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Monday 25 October

SESSION 1

Room: 103 C .......................... Mon. 8:30 to 10:40 am

Nanotube: Material

Chairs: Peter J. Burke, Univ. of California/Irvine; Ant Ural, Univ. of Florida

8:30 am: Synthesis of long, aligned, carbon nanotubes for sensing applications (Invited Paper), J. Hone, Columbia Univ. ........................ [5593-01]

8:50 am: Size control of carbon nanotubes for biomedical applications (Invited Paper), K. Tohji, Y. Sato, Y. Akimoto, K. Shinoda, J. Balachandran, K. Motomiya, Tohoku Univ. (Japan); K. Shibata, Hokkaido Univ. (Japan) ........................ [5593-02]

9:10 am: Synthesis of inorganic thin-layer-coated carbon nanotubes towards passivated nanoprobes (Invited Paper), T. Ikuno, M. Kishida, J. Lee, S. Honda, M. Katayama, H. Mori, K. Oura, Osaka Univ. (Japan) ........................ [5593-03]

9:30 am: Single-walled carbon nanotube thin films: from synthesis to devices (Invited Paper), Q. Fu, S. Huang, J. Liu, Duke Univ. ................................ [5593-04]

9:50 am: Electric field assisted growth and assembly for nanotube electronics and nanosensing applications (Invited Paper), A. Ural, Univ. of Florida ........................ [5593-05]

Coffee Break ................................ 10:40 to 11:00 am

Nanotube: Nanophotonics, and Nano-Sensors Plenary

Room: Auditorium Lecture Hall ........................ Mon. 11:00 to 11:40 am

Chemical and Biological Sensing Devices, Sensor Networks, and Future Sensor Technologies, R. Stanley Williams, Hewlett-Packard Labs.

Lunch Break ................................ 11:40 am to 1:00 pm

SESSION 2

Room: 103 C .......................... Mon. 1:00 to 3:10 pm

Nanotube: Devices

Chairs: Ant Ural, Univ. of Florida; Peter J. Burke, Univ. of California/Irvine

Keynote

1:00 pm: Detecting biomolecules with nanoscale active electronic devices (Invited Paper), G. Gruner, Univ. of California/Los Angeles and Nanomix Inc. ........................ [5593-07]

1:30 pm: Carbon nanotube chemical sensors (Invited Paper), P. Kim, J. P. Small, Columbia Univ.; T. Someya, Univ. of Tokyo (Japan); C. Nuckolls, Columbia Univ. ........................ [5593-08]

1:50 pm: Carbon nanotubes-based nano-electrode arrays: fabrication, evaluation, and biosensing application (Invited Paper), Y. Lin, Pacific Northwest National Lab.; Y. Tu, Boston College; F. Lu, Pacific Northwest National Lab.; Z. Ren, Boston College ........................ [5593-09]

2:10 pm: Carbon nanotubes devices for GHz to THz applications (Invited Paper), P. J. Burke, Univ. of California/Irvine ........................ [5593-10]

2:30 pm: Development of microwave carbon nanotube resonator sensors (Invited Paper), A. H. Pham, Univ. of California/Davis ........................ [5593-11]

2:50 pm: Optical method for trapping and detection of single-walled carbon nanotubes in aqueous solution (Invited Paper), Y. Zhang, Intel Corp. ........................ [5593-12]

Coffee Break ................................ 3:10 to 3:30 pm

SESSION 3

Room: 103 C .......................... Mon. 3:30 to 6:20 pm

Nano-Structures for Sensing: Exciting Developments and Future Research Directions

Chairs: Mehdi Anwar, Univ. of Connecticut; Achyut K. Dutta, Banpil Photonics, Inc.

Keynote

3:30 pm: Nanosensors and nanoprobes for gene diagnostics and cellular biomaging (Invited Paper), T. Vo-Dinh, Oak Ridge National Lab. ........................ [5593-13]

4:00 pm: Nanotechnoogy strategic plan for the U.S. Air Force (Invited Paper), M. M. Freund, Air Force Research Lab. ........................ [5593-14]


5:00 pm: Local synthesis of Si and SiO2 nanowires on MEMS micro-bridges for sensor applications (Invited Paper), S. M. Prokes, S. Arnold, Naval Research Lab. ........................ [5593-16]


5:40 pm: Tunable surface enhanced Raman hot-spots for nanobio sensing (Invited Paper), X. Zhang, K. K. Su, Q. Wei, S. Durant, Univ. of California/Los Angeles ........................ [5593-18]

6:00 pm: Chemical sensors based on photonic crystal nanolasers (Invited Paper), M. Loncar, Harvard Univ. and California Institute of Technology; M. L. Adams, Enisco, Inc. and California Institute of Technology; A. Scherer, California Institute of Technology ........................ [5593-19]

Tuesday 26 October

SESSION 4

Room: 103 C .......................... Tues. 8:30 to 10:10 am

Synthesis and Assembly Mechanisms of Nanostructure Arrays for Sensing

Chairs: Chongwu Zhou, Univ. of Southern California; Zhiyong Li, Hewlett-Packard Labs.

