SPIE's First International Symposium on Microtechnologies for the New Millennium 2003

19-21 May 2003
Gran Hotel Costa Meloneras
Maspalomas, Gran Canaria, Canary Islands, Spain

Conferences • Tabletop Exhibition

Symposium Chairs
José Fco. López, Univ. de Las Palmas de Gran Canaria (Spain)
Derek Abbott, Adelaide Univ. (Australia)

Four parallel conferences:
Smart Sensors, Actuators, and MEMS
VLSI Circuits and Systems
Nanotechnology
Bioengineered and Bioinspired Systems

Register Today and Save $100!

Network with your colleagues
Hear cutting-edge research
Stay informed

Sponsored by SPIE The International Society for Optical Engineering
SPIE’s First International Symposium on

Microtechnologies for the New Millennium 2003

19-21 May 2003
Gran Hotel Costa Meloneras
Maspalomas, Gran Canaria, Canary Islands, Spain

Plan now to attend!

This symposium brings four exciting parallel conferences together to explore the latest micro- and nanotechnologies that will take us into the new millennium. The developments in VLSI, MEMS, nanotechnology, quantum electronics, and the interplay between electronic and biological systems are all areas of intense interest. This is an excellent opportunity to participate in a conference at the cutting edge of technology. Located in the idyllic Canary Islands, we welcome you to enjoy the best of Spanish hospitality as you participate in this stimulating scientific symposium.

Symposium Chairs
José Fco. López, Univ. de Las Palmas de Gran Canaria (Spain)
Derek Abbott, Adelaide Univ. (Australia)

Co-Sponsors:
Spanish Government
Canary Government
Canary Islands Special Zone
Research Institute for Applied Microelectronics (IUMA)
University de Las Palmas de Gran Canaria
• School of Telecommunication Engineering
• Department of Electronic Engineering and Control

Cooperating Organizations:
Las Palmas University Foundation
Sociedad Española de Optica (SEDO)

SPIE’s Event Manager for this symposium is Marilyn Gorsuch.
For information about the technical program, e-mail: meetinginfo@spie.org

Register by 9 May 2003 and Save US$100!
www.spie.org/info/emt
Plenary Presentations and Special Events

Sunday 18 May
Welcome Reception .......................... 19.00 to 21.00
Conference Area Hallway

Monday 19 May
Welcome and Opening Remarks ................. 8.30 to 9.00
Maspalomas Ballroom
José Fco. López, Univ. de Las Palmas de Gran Canaria (Spain)
Derek Abbott, Adelaide Univ. (Australia)
Plenary Presentation 1 ....................... 9.00 to 10.00
Maspalomas Ballroom
Photons and Dollars: The Economic Challenge of the Internet
Ira Deyhimy, Vitesse Semiconductor Corp. (USA)

Tuesday 20 May
Plenary Presentation 2 ....................... 8.30 to 9.30
Maspalomas Ballroom
IC Technology Trends for Wireless Local Area Networks
Neil Weste, Cisco Systems, Inc. (Australia)
All Symposium Poster Session ................ 17.30 to 19.00
Conference Area Hallway
Conference Dinner ........................... 20.00 to 24.00
Congress Palace of Maspalomas
(2 minutes walk from Gran Hotel Costa Meloneras)

Wednesday 21 May
Plenary Presentation 3 ....................... 8.30 to 9.30
Maspalomas Ballroom
Photons from the Universe
Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain)

Passports/Visas
The Canary Islands are part of Spain; therefore, all rules on passports and visas which apply to Spain apply to the Canary Islands. Please contact your travel agent to obtain current information about passport and visa requirements.

Letters of Invitation
Individuals requiring letters of invitation to obtain travel visas may access and print an Invitation Letter Request Form found at this Web site: http://spie.org/forms/invitationrequest.pdf
Please fill out a separate form for each person requesting a letter. All letters of invitation will be sent by airmail and by PDF e-mail attachment unless a courier account number or credit card number with expiration date is provided with the original request. Please allow 15 business days for processing requests.

Contents
Technical Conferences ........................ 4–16
5116 Smart Sensors, Actuators, and MEMS .... 4–7
5117 VLSI Circuits and Systems ............... 8–10
5118 Nanotechnology .......................... 11–14
5119 Bioengineered and Bioinspired Systems 15–16
Participants List .............................. 17–20
General Information ........................... 21
Hotel Information/Reservation Form .......... 22
Travel/Local Area Information ................ 23
Proceedings of SPIE ........................... 24
Registration Form .............................. 25

We would like to express our deepest appreciation to the program chairs, conference chairs, cochairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible. The symposium would not be possible without the dedicated contribution of our participants and members.

This program is based on commitments received up to the time of publication and is subject to change.

SPIE—the International Society for Optical Engineering is dedicated to advancing scientific research and engineering applications of optical, photonic, imaging, and optoelectronic technologies through its meetings, education programs, and publications.
Monday 19–Wednesday 21 May 2003 • Proceedings of SPIE Vol. 5116

Smart Sensors, Actuators, and MEMS

Session 1 to run parallel with Session 2

Session 1 ............... Mon. 10.15 to 12.55

Materials
SOI-silicon as structural layer for MEMS applications, M. Villarroya, Univ. Autònoma de Barcelona (Spain); E. Figueras, F. Perez-Murano, F. Campabadal, J. Esteve, Ctr. Nacional de Microelecronicà (Spain); N. Barniol, Univ. Autònoma de Barcelona (Spain) [5116-01]

Electroactive characteristics of hydrogels composed of poly(vinyl alcohol) and poly(N-isopropylacrylamide), S. J. Kim, S. J. Park, S. I. Kim, I. Y. Kim, Y. M. Lee, Hanyang Univ. (South Korea); H. C. Kim, Seoul National Univ. (South Korea); T. D. Chung, Sunshin Women’s Univ. (South Korea) [5116-05]

Surface microstructuring of biocompatible bone analogue material HAPEX using LIGA technique and embossing, A. Schneider, E. Hug, Rutherford Appleton Lab. (United Kingdom); S. Rea, W. Bonfield, Univ. of Cambridge (United Kingdom) [5116-07]

Modified sol-gel derived PZT ceramics, A. M. Amer, Suez Univ. (Egypt) ....... [5116-08]

Lunch Break

Session 2 ............... Mon. 10.15 to 12.55

Sensors I
Smart sensors development based on a distributed bus for microsystems applications, C. Ferrer, Ctr. Nacional de Microelecronicà (Spain) and Univ. Autònoma de Barcelona (Spain); B. Lorente, Univ. Autònoma de Barcelona (Spain) and Ctr. Nacional de Microelecronicà (Spain) [5116-09]

Low-temperature InOx thin films for O2 and NO gas sensing, G. Kiriakidis, H. Ouacha, Foundation for Research and Technology (Greece) [5116-10]

Novel strain sensors based on magnetostrictive magnetic tunneling junctions, M. Loehndorf, CAESAR (Germany); J. Wecker, M. Rüehrig, Siemens AG (Germany); E. Quandt, CAESAR (Germany) [5116-11]

