore's Law-type semiconductor road mapping that has been in place for about 15 years. The workshop will feature leading approaches to computing based on various measures of effectiveness, such as performance, power efficiency, and/or utility. The first three approaches (labeled "tracks" in the schedule) will be described by a visionary presentation followed by a presentation of experimental results, with a fourth approach described in a presentation. Five of the six presentations will be accompanied by a peer-reviewed academic paper in the December issue of IEEE Computer magazine (provided to participants). The four technology tracks are:

(1) A class of computing methods known as stochastic, probabilistic, and approximate computing. As the power consumption of computer components goes down, the reliability goes down as well. The rise in errors can be accommodated in various ways, which will be described.

(2) 3D integration and new low power devices, which is essentially the continuation of Moore's Law through new disruptive devices and manufacturing technology.

(3) Brain-inspired computing, focusing on the OSTP nano-inspired Grand Challenge. The particular form of brain-inspired computing will be computer systems that process "Big Data" and also learn from the data using methods from the brain (i. e. neither artificial intelligence nor building brains).

(4) Superconducting electronics, an approach of using the Josephson junction in lieu of the transistor while preserving existing architectures and retaining software compatibility with today's codes.

Intermixed with the technical presentations, other organizations and government agencies will briefly describe their activities in advanced computer research.

Participants will then divide into three tracks whose objective is to formulate realistic expectations and timeframes for each of the three technology areas. The tracks will include specialists in the various areas and may include some presentations (inter-track schedules are at the discretion of the participants).

Friday likewise begins at 8:30 with a review and then continuation of the working groups, also including specialists and additional presentations as needed. The second working group sessions will debrief before lunch.

The workshop will formally conclude at 12:30 PM Friday, yet the IEEE/RC "Sensible Machine" activity will have a group meeting during Friday afternoon. Information on the Sensible Machine activity will be available elsewhere.

Duration				
	Wednesday, December 9, 2015			
3:00	6:00 PM	Reception		
	9:00 PM	End reception		
	Thursday, December 10, 2015			
0:15	8:30 AM	Review of impetus for IEEE RC initiative, review of RC summits (3 pillars, complementary nature of various approaches, etc.). Tom Conte/Elie Track		
1:15	8:45 AM	Track 1: Probabalistic/random/approximate big picture and experimental results L. Monroe; S. Khasanvis (tent.)		
0:15	10:00 AM	Break		
0:30	10:15 AM	Extra Track: Superconductive electronics/C^3 Marc Manheimer		
0:15	10:45 AM	Review of other initiatives in this area – ITRS 2.0 Paolo Gargini		
0:15	11:00 AM	Review of other initiatives in this area – SRC William Joyner		
0:15	11:15 AM	Review of other initiatives in this area – NSCI William Koella		
1:00	11:30 AM	Lunch (after a brief announcement of LPIRC 2016)		
1:15	12:30 PM	Track 2: 3D integration and new devices big picture and experimental results Kirk Bresniker; H. S. P. Wong		
0:30	1:45 PM	Track 1: Co-facilitators Dave	Track 2: Beyond CMOS	Track 3: Co-facilitators Erik
0:30	2:15 PM	Mountain, Laura Monroe	Benchmarking I. Young, plus	DeBenedictis, Yung-Hsiang Lu
0:30	2:45 PM		discussion	
0:30	3:15 PM	Break		
1:15	3:45 PM	Track 3: Neuromorphic/Sensible Machine big picture and experimental results Stan Williams; Dave Mountain		
0:15	5:00 PM	Review of other initiatives in this area – OSTP Grand Challenge Lloyd Whitman		
0:15	5:15 PM	Review of other initiatives in this area – DARPA Dan Hammerstrom		
0:15	5:30 PM	Review of other initiatives in this area – IARPA Jason Matheny		
0:30	5:45 PM	Break (needed for set up by hotel) and ***** GROUP PICTURE *****		
0:45	6:15 PM	Posters (in same room as reception)		
2:00	7:00 PM	Reception starts in poster area		
	9:00 PM	End reception		
	Friday, December 11, 2015			
0:30	8:30 AM	First working group review		
1:00	9:00 AM	Track 1: Co-facilitators: Dave	Track 2: Moore's law	Track 3, continued
0:30	10:00 AM	Mountain, Laura Monroe	E3S Eli Yablonovitch	Neuromophic tech. Matt Marinella
0:30	10:30 AM		Steep Slope Transistors S. Datta	Dot Product Engine J. P. Strachan
1:00	11:00 AM	Second working group review		
0:30	12:00 PM	Lunch		
0:00	12:30 PM	RCS 4 Adjourns		
5:30	12:30 PM	Associated IEEE/RC "Sensible Machine" Grand Challenge group meeting		
	6:00 PM	Sensible Machine group meeting adjourns		