8:30 am: Carbon nanopipettes and micropipes for electrochemical sensing and microfluidics (Invited Paper), G. R. C. Mani, G. Bhimarasetti, M. K. Sunkara, Univ. of Louisville ........................ [5593-20]

8:50 am: Large-scale and highly ordered 1D nanostructural arrays by template-assisted electrodeposition (Invited Paper), D. Xu, Peking Univ. (China) ........................ [5593-21]

9:10 am: Complex-oriented nanostructures for chemical- and biosensing (Invited Paper), J. Liu, Sandia National Labs. ........................ [5593-22]

9:30 am: Integration of metal-oxide nanobelts with microsystems for sensor applications (Invited Paper), C. Yu, S. Saha, C. Villalobos, L. Shi, Univ. of Texas/Austin; X. Kong, Z. L. Wang, Georgia Institute of Technology ........................ [5593-23]


Coffee Break ................................ 10:10 to 10:30 am
SESSION 5
Room: 103 C .................................. Tues. 10:30 am to 12:00 pm
Chemical Assembly of Nanostructured Films for Sensing Applications
Chairs: Chongwu Zhou, Univ. of Southern California; Zhiyong Li, Hewlett-Packard Labs.

Keynote
10:30 am: Chemical assembly of nanostructured films for sensing applications (Invited Paper), S. Yang, Hong Kong Univ. of Science and Technology (Hong Kong China) ........................................ [5593-25]
11:00 am: Platinum and gold passivated nanowire arrays on Si(001) (Invited Paper), R. Ragan, S. Kim, D. A. A. Ohlberg, Hewlett-Packard Labs.; Y. Chen, Univ. of California/Los Angeles; R. S. Williams, Hewlett-Packard Labs. .............. [5593-26]
11:20 am: Chemical design of inorganic nanowires, nanotubes, and nanowire networks (Invited Paper), M. K. Sunkara, Univ. of Louisville .............. [5593-27]
12:40 pm: Template-based growth of nanorod arrays by solution methods (Invited Paper), G. Z. Cao, Univ. of Washington .......................................... [5593-28]
Lunch Break ................................... 12:00 to 1:30 pm

Nanotechnology, Nanophotonics, and Nano-Sensors Plenary II
Room: Auditorium Lecture Hall ................. Tues. 1:30 to 2:10 pm
Engineering Nanotechnology for Advanced Electronic Applications,
Daniel J. Radeck, DARPA

SESSION 6
Room: 103 C .................................. Tues. 2:15 to 2:55 pm
Novel Engineered Nanostructures for Sensor Applications
Chairs: Regina Ragan, Univ. of California/Irvine; M. Salf Islam, Univ. of California/Davis

Keynote
2:15 pm: Semiconducting and piezoelectric nanobelts, nanosprings, and nanorings for sensing (Invited Paper), Z. L. Wang, Georgia Institute of Technology .. [5593-29]
Coffee Break ................................... 2:55 to 3:20 pm

SESSION 7
Room: 103 C .................................. Tues. 3:20 to 4:40 pm
Integrated Chemical/Biological Nano-Sensor Devices
Chairs: Regina Ragan, Univ. of California/Irvine; M. Salf Islam, Univ. of California/Davis

3:20 pm: Nanowires and nanotubes for chemical and biosensing applications (Invited Paper), C. Zhou, Univ. of Southern California ................. [5593-31]
3:40 pm: Sequence-specific DNA sensors based on silicon nanowires (Invited Paper), Z. Li, Hewlett-Packard Labs.; Y. Chen, Univ. of California/Los Angeles; X. Li, T. I. Kamins, R. S. Williams, Hewlett-Packard Labs. ......................... [5593-32]
4:00 pm: Nanofabricated metal and semiconductor building blocks for devices and sensors (Invited Paper), J. A. Rogers, Univ. of Illinois/Urbana-Champaign [5593-33]
4:20 pm: Nanostructure engineered chemical sensors for hazardous gas and vapor detection (Invited Paper), J. Li, NASA Ames Research Ctr. ................. [5593-34]