Multimode torsional micro-oscillators and micromagnets for NMR force microscopy, J. T. Markert, Y. J. Lee, T. C. Messina, C. W. Miller, Univ. of Texas/Austin (USA) [5116-12]

Hybrid neural networks for ISFET source separation, S. Bermejo, G. Bedoya, J. Cabestany, Univ. Politécnica de Catalunya (Spain) [5116-13]

Compatibility of gas and flow sensor technology fabrication, N. Sabate, I. Gracia, C. Cane, Nacional de Microelecronicà (Spain); J. Puigcorbé, J. Cerdà, J. R. Morante, Univ. de Barcelona (Spain); J. Berganza, Ikerlan (Spain) [5116-14]

Pencil probe system for electrochemical analysis and modification in nanometer dimension, R. J. Fasching, D. Yao, K. Hammerick, F. B. Prinz, Stanford Univ. (USA) [5116-15]

Lunch Break

Order Proceedings now and take advantage of the special prepublication price.

Smart Sensors, Actuators, and MEMS
Editor: Jung-Chih Chiao, Univ. of Texas/Arlington (USA)
Proceedings of SPIE Vol. 5116
Prepublication price: US$ 135

See page 25 to order.

Proceedings of SPIE
This conference will generate editor-reviewed, full manuscript volumes published in the Proceedings of SPIE. You receive one volume with your registration; additional volumes can also be ordered through the order form, on the web, or onsite at the meeting.
CONFERENCE 5116

SESSION 3 to run parallel with SESSION 4

SESSION 3  
Mon. 14.15 to 17.20  
MEMS I

Overview of MEMS/MEMS technology development for space applications at NASA/JPL (Invited Paper), T. George, Jet Propulsion Lab. (USA)  
[5116-17]

Adhesive wafer bonding for MEMS applications, V. Dragoi, T. Ginsger, M. Mittendorfer, EV Group E. Thallner GmbH (Austria); B. Wieder, EV Group Inc. (USA); P. Lindner, EV Group E. Thallner GmbH (Austria)  
[5116-18]

Silicon nanolayer transfer, A. Usenko, Silicon Wafers Technologies (USA); W. Carr, New Jersey Institute of Technology (USA)  
[5116-19]

Power consumption in microvalves design, T. Hsu, San Jose State Univ. (USA) and Univ. of Illinois (USA)  
[5116-20]

Micromolding with surface engineered metallic Inserts, W. J. Meng, Louisiana State Univ. (USA)  
[5116-21]

High-performance polysilicon air-gap thin film transistor on low-temperature substrates, H. M. Kotb, A. Salamun, M. Tayeb, B. Olivier, Univ. de Rennes 1 (France)  
[5116-22]

Soft lithographic patterning of oxide thin films, E. Abad, Tekniker (Spain) and Cranfield Univ. (United Kingdom); R. W. Whatmore, Q. Zhang, Z. Huang, Cranfield Univ. (United Kingdom)  
[5116-23]

Observability, exact controllability, and stabilization of piezoelectric medium coupled to electronic systems, G. Senouci-Bereksi, Ctr. of Advanced European Studies and Research (Germany); A. Benchaab, Univ. de Mostaganem (Algeria)  
[5116-24]

SESSION 4  
Mon. 14.15 to 17.20  
Actuators I

Optical components and actuators for integrated near-field optical data storage (Invited Paper), K. Hane, Y. Kanamori, Tokohu Univ. (Japan)  
[5116-25]

Integrated near-field optical head for hybrid recording, Y. Chiu, M. Wu, H. D. Shieh, Y. T. Sun, H. Chou, W. Hsu, National Chiao Tung Univ. (Taiwan)  
[5116-26]

Optomechanical cycles of photochromic-polymer microsystems induced by laser irradiation, A. Athanassiou, M. Kalyva, K. Lakiotaki, C. Fotakis, Foundation for Research and Technology-Hellas (Greece)  
[5116-27]

Classical holography and opto-digital holography applied to testing of microsystems: a comparative study, V. D. Petrov, Holographic Lab. (Germany)  
[5116-28]

Smart tang grippers for micro parts, J. Schlick, D. Zuehle, Univ. Kaiserslautern (Germany)  
[5116-29]

Shell-type micromechanical oscillator, M. Zalalutdinov, K. Aubin, Cornell Univ. (USA); B. H. Houston, Naval Research Lab. (USA); A. T. Zehnder, B. Ilic, D. Czaplewski, H. G. Craighed, J. M. Parpia, Cornell Univ. (USA)  
[5116-30]

Knitted strain gauges, R. Wijesiriwardana, T. Dias, S. Mukhopadhyay, Univ. of Manchester Institute of Science and Technology (United Kingdom)  
[5116-31]

Analysis of a piezoelectric-driven hydraulic poppet valve, R. Nunez-Lopez, Univ. of Sheffield (United Kingdom); W. A. Bullough, Univ. of Sheffield (United Kingdom) and Journal of Intelligent Materials and Structures (USA) and Journal of Applied Mechanics and Engineering (United Kingdom); S. B. Chin, Univ. of Sheffield (United Kingdom)  
[5116-32]

Tuesday 20 May

SESSION 5 to run parallel with SESSION 6

SESSION 5  
Tues. 9.45 to 12.55  
Actuators II

Folded and tapered-beam thermal actuator (Invited Paper), M. J. Sinclair, Microsoft Corp. (USA); K. Wang, Univ. of Washington (USA)  
[5116-33]

Evaluation of mechanical properties of polysilicon by comb-finger actuation, R. Cambie, F. Carli, C. Comb, Univ. degli Studi di Pavia (Italy)  
[5116-34]

Smart electrostrictive composite materials for actuators, N. Yu, Yuan-Ze Univ. (Taiwan)  
[5116-35]

Electronic circuitry development in a microprophtecy system for micropropulsion applications, M. Puig-Vidal, J. Lopez-Sanchez, P. L. Mireb-Calata, E. Montane-Borras, J. M. Lopez-Villagas, J. Samitier-Marti, Univ. de Barcelona (Spain); C. Rossi, T. Camps, M. Dumonteuil, CNRS (France)  
[5116-36]

Sigma-delta microsystems for readout and servo control, N. Delorme, C. Condemine, LETI-CEA (France); D. Barbier, INSYMA Lyon (France)  
[5116-37]

Brass microfabricated pump with a built in magnetic driver, R. M. Atta, Univ. of Southampton (United Kingdom)  
[5116-38]

Laser beam micro forming as a new adjustment technology using dedicated actuator structures, A. M. Olowinsky, L. Bosse, Fraunhofer-Institut für Lasertechnik (Germany)  
[5116-39]

Design and fabrication of a three-dimensional long-stretch micro drive by electroplating, C. Wu, W. Tai, W. Hsu, National Chiao Tung Univ. (Taiwan)  
[5116-40]

