ICRC 2017 Schedule at a Glance

Tuesday November 7		Wednesday November 8		Thursday November 9	
		8:00-8:15 AM	Welcoming remarks		
		8:15-8:45 AM	**Opening Address** **Dr. Hava Siegelmann (DARPA)** *DARPA's Vision for the Future of Computing*	**8:15-8:45 AM**	**Opening Address** **Dr. Robinson Pino (DOE)** *DOE Vision and Programmatic Activities in Advanced Computing Technologies*
		8:45-9:30 AM	**Plenary Talk** **Prof. Karlheinz Meier (Heidelberg University)** *Continuously Learning Neuromorphic Systems with High Biological Realism*	**8:45-9:30 AM**	**Plenary Talk** **Prof. Margaret Martonosi (Princeton University)** *End of Moore's Law Challenges and Opportunities: Computer Architecture Perspectives*
			Coffee break (Foyer)		Coffee break (Foyer)
		9:45-11:45 AM	**Session 1A** Neuromorphic Computing 1 / **Session 1B** Beyond CMOS	**9:45-11:35 AM**	**Session 4A** Neuromorphic Computing 3 / **Session 4B** Energy-efficient and Adiabatic Computing
			Lunch (provided) (Ballroom Salon I)		**Buffet Lunch** (provided) and **Poster Session** (Ballroom Salon I)
		1:05-1:50 PM	**Plenary Talk** **Prof. Robert Schoelkopf (Yale University)** *The Prospects for Quantum Computing with Superconducting Circuits*	**1:05-1:50 PM**	**Plenary Talk** **Prof. Luis Ceze (University of Washington)** *Borrowing from Nature to Build Better Computers*
		2:00-4:00 PM	**Session 2A** Neuromorphic Computing 2 / **Session 2B** Special Session on Future Electronic Design Automation	**2:00-4:00 PM**	**Session 5A** Quantum Computing / **Session 5B** Novel Architectures and Near-memory Computing
			Coffee break (Foyer)		Coffee break (Foyer)
		4:15-6:15 PM	**Session 3A** Algorithms and Applications / **Session 3B** Quantum and Special Purpose Annealers	**4:15-6:25 PM**	**Session 6A** Optical Computing / **Session 6B** Probabilistic Computing and Nonlinear Dynamics
6:30 PM	Joint IRDS/ICRC Reception (Old Dominion)	**6:30 PM**	**ICRC Banquet** (Ballroom Salon II-III + Prefunction area)	**6:30 PM**	**Joint ICRC/Industry Summit Reception** (Ballroom Salon II-III + Prefunction area)
		7:45 – 9:15 PM	**Special Evening Panel Discussion** *AI, Cognitive Information Processing, and Rebooting Computing* (Ballroom Salon II-III)		

Registration:

7am-5pm

Foyer area of Ballroom Salon II-III (5th floor)

Speaker preparation: Attache Room

Locations (subject to change):

Ballroom Salon II-III

Plaza Room

Colonnade Room

Wednesday November 8: Regular and Special Sessions

Session 1A: Neuromorphic Computing 1
Plaza Room 9:45-11:45 AM
Chair: TBD

1A.1 9:45-10:15 AM	**Aaron J. Hill (Sandia National Laboratories)** *A Spike-Timing Neuromorphic Architecture*
1A.2 10:15-10:45 AM	**Stanislaw Wozniak (IBM Research, Zurich)** *Feature Learning using Synaptic Competition in a Dynamically-Sized Neuromorphic Architecture*
1A.3 10:45-11:05 AM	**Yan Fang (University of Pittsburgh)** *Achieving Swarm Intelligence with Spiking Neural Oscillators*
1A.4 11:05-11:25 AM	**Reginald Meeson (Institute for Defense Analyses)** *Auditory Neural Pathway Simulation*
1A.5 11:25-11:45 AM	**Michael Schneider (National Inst. of Standards and Technology)** *Energy Efficient Single Flux Quantum Based Neuromorphic Computing*

Session 1B: Beyond CMOS
Colonnade Room 9:45-11:45 AM
Chair: TBD

1B.1 9:45-10:15 AM	**Invited: Puneet Gupta (University of California, Los Angeles)** *Advanced Packaging and Heterogeneous Integration to Reboot Computing*
1B.2 10:15-10:45 AM	**Himanshu Thapliyal (University of Kentucky)** *Low-Power and Secure Lightweight Cryptography Via TFET-Based Energy Recovery Circuits*
1B.3 10:45-11:05 AM	**Sébastien Le Beux (Ecole Centrale de Lyon)** *Hybrid Topologies for Reconfigurable Matrices Based on Nano-Grain Cells*
1B.4 11:05-11:25 AM	**Naveen Kumar Macha (University of Missouri, Kansas City)** *A New Concept for Computing using Interconnect Crosstalks*
1B.5 11:25-11:45 AM	**Ronald DeMara (University of Central Florida)** *Heterogeneous Technology Configurable Fabrics for Field Programmable Co-design of CMOS and Spin-based Devices*