Room: 103 C .................................. Tues. 4:40 pm
Late Breaking News
Chairs: M. Salf Islam, Univ. of California/Davis; Achyut K. Dutta, Banpil Photonics, Inc.
### SESSION 8

**Room: 103 C**  
**Wednesday 8:30 to 10:40 am**

**Functionalization and Patterning of Surfaces with Biomolecules**

**Chairs:** Andrew McMillan, NASA Ames Research Ctr.; Sehun Kim, Korea Advanced Institute of Science and Technology (South Korea)

8:30 am: Mesoscale surface for DNA: micro-array and other applications (Invited Paper), I. W. Park, Pohang Univ. of Science and Technology (South Korea)  
8:50 am: Patterning silicon surfaces with covalently attached DNA at sub-micrometer resolution (Invited Paper), X. Zhao, J. Duyang, Peking Univ. (China)  
9:30 am: Molecular biomimetics: genetically engineered polypeptides for inorganic and GEP as molecular building blocks (Invited Paper), M. Sarikaya, Univ. of Washington; C. Tamerler, Istanbul Technical Univ. (Turkey); A. Jen, D. T. Schwartz, B. Traxler, F. Baneux, Univ. of Washington  
9:50 am: Nanoscopic synthetic templates based on self-assembled helical fibrils (Invited Paper), V. P. Conticello, Y. Zimenkov, Emory Univ. (Invited Paper)  
10:10 am: Supramolecular interfacial architectures for biosensing (Invited Paper), W. Knoll, Max-Planck-Institut für Polymerforschung (Germany)  
10:40 to 11:00 am: Coffee Break

### SESSION 11

**Room: 102 A**  
**Wednesday 8:10 to 10:40 am**

**Advanced Nanofabrication, Novel Techniques and Devices for Sensing**

**Chairs:** William M. Tong, Hewlett-Packard Labs.; Pavel Kornilovich, Hewlett-Packard Co.

8:10 am: Ultrahigh-Q toroid microcavities on a chip (Invited Paper), T. J. Kippenberg, S. M. Spillane, D. K. Armani, K. J. Vahala, California Institute of Technology  
8:50 am: Applications of integrated optical devices for nanoscale displacement sensing (Invited Paper), I. Kiyat, Bilkent Univ. (Turkey); C. Cocabas, Univ. of Illinois/ Urbana-Champaign; A. Kocabas, A. Aydinli, Bilkent Univ. (Turkey)  
9:30 am: Integrated poly-silica nanomechanical resonators for wireless sensor nodes (Invited Paper), E. P. Quevy, T. King, R. T. Howe, Univ. of California/Berkeley  
9:50 am: Sub-diffraction-limit nano-photonic waveguides by quantum-dot array structure: modeling and simulation (Invited Paper), C. Wang, L. Lin, Univ. of Washington  

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**Nanotechnology, Nanophotonics, and Nano-Sensors Plenary III**

**Room: Auditorium Lecture Hall**  
**Wednesday 11:00 to 11:40 am**

**What is the “Bio” in Bio-Nanotechnology?**

Jonathan D. Trent, Andrew McMillan, Chad Paavola, NASA Ames Research Ctr.

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**SESSION 9**

**Room: 103 C**  
**Wednesday 1:00 to 2:55 pm**

**Bio-Inspired Assembly of Biomaterials, Hybrid Systems, and Nanoprobes for Biosensing**

**Chairs:** Sehun Kim, Korea Advanced Institute of Science and Technology (South Korea); Andrew McMillan, NASA Ames Research Ctr.

2:00 pm: Nanocarbon materials for active electronics and bioimnotechnology (Invited Paper), C. S. Ozkan, Univ. of California/Riverside  
2:20 pm: Interaction analysis and nanoscale fabrication of biomolecular array by force spectroscopy using AFM probe (Invited Paper), C. Nakamura, Tokyo Univ. of Agriculture and Engineering (Japan); N. Nakamura, Shinkosha Co., Ltd. (Japan); J. Miyake, Tokyo Univ. of Agriculture and Engineering (Japan)  
2:40 pm: In-situ synthesis of oligonucleotides on plasma-modified PTFE for fabricating DNA chips, N. He, Southeast Univ. (China)  
3:40 pm: Lunch/Exhibition Break

