



2012 NRI Annual Review

November 6, 7 & 8, 2012



AGENDA

Hotel, Meetings & Events will be held at the
Holiday Inn, 2 Montgomery Village Ave., Gaithersburg, MD 20879

Tuesday, November 6, 2012: NRI-NIST Centers		
7:00 – 8:00 am	Registration & Breakfast	
8:00 – 8:15 am	Welcome & Introductory Remarks	Tom Theis (NRI) Dave Seiler (NIST)
8:15 – 8:45 am	NRI Benchmarking Results	Dmitri Nikonov (Intel)
8:45 – 10:30 am	SWAN Center <i>Overview</i> <i>Theory</i> <i>Device Benchmarking</i> <i>Metrology</i>	Sanjay Banerjee (UT-Austin) Allan MacDonald (UT-Austin) L. Frank Register (UT-Austin) Robert Wallace (UT-Dallas)
10:30 – 10:45 am	Break	
10:45 – 12:30 pm	MIND Center <i>Overview</i> <i>Tunnel FETs</i> <i>NanoMagnetic Logic (NML)</i>	Alan Seabaugh (Notre Dame) Debdeep Jena (Notre Dame) and Vijay Narayanan (Penn State) Michael Niemier (Notre Dame)
12:30 – 1:30 pm	Lunch	
1:30 – 3:15 pm	WIN Center <i>Overview</i> <i>NanoMagnetic Devices and Circuits</i> <i>Spin Wave Devices</i> <i>Spin Torque Triad Devices</i>	Kang L. Wang (UCLA) Jeff Bokor (UC-Berkeley) Alex Khitun (UC-Riverside) Alex Kozhanov (UC-Santa Barbara)
3:15 – 3:30 pm	Break	
3:30 – 5:15 pm	INDEX Center <i>Graphene PN Junction Devices</i> <i>All Spin Logic Devices</i> <i>Metrology</i> <i>Low Energy Magnetic Domain Walls</i>	Ji Ung Lee (U. Albany-SUNY) Avik Ghosh (UVa) Alain Diebold (U. Albany-SUNY) Vincent LaBella (U. Albany-SUNY) Dimitri Antoniadis and Caroline Ross (MIT)
5:15 – 5:30 pm	Wrap-Up	
5:30 – 7:30 pm	Reception	



AGENDA

Wednesday, November 7, 2012: NRI-NSF Projects		
7:30 – 8:30 am	Registration & Breakfast	
8:30 – 8:45 am	NSF Joint Program Introduction	Tom Theis (NRI) Mike Roco and Larry Goldberg (NSF)
8:45 – 9:15 am	Stanford NSEC <i>Info Processing & Cognitive Computing with Neuromorphic Elec. Synapses</i>	H.-S. Philip Wong (Stanford)
9:15 – 9:45 am	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)
9:45 – 10:15 am	Penn State MRSEC <i>Very Low Energy Dissipation Computing Using Inter-band Tunneling Injected non-equilibrium Ballistic Carriers</i>	Suman Datta (Penn State)
10:15 – 10:30 am	Break	
10:30 – 11:00 am	Illinois Urbana-Champaign NSEC <i>Anisotropic and Environment-Limited Thermal Conduction in Flexible Nanotube Arrays and Graphene Sheets</i>	Eric Pop (UI-UC)
11:00 – 11:30 am	Northwestern MRSEC <i>Generating, Probing, and Manipulating Excitons in Carbon-Based Nanomaterials</i>	Mark Hersam (Northwestern)
11:30 – 12:00 pm	Princeton MRSEC (UT-Austin) <i>Quantum Coherence in Graphene Bilayers</i>	Emanuel Tutuc (UT-Austin) and Jun Xiong (Princeton)
12:00 – 12:30 pm	Columbia NSEC <i>Graphene Hybrid Devices: Implementing Novel Quantum Switches</i>	Philip Kim (Columbia)
12:30 – 1:30 pm	Luncheon Buffet	
1:30 – 2:00 pm	Columbia NEB <i>Novel Quantum Switches Using Heterogeneous Atomically Layered Nanostructures</i>	Philip Kim (Columbia)
2:00 – 2:30 pm	Cornell NEB <i>Ultimate Electronic Device Scaling Using Structurally Precise Graphene Nanoribbons</i>	Paulette Clancy (Cornell)
2:30 – 3:00 pm	UC-Santa Barbara NEB <i>Superlattice-FETs, Gamma-L-FETs, and Tunnel-FETs: Materials, Devices and Circuits for Fast Ultra-Lower-Power ICs</i>	Mark Rodwell (UCSB)

3:00 – 3:15 pm	Break	
3:15 – 3:45 pm	Carnegie Mellon NEB – EAGER <i>Novel Four-Terminal Spin Transfer Torque Devices to Enable All-Magnetic Logic Circuits</i>	Larry Pileggi (CMU)
3:45 – 4:15 pm	Notre Dame NEB <i>Nanoelectronics with Mixed-valence Molecular QCA</i>	Craig Lent (Notre Dame)
4:15 – 5:45 pm	Notre Dame NEB <i>Physics-Inspired Non-Boolean Computation based on Spatial- Temporal Wave Excitations</i>	Wolfgang Porod (Notre Dame)
4:45 – 5:15 pm	MIT NEB <i>Integrated Biological and Electronic Computation at the Nanoscale</i>	Timothy Lu (MIT)
5:15 – 5:30 pm	Wrap-up	Tom Theis
5:30 – 8:00 pm	Dinner	



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Thursday, November 8, 2012: NRI-NSF Projects		
7:30 – 8:30 am	Registration & Breakfast	
8:30 – 9:00 am	Virginia Commonwealth NEB <i>Hybrid Spintronics and Straintronics: Technology for Ultra-Low Energy Computing and Signal Processing Beyond 2020</i>	Supriyo Bandyopadhyay (VCU)
9:00 – 9:30 am	Minnesota NEB <i>Scalable Perpendicular All-Spin Non-Volatile Logic Devices and Circuits with Hybrid Interconnection</i>	Jian-Ping Wang (U. of Minnesota)
9:30 – 10:00 am	UC-Riverside NEB <i>Developing a Graphene Spin Computer: Materials, Nano-Devices, Modeling, and Circuits</i>	Roland Kawakami (UCR)
10:00 – 10:30 am	UC-Riverside NEB <i>Charge-Density-Wave Computational Fabric: New State Variables and Alternative Material Implementation</i>	Alexander Balandin (UCR)
10:30 – 10:45 am	Break	
10:45 – 11:15 am	Drexel NEB <i>Meta-Capacitance and Spatially Periodic Electronic Excitation Devices (MC-SPEEDs)</i>	Jonathan Spanier (Drexel)
11:15 – 11:45 pm	Pittsburgh NEB <i>Scalable Sensing, Storage and Computation with a Rewritable Oxide Nanoelectronics Platform</i>	Jeremy Levy (U. of Pittsburgh)
11:45 – 12:30 pm	Univ. of Virginia – ViNC <i>Phase transition switches based on the electrically induced metal-semiconductor transition in VO₂</i>	Stuart Wolf (UVa)
12:30 – 12:45 pm	Wrap-Up	Tom Theis
12:45 pm	To-Go Boxed Lunch	
12:45 – 2:00 pm	Working Lunch Closed Intra-company Caucus (Industry / NIST / NSF Participants Only)	
2:00 pm	Adjourn	