Session 2A: Neuromorphic Computing 2
Plaza Room 2:00-4:00 PM
Chair: TBD

2A.1 2:00-2:30 PM	**Geoffrey Burr (IBM Research, Almaden)** *Improved Deep Neural Network Hardware Accelerators Based on Non-Volatile-Memory: the Local Gains Technique*
2A.2 2:30-3:00 PM	**David Mountain (US Department of Defense)** *A Comparison Between Single Purpose and Flexible Neuromorphic Processor Designs*
2A.3 3:00-3:30 PM	**Sumit Kumar Jha (University of Central Florida)** *Flow-based Non-volatile Memory Crossbar Accelerators for Parallel Computations*
2A.4 3:30-4:00 PM	**Aidana Irmanova (Nazarbayev University)** *Neuromorphic Adaptive Edge-preserving Denoising Filter*

Session 2B: Special Session on Future EDA:
Next Generation Design Automation for Accelerating the Reboot
Colonnade Room 2:00-4:00 PM
Organizers: Shishpal Rawat & Ayse K. Coskun

2:00-2:10 PM	**Shishpal Rawat & Ayse K. Coskun** *Welcome and Overview*
2B.1 2:10-2:35 PM	**Arijit Raychowdhury (Georgia Institute of Technology)** *EDA Challenges in Designing Computing Systems with post-CMOS Devices*
2B.2 2:35-3:00 PM	**Shobha Vasudevan (University of Illinois, Urbana-Champaign)** *Verification in the Nanoscale Era of Computing*
2B.3 3:00-3:25 PM	**Yu (Kevin) Kao (University of California, San Diego)** *Random Sparse Adaptation for Accurate Inference with Inaccurate RRAM Arrays*
2B.4 3:25-3:50 PM	**Douglas Densmore (Boston University)** *How Bio-Design Automation Can Help Reboot Computing: Lessons, Challenges, and Future Directions*
3:50-4:00 PM	*Q&A and Final Thoughts*

Session 3A: Algorithms and Applications
Plaza Room 4:15-6:15 PM
Chair: TBD

3A.1 4:15-4:45 PM	**Invited: Dejan Milojicic (Hewlett Packard Labs)** *Generalize or Die: Operating System Support for Memristor-based Accelerators*
3A.2 4:45-5:15 PM	**Mohsen Imani (University of California, San Diego)** *VoiceHD: Hyperdimensional Computing for Efficient Speech Recognition*
3A.3 5:15-5:35 PM	**Bicky Marquez (Institut FEMTO-ST)** *Embedding in Neural Networks: A-priori Design of Hybrid Computers for Prediction*
3A.4 5:35-5:55 PM	**Dillon Graham (Rochester Institute of Technology)** *Convolutional Drift Networks for Spatio-Temporal Processing*
3A.5 5:55-6:15 PM	**Wafi Danesh (University of Missouri, Kansas City)** *A New Approach for Multi-Valued Computing Using Machine Learning*

Session 3B: Quantum and Special Purpose Annealers
Colonnade Room 4:15-6:15 PM
Chair: TBD

3B.1 4:15-4:45 PM	**Takuya Okuyama (Hitachi Ltd.)** *An Ising Computer Based on Simulated Quantum Annealing by Path Integral Monte Carlo*
3B.2 4:45-5:15 PM	**Zachary Baker (Los Alamos National Laboratories)** *An FPGA-Quantum Annealer Hybrid System for Wide-Band RF Detection*
3B.3 5:15-5:45 PM	**Georg Hahn (Imperial College London)** *Reducing Binary Quadratic Forms for More Scalable Quantum Annealing*
3B.4 5:45-6:15 PM	**Nga Nguyen (Los Alamos National Laboratories)** *Solving Sparse Representation for Image Classification using Quantum D-Wave 2X Machine*

Thursday November 9: Regular Sessions

Session 4A: Neuromorphic Computing 3
Plaza Room 9:45-11:35 AM
Chair: TBD

4A.1 9:45-10:15 AM	<u>Invited</u>: **Todd Hylton (University of California, San Diego)** *On Thermodynamics and the Future of Computing*
4A.2 10:15-10:45 AM	**James Plank (University of Tennessee, Knoxville)** *A Unified Hardware/Software Co-Design Framework for Neuromorphic Computing Devices and Applications*
4A.3 10:45-11:15 AM	**Robin Jacobs-Gedrim (Sandia National Laboratories)** *Impact of Linearity and Write Noise of Analog Resistive Memory Devices in a Neural Algorithm Accelerator*
4A.4 11:15-11:35 AM	**Baibhab Chatterjee (Purdue University)** *An Energy-Efficient Mixed-Signal Neuron for Inherently Error-Resilient Neuromorphic Systems*

