



CONFERENCE PROGRAM

ASME Nano Conference 2005

Integrated Nanosystems : Design, Synthesis & Applications

University of California, Berkeley * Berkeley, California
September 14 – 16, 2005

Conference Chairs

Arun Majumdar, University of California, Berkeley
Gang Chen, Massachusetts Institute of Technology

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Integrated Nanosystems : Design, Synthesis & Applications

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FINAL PROGRAM

WEDNESDAY, September 14, 2005

- 11:00am - 1:00pm **REGISTRATION** (*In front of Sibley Auditorium, Bechtel Engineering Ctr.*)
- 1:00pm - 1:10pm **Welcome** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Arun Majumdar & Gang Chen, Conference Chairs
- 1:10pm - 2:00pm **Plenary Session I** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Arun Majumdar, UC Berkeley
- Plenary I: Nanotechnology – A Washington Perspective**
Floyd Kvamme, Kleiner Perkins Caufield & Byers, Menlo Park, United States
- 2:00pm - 3:30pm **Session 3-1 Nanomanufacturing I** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Steven Girshick, University of Minnesota
- Keynote: NANO2005-87038 Nanocomposites**
Rodney Ruoff, Northwestern University
- NANO2005-87036: Synthesis of Nanocomposites by Ballistic Impaction of Nanoparticles**
Rajesh Mukherjee, William M. Mook, Jami Hafiz, Xiaoliang Wang, William W. Gerberich, Joachim V. R. Heberlein, Peter H. McMurry, Steven Girshick, University of Minnesota, Minneapolis, MN, United States
- NANO2005-87068: Flexible Electronic Devices from Hot Embossing Materials Transfer**
Ashante Allen, Andrew Cannon, William King, Samuel Graham, Georgia Institute of Technology, Atlanta, GA, United States
- NANO2005-87082: Partially Aligned Piezoelectric Nanofibers By Sol-Gel Electrospinning Process**
Yong Shi, Shiyu Xu, Stevens Institute of Technology, Hoboken, NJ, United States, Sang-Gook Kim, Massachusetts Institute of Technology, Cambridge, MA, United States
- 3:30pm - 4:00pm **BREAK – Sponsored by Fulwider Patton Lee & Utecht, LLP** (*Rm. 120ABC, Bechtel Ctr.*)
- 4:00pm - 5:30pm **Session 3-2 Nanomanufacturing II** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Sang-Gook Kim, Massachusetts Institute of Technology
- Keynote: NANO2005-87091: Multiwalled Nanotube Yarns and Sheets for Artificial Muscle, Structural, Energy Storage, Energy Harvesting, Field Emission, and Other Applications**
Ray H. Baughman, University of Texas at Dallas, Richardson, TX, United States, M. Zhang, S. Fang, A. A. Zakhidov, M. Kozlov, S. B. Lee, A. E. Aliev, C. D. Williams, University of Texas at Dallas Nanotech Institute, Richardson, TX, United States, K. R. Atkinson, CSIRO Textile & Fibre Technology, Belmont, Victoria, Australia
- NANO2005-87033: Controlled Manipulation of Carbon Nanotubes For Nanodevices, Arrays, And Films.**
Xue Ming Henry Huang, Robert Caldwell, Bhupesh Chandra, Columbia University, New York, NY, United States, Seong Chan Jun, Columbia University, New York, NY, United States, Mingyuan Huang, James Hone, Columbia University, New York, NY, United States
- NANO2005-87058: Surface Plasmons-Assisted Nanoscale Photolithography**
Dongbing Shao, same, Austin, TX, United States, Shaochen Chen, The University of Texas at Austin, Austin, TX, United States

NANO2005-87067: High-Yield Plasma Synthesis of Luminescent Silicon Quantum Dots
Lorenzo Mangolini, Elijah Thimsen, Uwe Kortshagen, University of Minnesota, Minneapolis, MN, United States