Modeling and simulation for electrostatically driven microactuator, T. Haa, O. Kwon, J. Kim, T. Won, Inha Univ. (South Korea)  
[5116-41]

Lunch Break

SESSION 6  
Tues. 9.45 to 12.35  
Sensors II

Development of microbead size selection chip for a chemical array sensor (Invited Paper), D. Neikirk, B. H. Park, Y. S. Park, Univ. of Texas/Austin (USA)  
[5116-42]

Polymeric mechanical sensors with piezoresistive readout integrated in a microfluidic system, M. Calleja, P. A. Rasmussen, A. Johansson, A. Boisen, Danmarks Tekniske Univ. (Denmark)  
[5116-43]

Compact and smart laser diode systems for cancer treatment, V. N. Srivin, POLYUS Research and Development Institute (Russia); V. V. Sokolov, P.A. Hertzen Moscow Research Oncology Institute (Russia); T. I. Solovieva, POLYUS Research and Development Institute (Russia)  
[5116-44]

Fluidics technology: a source of new possibilities for the new millennium, N. F. Macia, Arizona State Univ. (USA)  
[5116-45]

Long period gratings in multimode fiber for measurement of metal in water, P. Suresh Kumar, C. P. Vallabhan, V. P. Nampoori, P. Radhakrishnan, Cochin Univ. of Science and Technology (India)  
[5116-46]

Metallophthalocyanine blend polymeric films-based ammonia gas sensor, S. D. Chakane, R. D. Kankaria, BIS College Waghodi (India)  
[5116-47]

Resonating cantilever mass sensor with on-plane excitation, J. Teva, G. Abadal, Univ. Autònoma de Barcelona (Spain); X. Jordà, Ctr. Nacional de Microelectrónica (Spain); N. Barniol, Univ. Autònoma de Barcelona (Spain)  
[5116-48]

Simulation of bulk micromachined vibration sensor with low noise, J. Zhu, Southeast Univ. (China); X. Liu, M. Hoo, W. Chen, Q. Chen, Harbin Institute of Technology (China)  
[5116-49]

Lunch Break

SPIE • www.spie.org/info/emt • TEL +1 360 676 3290 • FAX +1 360 647 1445 • spie@spie.org 5
MEMS II

Nano-bending method to quantify the residual stress of MEMS structure (Invited Paper), J. Kim, J. Kim, Seoul National Univ. (South Korea); J. Hahn, Korea Research Institute of Standards and Science (South Korea); Y. Kim, Seoul National Univ. (South Korea) ......................................................... [5116-50]

Laser bending of silicon microstructures, H. Exner, U. Lütschner, Laserinstitut Mittelbach e.V. (Germany) ......................................................... [5116-51]

Rapid prototyping and structure generation using three-dimensional nanolithography with electron beam induced chemical reactions, H. W. Koops, Nanofel GmbH (Germany) ......................................................... [5116-52]

Fabrication and characterization of nano-interdigitated electrodes, N. F. de Rooij, Univ. de Neuchatel (Switzerland) .......................... [5116-53]

Dynamic characterization of SiO₂-Au microcantilevers using Michelson interferometer, G. Marinier, Univ. de Rouen (France); S. Dilhaine, L. D. Patino Lopez, Univ. Bordeaux 1 (France); M. Benzoehra, Univ. de Rouen (France) ......................................................... [5116-54]

Experimental modeling for microsystems, O. B. Ozdoganlar, B. D. Hansche, T. G. Carne, Sandia National Labs. (USA) ......................................................... [5116-55]

Characterization of SU-8 as a photoresist for electron beam lithography, A. C. Nallani, S. W. Park, J. B. Lee, Univ. of Texas/Dallas (USA) ......................................................... [5116-56]

Characterization of embedded root method in UV-LIGA process, C. Ho, W. Hsu, National Chiao Tung Univ. (Taiwan) ......................................................... [5116-57]

MEMS III

Simpler method to fabricate buried channel optical waveguides based on porous silicon, J. Dong, Tsinghua Univ. (China); H. Shi, Harbin Institute of Technology (China); J. Lee, Kwangwoon Univ. (South Korea) ......................................................... [5116-89]

Dynamic characterization of passive microstructures (SiO₂-Au microcantilevers) under controlled environment, G. Marinier, M. Benzoehra, E. Joubert, M. Ketata, Univ. de Rouen (France) ......................................................... [5116-86]

Systematic design methodology of bistable compliant micro-mechanisms, J. Tsay, National Tsing Hua Univ. (Taiwan) ......................................................... [5116-87]

VIACT cascade microactuator, R. Dabbaj, Consultant (United Kingdom) ......................................................... [5116-88]

Circular RF MEMS resonator solutions for 100-nm to 10-nm SOI structures, C. A. Beard, Consultant (USA) ......................................................... [5116-50]

RF MEMS applications, J. Chiao, Univ. of Texas/Arlington (USA) ......................................................... [5116-84]


Characterization of embedded root method in UV-LIGA process, C. Ho, W. Hsu, National Chiao Tung Univ. (Taiwan) ......................................................... [5116-57]
Influence of microstructure of tungsten oxide thin films on their general applications, D. Resnik, D. Vrtacnik, U. Aljancic, M. Mozek, S. Amon, Univ. v Ljubljani (Slovenia) ........................................... [5116-124]

New micromachined VOA for improvement of the optical characteristics, S. Jung, Y. Hong, J. Lee, H. Lee, Samsung Electro-Mechanics Co., Ltd. (South Korea) ........................................... [5116-119]


Study of the systems “thin metal film – thick lithium niobate substrate” implanted by Ar+ ions and its application for production of pyroelectric photodetectors, V. O. Lysynyk, V. S. Slaschuk, L. V. Poperenko, Taras Shevchenko Kiev National Univ. (Ukraine); M. I. Klyy, Institute for Semiconductor Physics (Ukraine) ........................................... [5116-114]

Influence of electric field on emission of high-energy electron from ITO layers, J. Olesik, Pedagogical Univ. of Cezchocha (Poland) ........................................... [5116-116]

Novel three-axis silicon probe with integrated circuit on chip for microsystem components, P. Pornnoppadol, V. Nesterrov, U. Brand, Physikalisch-Technische Bundesanstalt (Germany); M. Schmidt, R. Wilke, S. Buettgenbach, Technische Univ. Braunschweig (Germany) ........................................... [5116-117]

Improvement of electromechanical microscanners efficiency using modeling results, N. I. Mukhurov, Institute of Electronics (Belarus) ........................................... [5116-118]

New micromachined VOA for improvement of the optical characteristics, K. I. Jolic, M. K. Ghantasala, Swinburne Univ. of Technology (Australia) ........................................... [5116-70]

High-density multi-layer connection technology for MEMS and CMOS application, S. Bai, R. Fasching, F. Prinz, Stanford Univ. (USA) ........................................... [5116-71]

Optically controlled microwave switch device, A. J. Viitanen, S. A. Tretyakov, Helsinki Univ. of Technology (Finland) ........................................... [5116-72]

