

Kavli Institute at Cornell for Nanoscale Science
Molecular Imaging 2009:
Routes to Three-Dimensional Imaging of Single Molecules

August 9 - 13, 2009
 Cornell University, Ithaca, NY

SUNDAY, August 9		
11:30 am - 12:00 pm	Boxed lunches provided	Duffield Hall Atrium
12:00 pm – 4:00 pm	Tutorials	318 Phillips Hall
12:00 pm – 2:00 pm	Raviv Raich (Oregon State) Tutorial: An Introduction to Sparse Image Reconstruction Algorithms	
2:00 pm – 4:00 pm	John Sidles (University of Washington) Tutorial: Practical recipes for the simulation of large-scale open quantum systems	
4:00 pm – 5:00 pm	Registration	RPCC First Floor Lounge
5:00 pm – 6:00 pm	Reception	
6:00 pm – 7:15 pm	Buffet Dinner	
<i>Session 1</i>	<i>Electron Microscopy in Materials Science and Biology</i> <i>Session Chair: Lee Harrell, U.S. Military Academy</i>	<i>Wendy Purcell Rm, RPCC</i>
7:30 pm – 7:45 pm	John A. Marohn (Cornell University) Welcoming Remarks and Charge to the Participants	
7:45 pm – 8:15 pm	David Muller (Cornell University) Fundamental Limits for Chemical Imaging by Electron Microscopy	
8:15 pm – 8:30 pm	Discussion	
8:30 pm – 9:00 pm	Sriram Subramaniam (National Institutes of Health) Visualizing Cells and Viruses at Molecular Resolution with 3D Microscopy	
9:00 pm – 9:15 pm	Discussion	
MONDAY, August 10		
8:00 am – 9:00 am	Breakfast	North Star Dining
<i>Session 2</i>	<i>Nanoscale Nuclear-Spin Imaging and Microscale Spectroscopy by Force Detection</i> <i>Session Chair: Raul Fainchtein, Johns Hopkins University</i>	<i>Wendy Purcell Rm, RPCC</i>
9:00 am – 9:30 am	Dan Rugar (IBM Almaden Research Center) Magnetic Resonance Force Microscopy at the Nanoscale: Successes and Future Challenges	
9:30 am – 9:45 am	Discussion	
9:45 am – 10:15 am	John Mamin (IBM Almaden Research Center) Magnetic Resonance Force Microscopy of Nuclear Spins in Organic Systems	
10:15 am – 10:30 am	Discussion	
10:30 am – 11:00 am	Break	
11:00 am – 11:30 am	Beat Meier (ETH Zurich) Multidimensional MRFM Experiments in Real and Spectral Space Using Hadamard and Fourier Encoding	
11:30 am – 11:45 am	Discussion	
12:00 pm – 1:15 pm	Lunch	North Star Dining
1:30 pm – 6:00 pm	Free Afternoon	
2:00, 2:30, 3:00 pm	Facility Tours	Cornell NanoScale Facility
6:00 pm – 7:15 pm	Dinner	North Star Dining

Session 3		<i>Very Recent Developments: Invited Poster Talks</i>	<i>Wendy Purcell Rm, RPCC</i>
<i>Session Chair: Steve Hickman, Cornell University</i>			
7:45 pm – 8:00 pm	Andrea Vinante (Leiden University)	MRFM with Nanowire and SQUID Detection	
8:15 pm – 8:30 pm	K.C. Fong (Max Planck Institute)	Spin Correlation Time of Few Electron Spins Ensemble in Magnetic Resonance Force Microscopy	
8:15 pm – 8:30 pm	Discussion		
8:30 pm – 8:45 pm	SangGap Lee (Cornell University)	New Physics for Coupling Spin Magnetization to a Mechanical Oscillator	
8:45 pm – 9:00 pm	Mark Butler (Université de Lyon)	Dynamics of Large Nuclear Spin Systems from Low-Order Correlations in Liouville Space	
9:00 pm – 9:15 pm	Discussion		
9:30 pm - 11:00 pm	Poster Session 1		<i>RPCC Rooms 220-222</i>