5:30pm - 7:00pm

Session 2-1 Nanoscale Phenomena I (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Kenny Breuer, Brown University

Keynote: NANO2005-87045: Nanomaterials and Physics
Zhifeng Ren, Boston College, Chestnut Hill, MA, United States

NANO2005-87047: Elastic Properties of Single-Walled Carbon Nanotubes in Axial and Transverse Directions: A First Principles Study
Xiaolan Song, Qingfeng Ge, S. C. Yen, Southern Illinois University, Carbondale, IL, United States

NANO2005-87055: Field-dependent Electrical and Thermal Characterization of Cu/CoFe Multilayer for Giant Magnetoresistive (GMR) Head Applications
Yizhang Yang, Jian-Gang Zhu, Carnegie Mellon University, Pittsburgh, PA, United States, Robert White, Carnegie Mellon University, Pittsburgh, PA, United States, Mehdi Asheghi

NANO2005-87046: Understanding Surface Instability Patterns in Nanoscale Thin Films
Rui Huang, Se Hyuk Im, Yaoyu Pang, University of Texas at Austin, Austin, TX, United States

7:00pm - 8:00pm

RECEPTION (*Lobby, Hearst Mining Building*)

THURSDAY, September 15, 2005 - Nanotechnology Commercialization Showcase

7:00am - 9:00am **REGISTRATION** (*In front of Sibley Auditorium, Bechtel Engineering Ctr.*)

9:00am - 9:30am **Plenary Session II: Nano Commercial Showcase** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Anthony Waitz, Quantum Insight

Plenary II: Nanotechnology Applications in Mature Industries
David Soane, Soane Labs, LLC

9:30am - 10:00am **Keynote Session** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chairs: Anthony Waitz, Quantum Insight
Kitu Bindra, Buchanan Ingersoll PC
Terry Fuqua, PricewaterhouseCoopers

Keynote: Development and Commercialization of Nanotechnology Based Products
Mohan Misra, President & CEO, ITN Energy Systems, Inc.

10:00am - 10:30am **Keynote: VC Investments in Nano/Micro Technology - PwC MoneyTree Survey Results**
Steve Bengston, Money Tree

10:30am - 10:45am **BREAK** (*Rm. 120ABC, Bechtel Engineering Ctr.*)

10:45am - 11:45pm **Panel: Obtaining Venture Capital**
Presenter and Moderator: Steve Bengston, PricewaterhouseCoopers

VCs on the Panel:
David Aslin, 3i
Tom Baruch, CMEA Ventures
Michael Dierks, Intel Capital
Erik Straser, Mohr Davidow Ventures

Company on the Panel:
Nobi Kambe, Nanogram Corporation

11:45pm - 1:10pm **LUNCH**

1:10pm - 2:00pm **Plenary Session III** (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Gang Chen, Massachusetts Institute of Technology

Plenary III: Colloidal Nanocrystals: From Fundamental Properties to Applications in Renewable Energy
Paul Alivisatos, UC Berkeley

2:00pm - 4:00pm

Nanolgnite Company Presentations (*Sibley Auditorium, Bechtel Engineering Ctr.*)
Chair: Kitu Bindra, Buchanan Ingersoll PC.

Come listen to the presentations of 8 exciting nanotechnology related startups:

1. **Transfer Devices Inc.**, a nanolithography company
2. **Wostec, Inc.**, using nanowires for displays, membranes and semiconductors.
3. **Gemio Technologies**, accelerating the development of nanobio products
4. **Lithium Electrochromic Systems**, a revolutionary energy efficiency company.
5. **CoTherm**, an alternative energy company
6. **Nanopoint, Inc.**, a nanobio tools and solutions company
7. **Crystal Clear Technologies**, a nanotechnology based water purification company
8. **Nanovative Technologies Inc.**, start-up company in virtual simulation tools for nanotechnology

Judges:

Eric Straser, General Partner, Mohr Davidow Ventures
Tom Baruch, Managing General Partner, CMEA Ventures
Himanshu Choksi, Managing Director, Pacifica Fund
Mohanjit Jolly, Managing Director, Garage Technology Ventures
Wasiq Bokhari, Managing Partner, Quantum Insight

4:00pm - 4:30pm

BREAK (*Rm. 120ABC, Bechtel Engineering Ctr.*)

4:30pm - 5:30pm

Poster Introduction (*Sibley Auditorium, Bechtel Engineering Ctr.*)

5:30pm - 8:30pm

Poster Session/Exhibit/Reception (*Lobby, Hearst Mining Building*)

Chairs: Mehdi Asheghi, Carnegie Mellon University,
Sang-Gook Kim, Massachusetts Institute of Technology
Gang Chen, Massachusetts Institute of Technology

NANO2005-87012: Shear-Driven Transport and Binding Reactions of Macromolecules in Nano-Channels: Mechanical and Tribological Investigations

Tony Tuzolana Mbumba, University of Ghent, Ghent, Belgium

NANO2005-87024: Nano Sensors

Samson Isaac, R.M.K.Engineering College, Chennai, Tamil Nadu, India, Sutharson B, Vellammal Engg College, Chennai, Tamil Nadu, India, Saral Sutharson, Velammal Engineering College, Chennai, Tamil Nadu, India

NANO2005-87029: Fullerene-Doped Composite Systems: New Materials for Next Generation Optoelectronics

Maksim Kireitseu, Damping tech Inc., Minsk, Russia, Natalie Kamanina, Vavilov State Optical Institute, St. Petersburg, Russia

NANO2005-87049: Microelectrode Design in Mems-Based Dep Cell Filtration Devices

Mohammed Jalal Ahamed, Mohammad Rahman, University of Toronto, Toronto, ON, Canada

NANO2005-87059: Photo-deformable Micro-shells of Nanometer Thick

Li-Hsin Han, The University of Texas at Austin, Tingji Tang, The University of Texas at Austin, Shaochen Chen, The University of Texas at Austin

NANO2005-87060: Lower Limits of Detection for Single Biological Particles using Impedance Spectroscopy

Pahnit Seriburi, Ashutosh Shastry, Angelique Van't Wout, John Mittler, Shih-Hui Chao, John Koschwanez, Deirdre Meldrum, University of Washington, Seattle, WA, United States

NANO2005-87062: The Patterned Optical Phase Change Recording Media

Evan Small, Carnegie Mellon University, Pittsburgh, PA, United States, Sadegh M. Sadeghipour, Carnegie Mellon University, Pittsburgh, PA, United States, Mehdi Asheghi

NANO2005-87070: Single Crystal Silicon Nanoparticle-Based Transistor

Yongping Ding, Ying Dong, Ameya Bapat, Christopher Perrey, C. Barry Carter, Stephen A. Campbell, Uwe Kortshagen, University of Minnesota, Minneapolis, MN, United States

NANO2005-87071: Propose and Characteristics Study of a new Actuation Method for Micropumps, Using Membrane Buckling

Mohammad H. Saghafi, Sharif University of Technology, Tehran, Tehran, Iran, Mohammad T. Ahmadian, Sharif Uni. of Tech., Tehran, Iran, Hadi Salehi, Sharif University of Technology, Tehran, Iran, Reza Monazami, Sharif Uni. of Tech., Tehran, Iran, Azad Qazi Zade, Sharif University of Technology, Tehran, Iran

NANO2005-87074: Compressive Properties of Dense Vertically Aligned Multi-Walled Carbon Nanotube Arrays

Tao Tong, Carmel Majidi, UC Berkeley, Berkeley, CA, United States, Yang Zhao, Atlas Scientific, Inc., San Jose, CA, United States, Lance Delzeit, NASA Ames Research Center, Moffett Field, CA, United States, Richard E. Groff, Pramod Reddy, UC Berkeley, Berkeley, CA, United States, Arun Majumdar, Ali Kashani, Atlas Scientific, Inc., San Jose, CA, United States, M. Meyyappan, NASA Ames Research Center, Moffett Field, CA, United States