Hot electron bolometer on membranes for THz applications, M. Salez, Observatoire de Paris (France); P. Pons, LAAS CNRS (USA); J. Baubert, Y. Delorme, Observatoire de Paris (France); G. Golitsman, Moscow State Pedagogical Univ. (Russia) ........................................... [5116-73]

Submillimeter mixer based on superconductive parallel junction arrays, F. Bousaha, Observatoire de Paris (France) ........................................... [5116-74]

Lunch Break

SESSION 10 ........................................... Wed. 14.15 to 17.30

MEMS III

Monolithic photovoltaic multilayers using bulk micromachining techniques, S. Bermejo, P. R. Ortega, L. Casañera, Univ. Politècnica de Catalunya (Spain) ........................................... [5116-75]

Stress release of PECVD oxide by RTA, R. Charavel, J. P. Raskin, Univ. Catholique de Louvain (Belgium) ........................................... [5116-76]

Modeling and simulation of the geometrical effect by manufacturing tolerances for micro-electro-mechanical systems, J. W. Kim, O. S. Kwon, T. Ha, J. Oh, T. Won, Inha Univ. (South Korea) ........................................... [5116-77]

Fabrication of conductive APF probes and their evaluation for carrier mapping, M. Foucheur, P. Eyben, IMEC (Belgium); D. Alvarez, Infineon Technologies AG (Germany) and IMEC (Belgium); N. Duhayon, IMEC (Belgium); W. Vandervorst, IMEC (Belgium) and KULeuven (Belgium) ........................................... [5116-78]

Characterization of front- to backwaffer alignment and bulk micromachining using electrical overlay test structures, H. W. Van Zeijl, J. Slabberskoom, Technische Univ. Delft (Netherlands) ........................................... [5116-79]

Modification on surface roughness by combining dry and wet etching, C. Lee, W. Hsu, National Chiao Tung Univ. (Taiwan) ........................................... [5116-80]

Matching different size mask to improve steppe throughput effectively, F. Weng, H. Hsu, C. Chang, Y. Hsiao, C. Kuo, Taiwan Semiconductor Manufacturing Co., Ltd. (Taiwan) ........................................... [5116-81]

Micro lens design for compact lens system, H. Hsu, F. Weng, C. Chang, Y. Hsiao, Taiwan Semiconductor Manufacturing Co., Ltd. (Taiwan) ........................................... [5116-82]

Microfabrication using selective laser sintering micron metal powder, J. Chen, T. Zuo, Beijing Polytechnic Univ. (China) ........................................... [5116-83]
Monday 19-May 21 May 2003 • Proceedings of SPIE Vol. 5117
VLSI Circuits and Systems

Conference Chair: José F. López, Univ. de Las Palmas de Gran Canaria (Spain)

Welcome and Opening Remarks .......... Mon. 8.30 to 9.00
Plenary Presentation ........................ Mon. 9.00 to 10.00
Photos and Dollars: The Economic Challenge of the Internet
Ira Deyhim, Vitesse Semiconductor Corp. (USA)

SESSION 1 ................................... Mon. 10.15 to 11.30
Image Processing I
Chair: Yan-Kuang Chen, Intel Corp. (USA)

VLSI architecture for MPEG-4 core profile video codec with accelerated bitstream processing, W. Stechel, Technische Univ. München (Germany) .......... [5117-01]

FPGA implementation of Santos-Victor optical flow algorithm for real-time image processing: an useful attempt, P. Cobos Arribas, Univ. Politécnica de Madrid (Spain) .................................... [5117-02]

Integer cosine transform chip design for image compression, G. A. Ruiz, J. A. Michell, A. M. Burón, J. M. Solana, M. A. Manzano, F. J. Díaz, Univ. de Cantabria (Spain) [5117-03]

Mapping of real-time and low-cost super-resolution algorithms on a hybrid video encoder, G. M. Callicó, Univ. de Las Palmas de Gran Canaria (Spain); R. P. Llopias, Philips Research Labs. (Netherlands); A. Núñez, Univ. de Las Palmas de Gran Canaria (Spain); R. Sethuraman, Philips Research Labs. (Netherlands) ................ [5117-04]

Current mode RGB to YUV Interpolating converter for embedded image processing on CMOS cameras, S. W. Lachowicz, A. Rassau, G. Alagoda, A. Berger, K. Eshraghian, Edith Cowan Univ. (Australia) ................... [5117-05]

SESSION 2 ................................... Mon. 11.40 to 12.50
Mixed Circuits I
Chair: Hans-Jörg Pfeiferer, Univ. Ulm (Germany)

State-of-the-art in threshold logic VLSI implementations and systems (Invited Paper), P. Celinski, Univ. of Adelaide (Australia) and Delft Univ. of Technology (Australia) ........................................ [5117-06]

New efficient offset voltage cancellation techniques using digital trimming, S. Al-Sarawi, Univ. of Adelaide (Australia) ................................... [5117-07]

Novel 1.25-Gb/s preamplifier with high sensitivity and peak detector with high accuracy for the burst-mode optical receiver using a 0.18-µm CMOS technology, J. W. Seo, Information and Communications Univ. (South Korea) ................ [5117-08]

Differential 6th order continuous time beldpass sigma delta modulator in cmos technology, Y. Zhu, S. Al-Sarawi, M. Liebelt, Univ. of Adelaide (Australia) ..... [5117-09]

Lunch Break

SESSION 3 ................................... Mon. 14.15 to 15.15
Data Communications I
Chair: Said Al SARAWI, Univ. of Adelaide (Australia)

Scheduling components for multi-gigabit network SoCs, I. Papaefstathiou, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Dake Liu, Linköping Univ. (Sweden); Enrico Macii, Politecnico di Torino (Italy); Antonio Núñez, Univ. de Las Palmas de Gran Canaria (Spain); Hans-Jörg Pfeiferer, Univ. Ulm (Germany); Kaushik Roy, Purdue Univ. (USA); César Sanz, Univ. Politécnica de Madrid (Spain); Roberto Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain); Walter Stechel, Technische Univ. München (Germany); Yervant Zorian, LogicVision Inc. (USA)

Practical high-level methodology case study: Implementation of an ATM over SDH transceiver from the system specification, R. Arteaga, F. Tobajas, R. Esper-chain, V. De Armas, R. Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) .......................................................... [5117-13]

SESSION 4 ................................... Mon. 15.45 to 17.10
Technology I
Chair: Eby G. Friedman, Univ. of Rochester (USA)

High-bandwidth low-latency global interconnect (Invited Paper, Keynote Presentation), C. M. Svensson, P. Caputa, Linköping Univ. (Sweden) .......... [5117-14]

Leakage control for deep submicron circuits. K. Roy, Purdue Univ. (USA) ........ [5117-15]

Scaling down photonic devices for optical communications, P. Cheben, D. Dalacu, A. Delage, S. Janz, D. Xu, National Research Council Canada (Canada) ........................ [5117-16]