Tuesday, August 11

8:00 am – 9:00 am	Breakfast		North Star Dining
Session 4		<i>From MRFM to Diamond-Defect Magnetometry</i>	<i>Wendy Purcell Rm, RPCC</i>
<i>Session Chair: Martino Poggio, University of Basel</i>			
9:00 am – 9:30 am	Christian Degen (MIT)	The Various Paths to Nanoscale 3D Microscopy	
9:30 am – 9:45 am	Discussion		
9:45 am – 10:15 am	Toeno van der Sar (TU Delft)	Nanopositioning of Single NV Spins	
10:15 am – 10:30 am	Discussion		
10:30 am – 11:00 am	Break		
11:00 am – 11:30 am	Mikhail Lukin (Harvard University)	Nanoscale Detection, Manipulation and Magnetic Sensing Using Individual Spin Qubits in Diamond	
11:30 am – 11:45 am	Discussion		
12:00 pm – 1:15 pm	Lunch		North Star Dining
1:30 pm – 6:00 pm	<i>Free Afternoon</i>		
2:00, 2:30, 3:00 pm	<i>Facility Tours</i>		<i>Cornell NanoScale Facility</i>
6:00 pm – 7:15 pm	Dinner		North Star Dining
Session 5		<i>Diamond-defect Magnetometry and Recent Developments</i>	<i>Wendy Purcell Rm, RPCC</i>
<i>Session Chair: Sy-Hwang Liou, University of Nebraska-Lincoln</i>			
7:45 pm – 8:00 pm	Palash Banarjee (Ohio State University)	Mechanical Measurement of Magnetization Reversal in a Single Iron Filled Carbon Nanotube	
8:00 pm – 8:15 pm	Steven Hickman (Cornell University)	Batch Fabrication of Overhanging sub-100 nm Diameter Nickel Nanorods on Attonewton Sensitivity Silicon Cantilevers	
8:15 pm – 8:30 pm	Discussion		
8:30 pm – 9:00 pm	G. Balasubramanian (University of Stuttgart)	Single Spins in Diamond – Novel Probes for Nanoscience	
9:00 pm – 9:15 pm	Discussion		
9:30 pm - 11:00 pm	Poster Session 2		<i>RPCC Rooms 220-222</i>

Wednesday, August 12

8:00 am – 9:00 am	Breakfast	North Star Dining
Session 6	<i>Nanoscale Ferromagnetic Resonance and Nanowire Oscillators</i> Session Chair: Doran Smith, U.S. Army Research Laboratory	Wendy Purcell Rm, RPCC
9:00 am – 9:30 am	Chris Hammel (Ohio State University) Generation of Localized Ferromagnetic Resonance Modes for Scanned Probe Imaging	
9:30 am – 9:45 am	Discussion	
9:45 am – 10:15 am	Olivier Klein (Commissariat à l'Energie Atomique) Ferro-Magnetic Resonance Force Imaging of Nano-Magnets	
10:15 am – 10:30 am	Discussion	
10:30 am – 11:00 am	Break	
11:00 am – 11:30 am	Raffi Budakian (University of Illinois at Urbana-Champaign) Ultrasensitive Force Detection Using Nanowire Mechanical Resonators	
11:30 am – 11:45 am	Discussion	
12:00 pm – 1:15 pm	Lunch	North Star Dining
1:30 PM	Buses load at RPCC and depart for OFF-SITE trip	Taughannock Falls St. Park
5:30 PM	Dinner off-site at Taughannock Falls State Park	
8:30 PM	Buses load and return to RPCC	

Thursday, August 13

8:00 am – 9:00 am	Breakfast	North Star Dining
Session 7	<i>Extending the Limits of Simulation, Image Reconstruction, and Detection</i> Session Chair: Vladimir Tsifrinovich, Polytechnic Institute of NYU	Wendy Purcell Rm, RPCC
9:00 am – 9:30 am	John Sidles (University of Washington) Analyzing the Quantum Limits to Magnetic Resonance Microscopy: Insights from Claude Shannon, John von Neumann, and Richard Feynman	
9:30 am – 9:45 am	Discussion	
9:45 am – 10:15 am	Alfred Hero (University of Michigan) Sparsity Constrained Image Reconstruction for MRFM	
10:15 am – 10:30 am	Discussion	
10:30 am – 11:00 am	Break	
11:00 am – 11:30 am	John Marohn (Cornell University) A Road Map for Structural Characterization of Individual Biomacromolecules and Macromolecular Complexes via Detection and Imaging of Electron Spin Resonance from Single Nitroxide Spin Probes	
11:30 am – 11:45 am	Discussion	
11:45 am – 11:55 am	Farewell and Thank You	
12:00 pm – 1:15 pm	Lunch	North Star Dining
1:15 pm - 2:00 pm	Conference Ends--Check Out of Townhouses	
1:30 pm – 4:30 pm	Working Session for Organizers	RPCC 220-222