NANO2005-87083: Photoswitchable Synaptic Receptors

Pau Gorostiza, UC Berkeley - Molecular & Cell Biology, Berkeley, CA, United States, Matthew Volgraf, UC Berkeley - College of Chemistry, Berkeley, CA, United States, Rika Numano, Stephanie Szobota, Richard Kramer, UC Berkeley - Molecular & Cell Biology, Berkeley, CA, United States, Dirk Trauner, UC Berkeley - College of Chemistry, Berkeley, CA, United States, Ehud Isacoff, UC Berkeley - Molecular & Cell Biology, Berkeley, CA, United States

NANO2005-87086: Fabrication of First-level Carbon Nanotube Interconnect Via Structures by Thermal Chemical Vapor *Deposition*

Yunyu Wang, Paul S. Ho, Zhen Yao, Li Shi, The University of Texas at Austin, Austin, TX, United States

NANO2005-87061: A Novel Structure and Experimental Procedure for Nanocalorimetry

Yizhang Yang, Shu Zhang, Carnegie Mellon University, Pittsburgh, PA, United States, Mehdi Asheghi

NANO2005-87018: Effective Thermal Conductivity and Viscosity of Nanofluids

S. M. S. Murshed, Nanyang Technological University, Singapore., Singapore, Singapore, Kai Choong Leong, Charles Yang, Nanyang Technological University, Singapore, Singapore, Singapore

NANO2005-87030: Elastic Fields of Surface Quantum Dots

Fjola Jonsdottir, Dadi Halldorsson, University of Iceland, Reykjavik, Iceland, Glenn Beltz, University of California, Santa Barbara, CA, United States, Alexei Romanov, A. F. Ioffe Physico-Technical Institute, St. Petersburg, Russia

NANO2005-87041: Theoretical Computing of Nanocontact Resistance between Atomic Force Microscope Tip and Gold Nanoparticles During Nanoindentation

Ashutosh Jain, Shri Shankaracharya College of Engineering and Technology, Bhilai, India

NANO2005-87063: Thermal Characterization of Silicon Nanowires

Wenjun Liu, Yizhang Yang, Carnegie Mellon University, Pittsburgh, PA, United States, Mehdi Asheghi

NANO2005-87064: Pump-Probe Experimental Study of Phonon Reflectivity at an Interface and Phonon Relaxation Time

Ronggui Yang, Xiaoyuan Chen, Aaron Schmidt, Gang Chen, MIT, Cambridge, MA, United States

NANO2005-87066: Thermal Radiative Heat Transfer between Closely Spaced Nanostructures

Lu Hu, Massachusetts Institute of Technology, Cambridge, MA, United States, Gang Chen, MIT, Cambridge, MA, United States

NANO2005-87072: Nonlocal Formulation of Rarefied Poiseuille Flow

Ronggui Yang, Gang Chen, MIT, Cambridge, MA, United States

NANO2005-87080: Tuning Thermal Transport in a Crystalline Solid Using Epitaxially Embedded Nanoparticles

Woochul Kim, University of California, Berkeley, Suzanne Singer, University of California, Berkeley, Arun Majumdar, University of California, Berkeley

NANO2005-87087: Thermal Transport in Silicon Nanowires

Marc Llaguno, University of California Berkeley, Berkeley, CA, United States, Renkun Chen, Dept. of Mechanical Engineering, University of California, Berkeley, CA, United States, Allon Hochbaum, Peidong Yang, Dept. of Chemistry, University of California, Berkeley, CA, United States, Arun Majumdar

NANO2005-87015: Modelling And Fem Simulation Of Vibration Damping Properties Of Nanoscale-Reinforced Composite Materials In Aerospace Applications

Maksim Kireitseu, Rolls-Royce UTC, Univ. of Sheffield and NAS of Belarus, Minsk, Belarus

