

# 2017 Energy Consequences of Information (ECI)

Dr. Andrew Pineda et al | February 22-25, 2017 | Santa Fe, NM

La Fonda on the Plaza Hotel  
100 E San Francisco St.  
Santa Fe, NM 87501

## Agenda - February 22-25, 2016

Time	Wed., Feb. 22	Thur., Feb. 23	Fri., Feb. 24	Sat., Feb. 25
7:00 AM				
7:20 AM		Registration & Breakfast	Registration & Breakfast	Registration & Breakfast
7:40 AM				
8:00 AM		Welcome Remarks Dr. Chiping Li (AFOSR)	History of DARPA UPSIDE	Neuroscience - Beyond Neuron- Centricity in Brain Function for Supporting Energy Efficient Computing Cindy Leiton (Stony Brook Univ)
8:20 AM		Beyond Moore's Law Computing Robinson Pino (DOE)	Dan Hammerstrom (Portland State Univ)	
8:40 AM		Government Talk Jim Lyke (AFRL)	Computational Complexity and New Computing Approaches Erik P. DeBenedictis (SNL)	Deep Space Generative Autoencoders for Learning Context- Aware Representations from Unlabeled Images and Video Garrett Kenyon (LANL/NM Consortium)
9:00 AM		Driving Factors for Advanced Computing Dimitri Kusnezov (DOE)	A Mini-MIPS Microprocessor and Clocking for Adiabatic Computing Greg Snider (Univ of Notre Dame)	Introduction to AHaH Computing, kT-RAM, and the KnowmAPI and Knowm Memristors Alex Nugent (Knowm)
9:20 AM		Lloyd Whitman (OSTP)	Fundamental Limits on Energy Dissipation in Neuromorphic Computing Natash Ganesh (Univ Mass)	CBRAM Memristor Technology Hugh Barnaby (Arizona State Univ)

			Amherst)	
<b>9:40 AM</b>		20 minute Break	20 minute Break	Neuromorphic Computing in the Computing and Communications Division of AFRL Information Directorate Clare Thiem/Lisa Loomis (AFRL)
<b>10:00 AM</b>		Application of UPSIDE Technology Andreou/Strukov	Adiabatic Computing for Energy-Efficient and Secure IoT Devices Himanshu Thapliyal (Univ of Kentucky)	20 minute Break
<b>10:20 AM</b>		On the Link Between Energy & Information for the Design of Neuromorphic Systems Naryan Srinivasa (Intel)	Learning Structured Sparsity in Deep Neural Networks and Implementation on CPUs, GPUs and FPGAs Hai Li (Duke Univ)	Energy Efficient On-Line Learning Accelerators for Deep and Hierarchical Neural Networks Dhiresha Kudithipudi (Rochester Inst of Tech)
<b>10:40 AM</b>			Estimating the Energy Dividends from Quantum Processing Travis Humble (ORNL)	Experimental Demonstration of Analog Computing and Neuromorphic Computing with Memristor Crossbar Arrays J. Joshua Wang (U Mass Amherst)
<b>11:00 AM</b>		Sustainable Computing Progress Stan Williams (HPE)	Panel Discussion	Neuromorphic Coprocessor Energy Consumption in the Beyond Exascale Era Raphael Pooser (ORNL)
<b>11:20 AM</b>				Panel Discussion & Conclusion
<b>11:40 AM</b>		Lunch (provided)/ Poster talks	Lunch (local restaurants)	
<b>12:00 PM</b>				

<b>12:20 PM</b>				
<b>12:40 PM</b>				
<b>1:00 PM</b>				
<b>1:20 PM</b>		<p>Session Keynote: Title Michael DeBole (IBM Research)</p>	<p>Session Keynote: Thermodynamics and the Future of Computing Todd Hylton (UCSD)</p>	
<b>2:00 PM</b>		<p>Sustainable Data Centers Steven Hammond (NREL)</p>	<p>Generalized Reversible Computing, Truly Adiabatic Circuits, and Asynchronous Ballistic Logic Michael Frank (SNL)</p>	
<b>2:20 PM</b>		<p>Title Brent Draney (LBL)</p>	<p>Energy Saving Methods Used in the Design of a Bitcoin Processor ASIC John Cheng (Custom Silicon Solutions)</p>	
<b>2:40 PM</b>		<p>In-Place Deep Learning Paul Armijo (GSI Technology)</p>	<p>Stochastic Computing: A New Paradigm for Ultra Low Power, Skew Tolerant and Error Tolerant Computing Marc Riedel (Univ of Minnesota)</p>	
<b>3:00 PM</b>		<p>Secure and Lightweight Computing Environment for HPC Systems Lei Ding (Accenture Labs)</p>	<p>Voltage-Tunable Stochastic Computing With Magnetic Bits Shaloo Rakheja (NYU)</p>	
<b>3:20 PM</b>		20 minute Break	20 minute Break	
<b>3:40 PM</b>		<p>Title David Martinez (SNL)</p>	<p>Ultra-Efficient Neural Algorithm Accelerator Using a ReRAM Crossbar Accelerator Matt Marinella (SNL)</p>	

<b>4:00 PM</b>		<p>Transitioning Applications to the Pre-Exascale Cori System at NERSC Katy Antypas (NERSC)</p>	<p>Non-Volatile Redox Transistors for Low Power Analog Computing Alec Talin (SNL)</p>	
<b>4:20 PM</b>		<p>A Future Infrastructure Integrating Security, Privacy and Computing for Big Data Genomics Xinghua (Mindy) Shi (UNC Charlotte)</p>	<p>The cost of computing in the era of highly integrated programmable logic and heterogeneous hardwired processing systems. Alonzo Vera (COSMIAC/IDEAS Eng. &amp; Tech.)</p>	
<b>4:40 PM</b>		<p>A Server-Network Collaborative Approach to Optimizing Energy in Data Centers Guru Venkataramani (George Washington Univ)</p>	<p>Domain Specific Languages for Configurable Hardware Synthesis Pedro Diniz (USC/ISI)</p>	
<b>5:00 PM</b>		<p>Title Richard Murphy (Micron)</p>	<p>Harnessing the Power Efficiency of FPGAs for HPC using High-Level Synthesis and Overlay Architectures Hal Finkel (ANL)</p>	
<b>5:20 PM</b>		Panel Discussion	Panel Discussion	
<b>5:40 PM</b>				
<b>6:00 PM</b>	Reception and Registration	Dinner (Local Restaurants)		
<b>6:20 PM</b>				
<b>6:40 PM</b>				
<b>7:00 PM</b>			Workshop Dinner (La Terraza @ La Fonda on the Plaza)	
<b>7:20 PM</b>				
<b>7:40 PM</b>				

<b>8:00 PM</b>		Poster/Networking Session		
<b>8:20 PM</b>				
<b>8:40 PM</b>				
<b>9:00 PM</b>				
<b>9:20 PM</b>				
<b>9:40 PM</b>				