Efficiency limitation of Cds/CdTe heterojunction solar cell, J. Guo, Chengdu Univ. of Technology (China); C. Kong, W. Wang, Chongqing Univ. (China) ............ [5117-17]
Tuesday 20 May

Plenary Presentation .......................... Tues. 8.30 to 9.30
IC Technology Trends for Wireless Local Area Networks
Neil Weste, Cisco Systems, Inc. (Australia)

SESSION 5 ........................................ Tues. 9.45 to 10.55
VLSI Architectures I
Chair: Kaushik Roy, Purdue Univ. (USA)
Signaling in the heterogeneous architecture multiprocessor paradigm (Invited Paper, Keynote Presentation), A. Núñez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-18]
High-performance VLSI architecture for video processing, H. Navarro-Botello, J. Sosa-González, J. A. Montiel-Nelson, R. Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) [5117-19]
GSM channel filter realized as a SC FIR rotator structure in CMOS 0.35-1μm technology, R. Dlugosz, Poznan Univ. of Technology (Poland) [5117-20]

SESSION 6 ........................................ Tues. 11.00 to 12.00
CADI
Chair: Enrico Macii, Politecnico di Torino (Italy)
System-level verification methodology for advanced switch fabrics, J. Sosa-González, Univ. de Las Palmas de Gran Canaria (USA); J. A. Montiel-Nelson, H. Navarro-Botello, M. V. Shahdadpari, R. Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) [5117-21]
Models and algorithm for the calculation of the impulse response on IR-wireless indoor channels, S. Rodríguez Pérez, Univ. de La Laguna (Spain); R. Pérez Jiménez, Univ. de Las Palmas de Gran Canaria (Spain); F. J. López Hernández, Univ. Politécnica de Madrid (Spain); D. B. González Hernández, B. Rodríguez Mendoza, Univ. de La Laguna (Spain) [5117-22]
VESTA: a system-level verification environment based on C++, M. V. Shahdadpari, J. Sosa-González, H. Navarro-Botello, J. A. Montiel-Nelson, R. Sarmiento, Univ. de Las Palmas de Gran Canaria (Spain) [5117-23]
MHDL CAD tool with fault circuit handling, G. Espinosa Flores-Verdad, L. Altamirano Robles, L. Osorio Roque, Instituto Nacional de Astrofísica, Optica y Electrónica (Mexico) [5117-24]

SESSION 7 ........................................ Tues. 12.10 to 12.55
Data Communications II
Chair: César Sanz, Univ. Politécnica de Madrid (Spain)
Switch-based interconnect architecture for future systems on chip, P. P. Pande, C. S. Grecu, A. Ivanov, R. A. Saleh, Univ. of British Columbia (Canada) . . . . [5117-25]
CMOS receiver circuits for high-speed data transmission according to VLOS-standard, S. Hirsch, H. Pfleiderer, Univ. Ulm (Germany) . . . . [5117-26]
System-level optimization of baseband filters for communication applications, M. Delgado-Restituto, Ctr. Nacional de Microelectrónica (Spain); A. Rodríguez-Vázquez, Ctr. Nacional de Microelectrónica and Univ. de Sevilla (Spain); J. F. Fernandez-Bootel, Ctr. Nacional de Microelectrónica (Spain) [5117-27]
Lunch Break

SESSION 8 ........................................ Tues. 14.15 to 15.30
Mixed Circuits II
Chair: Olga Boric-Lubecke, Lucent Technologies/Bell Labs. (USA)
Analogue filter circuits testing using voltage and current measurements, M. A. Al-Qutayri, Etisalat College of Engineering (United Arab Emirates) . . . . [5117-28]
Iterative current mode per pixel ADC for 30 SoftChip implementation in CMOS, S. W. Lachowicz, A. Rassau, G. Alagoda, S. M. Lee, K. Eshraghian, Edith Cowan Univ. (Australia) . . . . [5117-29]
Novel low-voltage low-power Gb/s transimpedance amplifier architecture, D. Guckenberger, K. Komeyag, Cornell Univ. (USA) [5117-30]
Sigma-delta modulator for a programmable gain, low-power, high-linearity automotive sensor interface, J. M. de la Rosa, F. Medeiros, B. Pérez-Verdú, R. del Río, Ctr. Nacional de Microelectrónica (Spain); A. Rodríguez-Vázquez, Ctr. Nacional de Microelectrónica (Spain) and Univ. de Sevilla (Spain) [5117-31]

SESSION 9 ........................................ Tues. 15.45 to 16.45
VLSI Architectures II
Chair: Dake Liu, Linköping Univ. (Sweden)
Flexible coprocessor architectures for ambient intelligent applications in the mobile communication and automotive domain, W. Gehre, Philips Semiconductors Hamburg (Germany); W. Krujitzer, C. Alba, R. Sethuraman, Philips Research Labs. (Netherlands); J. Jachalski, M. Wahle, Univ. Hannover (Germany) [5117-33]
Lifting folded pipelined discrete wavelet packet transform architecture, G. Paya, M. A. Martínez-Peiró, J. F. Ballester, V. Herrero, J. F. Mora, Univ. Politécnica de Valencia (Spain) [5117-34]
Turbo decoder core design for system development, X. Chen, Q. Yao, Zhejiang Univ. (China) [5117-35]
Some experiences using system-on-chip buses, P. P. Carballo, M. Marrero, A. Núñez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-36]

Poster-Tuesday
Poster presenters will stand by their posters from 17.30 to 19.00 to answer questions.