NANO2005-87022: Bending Stiffness of a Double-Layered Graphene Sheet Using a Geometrically-Based Analytical Approach

Kambiz Behfar, Reza Naghdabadi, Sharif University of Technology, Tehran, GA, Iran

NANO2005-87023: Critical Analysis In Process Mechanics Of Nanomaterials

Inderpreet Singh, Punjab Engineering College, Chandigarh, India, Anindo Bandyopadhyay, NIT, Suratkal, Karnataka, India

NANO2005-87025: Activities In Iran For Standardization Of Nanotechnology

Ayat Rezaeifar, BTF Foundation, Tehran, Tehran, Iran, Bahar Mehmani, Workgroup of nanotechnology, Ministry of Industries and Mines, Tehran, Tehran, Iran, Mojtaba Mesgari Mashhadi, BTF Foundation, Tehran, Tehran, Iran

NANO2005-87027: The Local Instability of Nanostructures

Liang Zhang, University of Iowa, Jia Lu, University of Iowa

NANO2005-87028: Computational Modelling of Vibration Damping Effects In Nanoscale-Reinforced Materials

Liya Bochkareva, NAS of Belarus, Minsk, Belarus, Maksim Kireitseu, Damping tech Inc., Minsk, Russia

NANO2005-87031: The Invention Using a Liposome of a Bio-Micromachine

Matsunori Nara, Tokyo University of Science, Suwa, Chino Nagano, Japan

NANO2005-87039: Molecular Dynamics Simulations of Fluid Flow in a Rotating Channel

Zhaohui Qin, Iowa State University, Ames, IA, United States

NANO2005-87043: The Investigation of Using 3D Embroidery Technology for Creating Textile Scaffolds for Tissue Engineering

Tina Arora, Tilak Dias, Manuchehr Soleimani, The University of Manchester, Manchester, United Kingdom

NANO2005-87081: Detecting Phase Transitions During Melting using Microcantilevers

Sibani Lisa Biswal, UC Berkeley, Digvijay Raorane, UC Berkeley, Alison Chaiken, HP Labs, Arun Majumdar, UC Berkeley

NANO2005-87100: Preliminary Results Related to the Design of Virtual Probes for use in a Nano-Manipulation Test-Bed

Anant Trivedi, New Mexico State University, J. Cecil, New Mexico State University

FRIDAY, September 16, 2005

8:00am - 9:00am

REGISTRATION (In front of Sibley Auditorium, Bechtel Engineering Ctr.)

9:00am - 10:30am

Session 2-2 Nanoscale Phenomena II (Sibley Auditorium, Bechtel Engineering Ctr.)

Chair: Mehdi Asheghi, Carnegie Mellon University

Keynote: NANO2005-87090: Direct Measurement of Slip Velocities Using Three Dimensional Total Internal Reflection Velocimetry

Peter Huang, Jeffrey Guasto, Kenny Breuer, Brown University, Providence, RI, United States

NANO2005-87079: Measurement of Liquid Slip on NanoTurf Surfaces

Chang-Hwan Choi, UCLA (University of California, Los Angeles), Los Angeles, CA, United States, CJ Kim, UCLA, Los Angeles, CA, United States

NANO2005-87075: Nanofluidic Transistors for Control and Sensing of Ions and Biomolecules

Rohit Karnik, University of California at Berkeley, Kenneth Castelino, University of California at Berkeley, Chuanhua Duan, University of California at Berkeley, Rong Fan, University of California at Berkeley, Peidong Yang, University of California at Berkeley, Arun Majumdar

NANO2005-87056: Molecular Scale Imaging with a Multilayer Superlens

Pratik Chaturvedi, UIUC, MIE Dept, Urbana, IL, United States, Nicholas Fang, University of Illinois at Urbana-Champaign, Urbana, IL, United States

10:30am - 11:00am

BREAK (Rm. 120ABC, Bechtel Engineering Ctr.)