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**SESSION 12**

**Room: 102 A**  
**Wednesday 1:00 to 3:00 pm**

**Photonic Crystals and Quantum Structures for Sensing**

**Chairs:** Marko Loncar, Harvard Univ.; Shu Peng, Stanford Univ.

1:00 pm: Two-dimensional photonic crystal structures for biosensing applications (Invited Paper), A. C. Grot, E. Chow, L. W. Mirkamiri, M. Sigalas, D. Sobek, Agilent Technologies Inc.  
1:20 pm: Surface-emitting photonic crystal microcavity quantum cascade lasers and their applications (Invited Paper), M. Troccoli, F. Capasso, Harvard Univ.; R. Colombelli, Univ. Paris-Sud (France); K. Srinivasan, O. Painter, California Institute of Technology; C. Gmachl, Princeton Univ.  
1:40 pm: Microstructured fibers for light sensing (Invited Paper), M. Bayindir, F. Sorin, A. F. Abouraddy, J. F. Viers, Y. Fink, Massachusetts Institute of Technology  
2:00 pm: Graded-index colloidal photonic crystals and their versatile photonic applications (Invited Paper), D. Kim, J. Park, Kwangju Institute of Science and Technology (South Korea)  

Coffee Break  
3:00 to 3:30 pm
Session 10

Room: 103 C

Wednesday, 3:30 to 6:20 pm

Hybrid Systems and Nanoprobes for Biosensing

Chairs: Cengiz S. Ozkan, Univ. of California/Riverside; Mehmet Sarikaya, Univ. of Washington

- 3:30 pm: Luminescent quantum dots and optically encoded beads for multiplexed biological detection and imaging (Invited Paper), X. Gao, Emory Univ. and Georgia Institute of Technology
- 4:00 pm: Hybrid nanoprobes for detection of nucleic acids (Invited Paper), M. Ozkan, Univ. of California/Riverside
- 4:20 pm: Inorganic nanoprobes for biology (Invited Paper), A. Boccara, D. Dubertret, Ecole Superieure de Physique et de Chimie Industrielles (France)
- 5:00 pm: Nanoshells for integrated diagnosis and therapy of cancer (Invited Paper), R. A. Drezek, Rice Univ.
- 5:20 pm: Nanomaterials containing magnetic and luminescent nanocrystals and their biological applications (Invited Paper), Z. Rosenzweig, L. Rossi, Univ. of New Orleans
- 6:00 pm: BioMEMS to biotechnology: state-of-the-art in integrated biochips and future prospects (Invited Paper), R. Bashir, Purdue Univ.

Thursday, 28 October

Session 14

Room: 103 C

Thursday, 8:10 to 10:30 am

Surface-Enhanced Metal Nanoparticle Probes and Quantum-Dot Probes for Molecular Imaging and Profiling I

Chairs: Andrew McMillan, NASA Ames Research Ctr.; Mihrimah Ozkan, Univ. of California/Riverside

- 8:10 am: Multiplexed Raman spectroscopic detection of protein biomarkers in cells and tissues with silver-enhanced gold nanoparticle probes (Invited Paper), D. O. Ansari, S. Nie, Georgia Institute of Technology and Emory Univ. School of Medicine
- 8:30 am: Read-out strategies using nanometric labels (Invited Paper), M. D. Porter, Iowa State Univ.
- 8:50 am: Biological applications of nanolabels based on surface enhanced Raman scattering (Invited Paper), M. I. Natan, Nanoplex Technologies, Inc.
- 9:10 am: Surface-enhanced Raman scattering from engineered nanowire-nanoparticle structures (Invited Paper), T. Livneh, Univ. of California/Santa Barbara and NRCN (Israel); I. Pavel, M. Moskovits, Univ. of California/Santa Barbara
- 9:50 am: Optical fiber biosensor based on localized surface plasmon resonance in gold nanoparticles (Invited Paper), K. Kajikawa, Tokyo Institute of Technology (Japan); K. Mitsui, Japan Science and Technology Agency (Japan)

- 10:10 am: Nanotip arrays fabricated by one-step and self-masked ECR-plasma etching and their applications for field emission, anti-reflection, and sensing (Invited Paper), L. Chen, J. Hsu, National Taiwan Univ. (Taiwan); H. Lo, Academia Sinica (Taiwan) and National Chiao-Tung Univ. (Taiwan); I. Huang, National Taipei Univ. of Technology (Taiwan); C. Chien, Academia Sinica (Taiwan) and National Taiwan Univ. (Taiwan); C. Lin, National Taiwan Univ. of Technology (Taiwan); C. Chen, National Chiao-Tung Univ. (Taiwan)

Coffee Break

Session 13

Room: 102 A

Wednesday, 3:30 to 6:20 pm

Theoretical Modeling of Nanomaterials and Its Applications

Chairs: Marko Loncar, Harvard Univ.; Shu Peng, Stanford Univ.