Optimized 3D architecture for real time video compression, A. M. Ehrhardt, A. M. Rassau, G. N. Alagoda, K. Eshraghian, Edith Cowan Univ. (Australia) [5117-57]
Hierarchical test pattern composition to testing a Foveal Imager ASIC, M. Gonzalez Garcia, J. R. Salinas, F. J. Coslado, P. Camacho, F. Sandoval, Univ. de Malaga (Spain) [5117-58]
Experimental characterization of a synchronous frequency hopping spread spectrum communication system for wireless optical communications, S. T. Pérez Suárez, J. A. Rabadán Borges, F. A. Delgado Raúl, J. R. Velázquez Monzón, R. Pérez Jiménez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-59]
Analysis of current-mode flip-flops in CMOS technologies, R. Jimenez, Univ. de Huelva (Spain); P. Parra, Ctr. Nacional de Microelectrónica (Spain) and Univ. de Sevilla (Spain); P. M. Sammartin, Ctr. Nacional de Microelectrónica (Spain); A. J. Acosta, Ctr. Nacional de Microelectrónica (Spain) and Univ. de Sevilla (Spain) [5117-60]
Numerical modeling and simulation of semiconductor devices, S. Park, T. Won, Inha Univ. (South Korea) [5117-61]
Temperature in HFETs when operating in DC, B. González, A. Hernández, J. García, J. R. Sendra, J. del Pino, A. Núñez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-62]
Laser-induced structure defects and their use for (Cd, Hg)Te epitaxial layers and CdTe crystals properties modification, B. K. Kolyatkharich, Syvenky Institute for Applied Problems of Mechanics and Mathematics (Ukraine); A. Zaginey, Pidstryhach Institute for Applied Problems of Mechanics and Mathematics (Ukraine) [5117-63]
Cavity-controlled emission from intrinsic semiconductor in a damped single mode damped macro-cavity (nonperturbative theory), V. F. Chel'tsov, Moscow State Mining Univ. (Russia) [5117-64]
Design and simulation of an a-SEH/GaAs HBT with improved DC and high-frequency characteristics, F. Pezzienni, F. G. Della Corte, Univ. degli Studi di Reggio Calabria (Italy) [5117-65]
Diffusion barrier fabrication by plasma Immersion Ion Implantation, M. Kumar, Kurukshetra Univ. (India); R. Kumar, SCL Mohali (India); D. Kumar, P. George, Kurukshetra Univ. (India); A. K. Paul, CSIO (India) [5117-66]
Switching noise reduction in clock distribution in mixed-mode VLSI circuits, P. Parra, A. J. Acosta, M. Valencia, Ctr. Nacional de Microelectrónica (Spain) and Univ. de Sevilla (Spain) [5117-67]
Integrated optical scheme for residue based logic operations, P. Ghosh, Vidyasagar Univ. (India) [5117-68]
Digital optical switch based on amorphous silicon waveguide, L. Sirleto, M. Iodice, F. L. Cantore, F. G. Della Corte, I. Rendina, Consiglio Nazionale delle Ricerche (Italy) [5117-69]
1.55-μm reflection-type optical waveguide switch based on thermo-optic effect, F. L. Cantore, F. G. Della Corte, Univ. degli Studi di Reggio Calabria (Italy) [5117-70]
Comparison of CMOS and BICMOS optical receiver SOCs, S. T. Pérez Suárez, J. A. Rabadán Borges, F. A. Delgado Raúl, J. R. Velázquez Monzón, R. Pérez Jiménez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-71]
Method of generating trustworthy performance estimations for soft-IPs, M. Marrero, P. P. Carballo, A. Núñez, Univ. de Las Palmas de Gran Canaria (Spain) [5117-72]
Wednesday 21 May

SESSION 10 .............................  Wed. 9.45 to 11.10

Image Processing II

Chair: Walter Stechele, Technische Univ. München (Germany)

Performance optimization of the MPEG-2 to MPEG-4 video transcoder (Invited Paper), H. Kalva, A. Vetro, H. Sun, Mitsubishi Electric Research Labs. (USA). [5117-37]

New lifting folded pipelined discrete wavelet transform architecture, G. Payá, M. A. Martínez-Periò, J. F. Ballester, V. Herrero, R. Colom, Univ. Politécnica de Valencia (Spain). [5117-38]

SESSION 11 .............................  Wed. 11.20 to 12.55

Technology II

Chair: Richard B. Brown, Univ. of Michigan (USA)

Approaching nanoscale integration (Invited Paper, Keynote Presentation), D. Draxelmayr, Infineon Technologies AG (Austria). [5117-41]


Evaluation of package and technology effects on substrate-crosstalk isolation in CMOS RFICs, D. Mateo, Univ. Politécnica de Catalunya (Spain) and Lucent Technologies/Bell Labs (USA); X. Aragones, Univ. Politécnica de Catalunya (Spain); O. Boric-Lubecke, Lucent Technologies/Bell Labs, (USA). [5117-44]

Low-cost VLSI-compatible resonant-cavity-enhanced p-i-n photodiodes in mc-Si operating at the VCSEL wavelengths around 850 nm. I. Bendi, Consiglio Nazionale delle Ricerche (Italy); L. Moretti, Univ. degli Studi Mediterranea di Reggio Calabria (USA); L. De Stefano, C. Summonte, Consiglio Nazionale delle Ricerche (Italy). [5117-45]

Lunch Break

SESSION 12 .............................  Wed. 14.15 to 15.30

Modeling

Chair: Antonio Núñez, Univ. de Las Palmas de Gran Canaria (Spain)


Simulation of void formation in interconnect lines, A. Sheikholeslami, C. Heitzinger, Technische Univ. Wien (Austria); H. Puchner, Cypress Semiconductor Corp. (USA); S. Selberherr, Technische Univ. Wien (Austria). [5117-47]

Timing and power model for CMOS inverters, R. Geißler, H. Pfeifer, Univ. Ulm (Germany). [5117-48]

Modeling of Interconnect line using ADI-FDTD method, I. J. Choi, T. Won, Inha Univ., (South Korea). [5117-49]


SESSION 13 .............................  Wed. 15.45 to 17.15

CAD II

Chair: Juan A. Montiel-Nelson, Univ. de Las Palmas de Gran Canaria (Spain)


Optimal design of leak-proof SRAM cell using MCDM method, Q. Wang, S. Kang, Univ. of California/Santa Cruz (USA). [5117-53]

Evolutionary design and FPGA implementation of digital filters, V. Liberati, Univ. degli Studi di Milano (Italy). [5117-54]

Layout-fracturing algorithm for the numerical calculation of signal delay at VLSI interconnects, S. Yoon, Inha Univ. (South Korea); T. Won, Inha Univ. (USA). [5117-55]


Register by 9 May 2003 and Save US$100!

www.spie.org/info/emt
Monday 19 May

Welcome and Opening Remarks .......... Mon. 8.30 to 9.00
Plenary Presentation ................. Mon. 9.00 to 10.00
Phots and Dollars: The Economic Challenge of the Internet
Ira Deyhimy, Vitesse Semiconductor Corp. (USA)

SESSION 1 ........................ Mon. 10.15 to 13.00

Nanotechnology: Carbon Nanotubes and Beyond

Chairs: Angel Rubio, Univ. del Pais Vasco (Spain);
Jean C. Charlier, Univ. Catholique de Louvain (Belgium)

Exploring the carbon nanocosmos: doped nanotubes, networks, and other novel forms of carbon (Invited Paper, Keynote Presentation), M. Terrones, Instituto Potosino de Investigación Científica y Tecnológica (Mexico); P. M. Ajayan, Rensselaer Polytechnic Institute (USA); F. Banhart, Univ. Ulm (Germany); D. L. Carroll, Clemson Univ. (USA); J. C. Charlier, Univ. Catholique de Louvain (Belgium); R. Czerw, Clemson Univ. (USA); N. Grobert, Max-Planck-Institut für Metallforschung (Germany); M. Mayne, CEA Saclay (France); M. Reyes-Royes, H. Terrones, Instituto Potosino de Investigación Científica y Tecnológica (Mexico) ... [5118-01]

Formation, reactivity, and phase transformation in silicon/silica, tin oxide, and titanium oxide based nanostructures (Invited Paper), J. L. Gale, J. Stout, Z. Dai, Z. L. Wang, Georgia Institute of Technology (USA); C. Burda, Case Western Reserve Univ. (USA) .......... [5118-02]

