



# 2010 NRI Annual Review

## October 26, 27 & 28, 2010



### AGENDA

Hotel, Meetings & Events will be held at the  
Wyndham Garden Hotel Gaithersburg, 805 Russell Avenue, Gaithersburg, MD

Tuesday, October 26, 2010: NRI-NSF Projects		
7:00 – 8:00 am	Registration & Breakfast	
8:00 – 8:15 am	NSF Joint Program Introduction	Jeff Welser (NRI) Mike Roco (NSF)
8:15 – 8:45 am	Caltech MRSEC <i>Graphene Atomic Switches for Ultracompact Logic Devices and NV Memory Elements</i>	Nai-Chang Yeh (Caltech)
8:45 – 9:15 am	Harvard NSEC <i>Tunable Ultra-fast Conductance Switching Through External Fields</i>	Shriram Ramanathan (Harvard)
9:15 – 10:00 am	Purdue NCN <i>Experimental Realization of Low-Power Transistors with Negative Capacitors Exploration of All-Spin-Logic (ASPL) for Device-Circuit-Architecture</i>	Supriyo Datta (Purdue)
10:00 – 10:15 am	Break	
10:15 – 11:00 am	MIT MRSEC (UVa) <i>Reconfigurable Array Magnetic Automata (RAMA) nanoSTAR: VO<sub>2</sub> switches</i>	Caroline Ross (MIT), Stuart Wolf (UVa)
11:00 – 11:30 am	UC-Berkeley NSEC <i>Modeling and Simulation of Current and Field Induced Magnetic Switching</i>	Sayeeef Salahuddin (UC-Berkeley)
11:30 – 12:00 pm	University of Alabama MRSEC <i>Spintronic Logic Devices</i>	Arunava Gupta (U. of Alabama)
12:00 – 12:30 pm	Northwestern MRSEC <i>Generating, Probing, and Manipulating Excitons in Carbon-based Nanomaterials</i>	Mark Hersam (Northwestern)
12:30 – 1:30 pm	Luncheon Buffet	
1:30 – 2:00 pm	Brown MRSEC <i>Direct-Write Synthesis of Graphene Devices</i>	Vivek Shenoy (Brown)
2:00 – 2:30 pm	U. Maryland MRSEC <i>Controlling the Electronic Properties of Graphene</i>	Michael Fuhrer (UMD)
2:30 – 3:15 pm	Columbia NSEC <i>Graphene Devices: Electron Wavefunction Focusing &amp; Pseudospin Switching Graphene Hybrid Devices: Implementing Novel Quantum Switches</i>	Philip Kim (Columbia)

3:15 – 3:45 pm	Stanford NSEC (UI-UC) <i>Ultra-Low Power Pseudospintronic Switching in Bilayer Graphene</i>	Youngseok Kim (UI-UC)
3:45 – 4:00 pm	Break	
4:00 – 4:20 pm	Princeton MRSEC (UT-Austin) <i>Quantum Coherence in Graphene Bilayers</i>	Emanuel Tutuc (UT-Austin)
4:20 – 4:40 pm	U. Illinois, Urbana-Champaign NSEC <i>Anisotropic and Environment-Limited Thermal Conduction in Flexible Nanotube Arrays and Graphene Sheets</i>	Eric Pop (UIUC)
4:40 – 5:00 pm	U. Nebraska/Lincoln MRSEC <i>Study and Control of Intrinsic Magnetization at the Boundary of a Magneto-electric Material for Electrically Switchable Magnetic Nanostructures</i>	Kirill Belashchenko (U. Nebraska/Lincoln)
5:00 – 5:20 pm	Penn State MRSEC <i>Very Low Energy Dissipation Computing Using Inter-band Tunneling Injected non-equilibrium Ballistic Carriers</i>	Theresa Mayer (Penn State)
5:20– 5:40 pm	Stanford NSEC <i>Info Processing &amp; Cognitive Computing with Neuromorphic Elec. Synapses</i>	Duygu Kuzum (Stanford)
5:40– 6:00 pm	Wrap-up	Jeff Welser
6:00 – 7:30 pm	Reception in Lounge	



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<b>Wednesday, October 27, 2010: NRI-NIST Centers</b>		
7:00 – 8:00 am	Registration & Breakfast	
8:00 – 8:15 am	Welcome & Introductory Remarks	Jeff Welser (NRI) Dave Seiler (NIST)
8:15 – 8:45 am	NRI Benchmarking Results	Kerry Bernstein (IBM)
8:45 – 10:30 am	WIN Center <i>Spin devices</i> <i>Spin circuits</i> <i>Benchmarks &amp; metrics</i> <i>Spin Metrology</i>	Kang Wang (UCLA) Jeff Bokor (UCB) Jim Harris (Stanford) Alex Kozhanov (UC-Santa Barbara)
10:30 – 10:45 am	Break	
10:45 – 12:30 pm	SWAN Center <i>Logic devices with new state-variables</i> <i>Materials &amp; structures</i> <i>Nanoscale thermal management</i> <i>Interconnect &amp; Arch</i> <i>Nanoscale characterization</i>	Sanjay Banerjee (UT-Austin) Frank Register (UT-Austin) Eric Vogel (UT-Dallas)
12:30 – 1:30 pm	Lunch	
1:30 – 3:15 pm	MIND Center <i>Graphene devices: Thermal, Tunnel, &amp; Spin</i> <i>Interband Tunnel Devices</i> <i>NanoMagnetic Logic</i> <i>Non-equilibrium Systems Model / Measurement</i> <i>Nanoarchitecture</i>	Alan Seabaugh (Notre Dame) Gerhard Klimeck (Purdue) Theresa Mayer (Penn State) Sharon Hu (Notre Dame)
3:15 – 3:30 pm	Break	
3:30 – 5:15 pm	INDEX Center <i>Novel state-variable devices</i> <i>Fabrication &amp; Self-assembly</i> <i>Modeling &amp; Architecture</i> <i>Theory &amp; Simulation</i> <i>Roadmap</i> <i>Metrology</i>	Ji Ung Lee (U.Albany-SUNY) Robert Geer (U.Albany-SUNY) Supriyo Datta (Purdue) Vincent LaBella (U.Albany-SUNY)
5:15 – 5:30 pm	Wrap-Up	Jeff Welser (NRI)
5:30 – 9:00 pm	Reception in Lounge followed by Dinner in Russell Ballroom	
<b>Thursday, October 28, 2010</b>		
<b>NRI-NIST Phase 1.5 Proposal Presentations (Invitation Only)</b>		
7:00 – 8:00 am	Breakfast	
8:00 – 9:00 am	INDEX Director & PIs + TPG only	
9:00 – 10:00 am	MIND Director & PIs + TPG only	
10:00 – 11:00 am	SWAN Director & PIs + TPG only	
11:00 – 12:00 pm	WIN Director & PIs + TPG only	
12:00 noon	Boxed Lunch To Go	All
12:00 – 1:00 pm	Industry-NIST Caucus	TPG Only