Session 4B: Energy-efficient and Adiabatic Computing
Colonnade Room 9:45-11:35 AM
Chair: TBD

4B.1 9:45-10:15 AM	**Michael Frank (Sandia National Laboratories)** *Asynchronous Ballistic Reversible Computing*
4B.2 10:15-10:45 AM	**Nicolas Jeanniot (CNRS-LIRMM/University of Montpellier)** *Synchronised 4-Phase Resonant Power Clock Supply for Energy Efficient Adiabatic Logic*
4B.3 10:45-11:15 AM	**Yann Perrin (University Grenoble Alpes/CEA-LETI)** *Low-energy Computation with Mechanical Encoding : Towards Truly Adiabatic Operation*
4B.4 11:15-11:35 AM	**Neal Anderson (University of Massachusetts, Amherst)** *Architecture and Dissipation: Thermodynamic Costs of General Purposeness in von Neumann Processors*

Session 5A: Quantum Computing
Plaza Room 2:00-4:00 PM
Chair: TBD

5A.1 2:00-2:30 PM	<u>Invited</u>: **Jerry Chow (IBM Research, Yorktown)** *Building a Quantum Computing Community and Ecosystem*
5A.2 2:30-3:00 PM	**Travis Humble (Oak Ridge National Laboratory)** *Quantum Accelerators for High-Performance Computing Systems*
5A.3 3:00-3:20 PM	**Stewart Allen (IonQ Inc)** *Reconfigurable and Programmable Ion Trap Quantum Computer*
5A.4 3:20-3:40 PM	**Enrico Prati (CNR - Istituto di Fotonica e Nanotecnologie)** *From the Quantum Moore's Law toward Silicon Based Universal Quantum Computing*
5A.5 3:40-4:00 PM	**Fernando Corinto (Politecnico di Torino)** *Physical Constraints on Quantum Circuits*

Session 5B: Novel Architectures and Near-memory Computing
Colonnade Room 2:00-4:00 PM
Chair: TBD

5B.1 2:00-2:30 PM	<u>Invited</u>: **Wen-mei Hwu (University of Illinois, Urbana-Champaign)** *Rebooting the Data Access Hierarchy in Computing Systems*
5B.2 2:30-3:00 PM	**Sriseshan Srikanth (Georgia Institute of Technology)** *The Superstrider Architecture: Integrating Logic and Memory towards non-von Neumann Computing*
5B.3 3:00-3:30 PM	**Mohsen Imani (University of California, San Diego)** *NNgine: Ultra-Efficient Nearest Neighbor Accelerator Based on In-Memory Computing*
5B.4 3:30-4:00 PM	**Tarek Taha (University of Dayton)** *Socrates-D: Multicore Architecture for On-line Learning*

Session 6A: Optical Computing
Plaza Room 4:15-6:25 PM
Chair: TBD

6A.1 4:15-4:45 PM	**Sébastien Le Beux (Ecole Centrale de Lyon)** *An Energy-efficient Reconfigurable Nanophotonic Computing Architecture Design: Optical Lookup Table*
6A.2 4:45-5:05 PM	**Stefan Abel (IBM Research – Zurich)** *Multi-Level Optical Weights in Integrated Circuits*
6A.3 5:05-5:25 PM	**Matthias Freiberger (Ghent University - imec)** *On-chip Passive Photonic Reservoir Computing with Integrated Optical Readout*
6A.4 5:25-5:45 PM	**Jonathan George (The George Washington University)** *Towards On-Chip Optical FFTs for Convolutional Neural Networks*
6A.5 5:45-6:05 PM	**Zeb Barber (Montana State University)** *Spatial-Spectral Materials for High Performance Optical Processing*
6A.6 6:05-6:25 PM	**Thomas Van Vaerenbergh (Hewlett Packard Labs)** *Demonstration of a Coherent Tunable Amplifier for All-optical Ising Machines*

Session 6B: Probabilistic Computing and Nonlinear Dynamics
Colonnade Room 4:15-6:25 PM
Chair: TBD

6B.1 4:15-4:45 PM	<u>Invited</u>: **Sandip Tiwari (Cornell University)** *On the Physical Underpinnings of the Unusual Effectiveness of Probabilistic and Neural Computation*
6B.2 4:45-5:15 PM	**Eleonore Vissol-Gaudin (Durham University)** *Computing Based on Material Training: Application to Binary Classification Problems*
6B.3 5:15-5:45 PM	**Benham Kia (North Carolina State University)** *Nonlinear Dynamics and Chaos for Flexible, Reconfigurable Computing*
6B.4 5:45-6:05 PM	**Natesh Ganesh (University of Massachusetts, Amherst)** *A Thermodynamic Treatment of Intelligent Systems*
6B.5 6:05-6:25 PM	**Sourabh Kulkarni (University of Massachusetts, Amherst)** *Magneto-electric Approximate Computation for Bayesian Inference*