Synthesis of C- and CNX nanotubes and novel nanostructures using the aerosol method, M. Gierup, Univ. Montpellier II (France); M. Castignolles, Univ. Montpellier II (France) and ONERA (France); A. Loiseau, ONERA (France); P. Bernier, Univ. Montpellier II (France) ... [5118-03]

Structural, chemical, and electrical aspects of carbon nanotube-metal integration, K. Doovenko, J. Rullan, J. Ziroff, G. Agnello, F. Heuchling, Univ. at Albany (USA) ... [5118-04]

Interaction of molecular and atomic hydrogen with single wall carbon nanotubes, J. A. Alonso, Donostia International Physics Ctr. (Spain) and Univ. de Valladolid (Spain); J. S. Arellano, Univ. Autónoma Metropolitana Azcapotzalco (Mexico); L. M. Molina, Aarhus Univ. (Denmark); A. Rubio, Donostia International Physics Ctr. (Spain); M. J. Lopez, Univ. de Valladolid (Spain) ... [5118-05]

Large-scale growth of aligned tungsten oxide nanorods (Invited Paper), Z. Zhang, Tsinghua Univ. (China) ... [5118-06]

Lunch Break

SESSION 2 to run parallel with SESSION 3

SESSION 2 ........................ Mon. 14.15 to 17.25

Small is Different

Chairs: Xavier Aymerich, Univ. Autónoma de Barcelona (Spain);
El-Hang Lee, Inha Univ. (South Korea)

Atomic-scale nanostructures: small is different (Invited Paper, Keynote Presentation), K. Kern, Max-Planck-Institut für Festkörperforschung (Germany) ... [5118-07]

Physical issues in nanoscale electronics (Invited Paper), M. Di Ventra, Virginia Polytechnic Institute & State Univ. (USA) ... [5118-08]

Motion of nanocar on a polymer carpet, S. A. Prokhoro, Freiburger Materialforschungszentrum (Germany); J. Rühle, Institut für Mikrosystemtechnik (Germany) ... [5118-09]

Electric field directed shape control of gold nanocrystals, P. Mullaney, Univ. of Melbourne (Australia) ... [5118-10]

Deformations and thermal stability of carbon nanotube ropes (Invited Paper), M. J. Lopez, Univ. de Valladolid (Spain); A. Rubio, Univ. del Pais Vasco (Spain) and Donostia International Physics Ctr. (Spain); J. A. Alonso, Univ. de Valladolid (Spain) and Donostia International Physics Ctr. (Spain) ... [5118-11]

Market evolution from microsystems to nanosystems (Invited Paper), R. W. Wechung, STEAG microParts GmbH (Germany) ... [5118-12]

SESSION 3 ........................ Mon. 14.15 to 17.35

Nano-Optics

Chairs: Ludger Wirtz, Donostia International Physics Ctr. (Spain);
Jianguo Hou, Univ. of Science and Technology of China (China)

Laser generation of nanoparticles (Invited Paper, Keynote Presentation), P. Heszler, L. Landstrom, Uppsala Univ. (Sweden) ... [5118-13]

Optical properties of random Sb-SiN films and their applications in optical storage and optical microscopy (Invited Paper), J. Zhu, D. R. Ou, J. R. Zhu, J. Wang, Tsinghua Univ. (China) ... [5118-14]

Emerging nanotechnologies for chip-to-chip optical interconnects, S. Otko, V. Sokolovsky, M. Yakimov, Univ. at Albany (USA) ... [5118-15]

Toward nanosstructuring with femtosecond laser pulses, F. Korte, J. Koch, C. Fallnich, B. N. Chichkov, Laser Zentrum Hannover e.V. (Germany) ... [5118-16]

Surface morphology and photoluminescence of InAs quantum dots grown on [110]-oriented streaked islands by organometallic vapor phase epitaxy, T. S. Feng, Chang Shing Institute of Science and Technology (Taiwan); L. S. Yen, Land Mark Optoelectronics Corp. (Taiwan); C. C. Der, C. Y. Tung, Chung Shiang Institute of Science and Technology (Taiwan); H. T. Shen, T. E. Lee, R. M. Lin, Chang Gung Univ. (Taiwan); M. Y. Hsu, Chang Shiang Institute of Science and Technology (Taiwan) ... [5118-17]

Structural and light-emission modification in chemically post-etched porous silicon, D. Navarro-Urrios, C. Perez-Padrón, E. Lorenzo, N. E. Capu, Univ. de La Laguna (Spain); Z. Gaburro, C. J. Oton, L. Pavesi, Univ. degli Studi di Trento (Italy) ... [5118-18]

Nanonstructured gratings utilizing photorefractive materials (Invited Paper), G. Kirikidís, Univ. of Crete (Greece) and Foundation for Research and Technology (Greece) ... [5118-19]
Tuesday 20 May

Plenary Presentation ................. Tues. 8.30 to 9.30

IC Technology Trends for Wireless Local Area Networks

Neil Weste, Cisco Systems, Inc. (Australia)

SESSION 4 to run parallel with SESSION 5

SESSION 4 .................................. Tues. 9.45 to 12.50

Nanoelectronics: Single Molecules to Nanotubes

Chairs: László P. Biró, Research Institute for Technical Physics and Materials Science (Hungary); Timothy S. Cale, Rensselaer Polytechnic Institute (USA)

All-carbon nanotransistors (Invited Paper, Keynote Address), S. Roth, Max-Planck-Institut für Festkörperforschung (Germany) ......................... [5118-20]


Chairs: László P. Biró, Research Institute for Technical Physics and Materials Science (Hungary); Timothy S. Cale, Rensselaer Polytechnic Institute (USA)

SESSION 7 ................................. Tues. 14.15 to 17.35

Nanotechnology of Life

Chairs: Klaus Kern, Max-Planck-Institut für Festkörperforschung (Germany); Imre Kirci, Univ. of Szeged (Hungary)

Sporadically generated radioactive nanoparticles in the environment (Invited Paper, Keynote Presentation), W. H. Marlow, Texas A&M Univ. (USA) [5118-41]

Mössbauer spectroscopic study of the Fe/Al2O3 and Fe/CaO/Al2O3 catalysts in the CCCVD production of carbon nanotubes from acetylene (Invited Paper), Z. Konya, I. Kiricsi, Univ. of Szeged (Hungary) ......................... [5118-42]

Length, strength, and thermal stability of an Au-Au bond in the Au single-atomic chain and the 4f-level energy of an isolated Au atom, C. Q. Sun, Nanyang Technological Univ. (Singapore) ......................... [5118-43]

Modification of metal nanoparticles in SiO2 by thermal oxidation, H. Amekura, Y. Takeda, K. Kono, N. Kishimoto, National Institute for Materials Science (Japan) ......................... [5118-44]

Porous silicon optical sensors for vapors, liquids, and biological molecules, I. Rendina, Consiglio Nazionale delle Ricerche (Italy) ......................... [5118-45]

Fabrication of polyelectrolyte nanocapsules on ionic crystals and living cells, S. Krol, A. Diaspro, O. Cavalleri, D. Silvano, A. Gliozzi, Univ. degli Studi di Genova (Italy) ......................... [5118-46]

Physics of drug delivery: dielectric spectroscopy and fractals (Invited Paper), M. Strømme, Uppsala Univ. (Sweden) ......................... [5118-47]
Posters-Tuesday
Poster presenters will stand by their posters from 17:30 to 19:00 to answer questions.
Posters must be removed at the end of the poster session.