11:00am - 12:30pm

Session 1-1 Devices & Systems I (Sibley Auditorium, Bechtel Engineering Ctr.)

Chair: C.J. Kim, University of California at Los Angeles

Keynote: NANO2005-87089: Information Storage and Retrieval using Macromolecules as Storage Media

Masud Mansuripur, The University of Arizona, Tucson, AZ, United States

NANO2005-87052: Development of Ultra-sensitive Capacitive Readout for Magnetic Resonance Force Microscopy

Harish Bhaskaran, University of Maryland, College Park, MD, United States, Denis Pelekhov, P Chris Hammel, Department of Physics, The Ohio State University, Columbus, OH, United States, Keith Schwab, Laboratory for Physical Sciences, College Park, MD, United States

NANO2005-87077: Novel Piston Motion Opto-Mechanical Sensor for Nanoscale Motion Detection

Si-Hyung "Shawn" Lim, UC, Berkeley, Albany, CA, United States, Roberto Horowitz, UC, Berkeley, Berkeley, CA, United States, Arun Majumdar

NANO2005-87069: Nano-Imprint Fabrication of Injectable, Stimuli-Responsive Drug Delivery Vehicles

Luz Cristal Glangchai, University of Texas at Austin, Austin, TX, United States, Li Shi, The University of Texas at Austin, Austin, TX, United States, Krishnendu Roy, University of Texas at Austin, Austin, TX, United States

12:30pm - 1:30pm

LUNCH (Rm. 120ABC, Bechtel Engineering Ctr.)

1:30pm - 3:00pm

Session 1-2 Devices & Systems II (Sibley Auditorium, Bechtel Engineering Ctr.)

Chair: Mark Shannon, University of Illinois at Urbana Champaign

Keynote: NANO2005-87084: Programmable Self-Assembly Across the Micro and Nano Scales

Karl Bohringer, University of Washington, Seattle, WA, United States

NANO2005-87026: Nanoporous Energy Absorption Systems

Yu Qiao, Univ of Akron, Akron, OH, United States, Xinguo Kong, Falgun B. Surani, University of Akron, Akron, OH, United States

NANO2005-87057: Electromagnetic Nanoactuators Based On Nanocoils

D.J. Bell, L.X. Dong, B.J. Nelson, ETH Zurich, Zurich, Switzerland, Y. Sun, University of Toronto, Toronto, ON, Canada, L. Zhang, D.A. Gruetzmacher, Paul Scherrer Institute, Villingen, Switzerland

NANO2005-87050: Mechanical Testing of Freestanding Nano-Films Using a Novel Finite Diameter Tip MEMS-based Testing Machine

Zayd C. Leseman, Zuhaib Sheikh, Thomas J. Mackin, University of Illinois Urbana-Champaign, Urbana, IL, United States, Matthew R. Begley, University of Virginia, Charlottesville, VA, United States

3:00pm

CONFERENCE ADJOURN



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- **The Future of Water: A New ASME Initiative
@ ASME's Annual Congress**
Orlando, Florida * November 2, 2005, 11:15 am - 1:00 pm
www.asme.org/congress
- **1st European Fuel Cell Technology & Applications
Conference**
Rome, Italy * December 14-16, 2005
www.asmeconferences.org/efc05

- **Nanomechanics: Sensors & Actuators Impact Forum**
May 2006
- **Frontiers in Biomedicine**
Irvine, California * May 11-12, 2006
- **4th International Conference on Fuel Cell Science, Engineering and Technology**
Irvine, California * June 19-21, 2006
www.asmeconferences.org/fuelcell06
- **4th International Conference on Nanochannels, Microchannels and Minichannels**
Limerick, Ireland * June 19-21, 2006
www.asmeconferences.org/icnmm06
- **5th Nano Training Bootcamp**
July 2006
- **CANEUS 2006 Conference on Micro-Nano-Technologies for Aerospace
Applications – From Concepts to Systems**
Toulouse, France * August 27 – September 1, 2006
www.caneus.org/caneus06



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