Keynote

- 4:00 pm: Localization and shot noise in nanostructures (Invited Paper), M. Anwar, Univ. of Connecticut
- 4:40 pm: Modeling field-effect pH sensor (Invited Paper), P. Kornilovich, Hewlett-Packard Co.
- 5:00 pm: Sensors based on nanotubes and nanowires: molecular modeling applications (Invited Paper), A. Malti, Accelrys, Inc.
- 5:20 pm: Computational design of nanostructures and nanostructured materials (Invited Paper), G. A. Galli, A. Williamson, J. Grossman, R. Hood, A. Puzder, Lawrence Livermore National Lab.; J. Raty, Univ. de Liége (Belgium); A. van Buuren, L. Terminiello, F. Gygi, F. Rebrovero, Lawrence Livermore National Lab.; L. Pizzagalli, Univ. de Poitiers (France); E. Draeger, E. Schweger, Lawrence Livermore National Lab.

Lunch Break

Conference 5593 • Room: 103 C
SESSION 15
Room: 103 C ............................ Thurs. 1:00 to 2:00 pm
Surface-Enhanced Metal Nanoparticle Probes and Quantum Dot Probes for Molecular Imaging and Profiling II
Chairs: Mihrimah Ozkan, Univ. of California/Riverside; Andrew McMillan, NASA Ames Research Ctr.
1:00 pm: Semiconductor quantum dots as targeted contrast agents for in vivo molecular imaging (Invited Paper), A. M. Smith, Georgia Institute of Technology, S. Nie, Georgia Institute of Technology and Emory Univ. .................. [5593-81]
1:20 pm: Plasmonics: metallic nanostructures for energy guiding and sensing (Invited Paper), S. A. Maier, California Institute of Technology .................. [5593-82]
1:40 pm: Immobilization of photo-crosslinked polymers on an optical fiber tip for biochemical sensing (Invited Paper), Y. Chen, S. Pahl, Oregon Health and Science Univ.; M. Yan, Portland State Univ. .................. [5593-108]

SESSION 16
Room: 103 C ............................ Thurs. 2:00 to 4:50 pm
THz for Imaging and Sensing
Chairs: James Kolodzey, Univ. of Delaware; Nezih Pala, Rensselaer Polytechnic Institute
Keynote
2:00 pm: Terahertz plasma-wave electronics (Invited Paper), M. S. Shur, Rensselaer Polytechnic Institute; W. Knap, Univ. Montpellier II (France); V. Ryzhii, Univ. of Aizu (Japan) .......................... [5593-83]
2:30 pm: Room-temperature semiconductor modulators for free-space signal transmission with THz waves (Invited Paper), T. Kleine-Ostmann, Technische Univ. Braunschweig (Germany); K. Pierz, G. Hein, Physikalisch-Technische Bundesanstalt (Germany); P. Dawson, Univ. of Manchester (United Kingdom); M. Koch, Technische Univ. Braunschweig (Germany) .......................... [5593-84]
2:50 pm: Terahertz near-field microscopy (Invited Paper), H. Chen, Rensselaer Polytechnic Institute; G. C. Cho, IMRA America; R. Keistling, Univ. München (Germany) .......................... [5593-85]
3:10 pm: New approaches in semiconductor-based terahertz technology (Invited Paper), D. S. Citrin, Georgia Institute of Technology .......................... [5593-86]
Coffee Break .............................. 3:30 to 3:50 pm
3:50 pm: Electro-optic polymers for THz applications (Invited Paper), A. M. Sinyukov, M. R. Leahy, M. Hayden, Univ. of Maryland/Baltimore County .......................... [5593-87]
4:10 pm: Terahertz-emitting devices based on impurity transitions in doped silicon (Invited Paper), J. Kolodzey, P. Lue, R. T. Troeger, S. Kim, Univ. of Delaware .......................... [5593-88]
4:30 pm: Terahertz emission spectroscopy (Invited Paper), J. A. Deibel, D. Mittleman, Rice Univ. .......................... [5593-89]

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