Covalent immobilization of DNA onto functionalized Mica for atomic force microscopy, M. J. Southeast Univ. (China) ........................................... [5118-69]

Effects of ion irradiation on ferroelectric domains of Triglycine Sulfate single crystals on a nano-meter scale, Z. Xie, Hunan Univ. (China); E. Z. Luo, J. B. Xu, Chinese Univ. of Hong Kong (Hong Kong); Z. Wang, X. Chen, Hunan Univ. (China) .......................................................... [5118-70]

Dynamics of formation of nanoparticles by UV laser ablation, Q. Lou, J. Zhen, Shanghai Institute of Optics and Fine Mechanics (China) ........ [5118-71]

Comparative study of the growth curves of B. Subtilis, K. Pneumoniae, C. Xerosis, and E. Coli bacteria using nanometric silicon particles as a bacteriological sensor, J. Avalos, L. Perez, Univ. Metropolitana (USA) .......... [5118-72]

Photoelectric characteristics of contacts in-semiconductor AgSp, T. Laperashvili, Institute of Cybernetics (Georgia); M. Khachidze, Tbilisi State Univ. (Georgia) and Institute of Control Systems (Georgia); I. Inerlishvili, Tbilisi State Univ. (Georgia); D. Laperashvili, Georgian Technikul Univ. (Georgia) .................... [5118-73]

Assembly fabrication of linkers on glass surface and their effect on oligonucleotides synthesis and hybridization, Y. Shen, Southeast Univ. (China) ........................................................................ [5118-74]

MOS-based nanopcapactor using conductive AFM, D. Hill, Univ. Autònoma de Barcelona (Spain); S. Sadewasser, Hahn-Meitner-Institut (Germany); X. Blasco, X. Aymerich, Univ. Autònoma de Barcelona (Spain) ........................................................ [5118-75]

Near-field microscopy of light propagation in photonic crystal waveguides, S. I. Bozhevolnyi, V. S. Volkov, Aalborg Univ. (Denmark) .......... [5118-76]

New magnetic semiconductors CuCr1.5Sb0.54 with Co, D. A. Saifullaevna, S. F. Solieva, Samarkand State Univ. (Uzbekistan) ................ [5118-77]

Second-harmonic far-field microscopy of random metal nanostuctures, J. Beermann, Aalborg Univ. (Denmark); V. Coello, CICESE Monterrey (Mexico); S. I. Bozhevolnyi, Aalborg Univ. (Denmark) [5118-78]

Near-field imaging of out-of-plane light scattering in photonic crystal slabs, V. S. Volkov, S. I. Bozhevolnyi, Aalborg Univ. (Denmark); D. Talliaert, Univ. Gent (Belgium) ........................................ [5118-79]

Fabrication of smooth diamond-like carbon microstructures by photolithography together with dry etching techniques, L. Yu, S. Divakaran, T. BengKang, Nanyang Technological Univ. (Singapore) ................................. [5118-80]

Electrical behavior of atomic force microscopy grown SiOx as gate oxide of MOS devices, X. Blasco, M. Nafria, X. Aymerich, Univ. Autònoma de Barcelona (Spain) ............................................................ [5118-81]

STM investigation of carbon nanotubes completely covered with functional groups, A. A. Koós, Z. E. Horváth, Z. Osváth, Research Institute for Technical Physics and Materials Sciences (Austria); L. P. Bird, Research Institute for Technical Physics and Materials Sciences (Hungary) ................... [5118-82]

Nanofinger electrodes of electro-optically generated and tuned gratings for switching and processing applications, J. Giglmayr, Kwangju Institute of Science and Technology (South Korea) ......................... [5118-83]

Three-dimensional nanostructuring by two-photon polymerization of hybrid materials, J. J. Serbin, B. N. Chichkov, Laser Zentrum Hannover e.V. (Germany) ................................................................ [5118-84]

Modeling of experimental reflectance of porous silicon multilayers, C. Hernández-Rodríguez, Univ. de La Laguna (Spain) ........ [5118-85]

STM and STS investigation of few wall carbon nanotubes containing non-hexagonal rings, Z. Osváth, Research Institute for Technical Physics and Materials Sciences (Hungary); L. Fulcheri, École des Mines de Paris (France); G. I. Márk, J. Gyulai, L. P. Bird, Research Institute for Technical Physics and Materials Sciences (Hungary) ........................................ [5118-86]

Scanning force microscopy (AFM) and transmission electron microscopy (TEM): two complementary techniques for the analysis of the pathological state of cells, K. Schlicher, Profaktor GmbH (Austria); R. Silve, Wagner Jauregg Krankenhaus (Austria); H. Pillerstorfer, P. Betthelheim, Laborgemeinschaft für Spezialdiagnostik (Austria) ............ [5118-87]

Spatial distribution of the local optical field of microcavity structures using far- and near-field spectroscopy, O. V. Lebedev, A. I. Malykovski, A. Fedyanin, D. Kazantsis, Moscow State University (Russia) ........................................... [5118-88]

Incoherent third and second harmonics from silver island films, E. M. Kim, A. Nikulin, O. A. Aktipetrov, Moscow State University (Russia) .......... [5118-89]

Isolated single-molecule magnets on a polymeric thin film as magnetic quantum bits, D. Ruiz-Molina, Instituto de Ciencia de Materiales de Barcelona (Spain) [5118-90]

Near-field optical imaging of ferromagnetic materials using linear and non-linear techniques, W. Dickson, S. Takahashi, Queen's Univ. of Belfast (Ireland); A. V. Zayats, Queen's Univ. of Belfast (United Kingdom) .... [5118-91]

Nondistribution of the dissolved hydrogen and deuterium in near surface area of metals, E. Deulin, E. Rodina, Bauman Moscow State Technical University (Russia) .................................................. [5118-92]

Preparation and characterization of nano crystalline, M. L. Singla, Central Scientific Instruments Organisation (India) .................. [5118-93]

Stress induced leakage currents of silicon oxides in flash EEPROM transistor, C. S. Kang, Yonhan College (South Korea) ........................................... [5118-94]

Thermal spectral emission properties from doped silicon and from metallic grating structure, N. Pinhas, S. Hava, Ben-Gurion Univ. of the Negev (Israel) ........ [5118-95]

Electrical characterization of single wall carbon nanotubes, S. Orlanducci, F. Brunetti, M. Berlocchi, A. Di Carlo, M. L. Terranova, P. Lugli, Univ. degli Studi di Roma Tor Vergata (Italy) ........................................ [5118-96]

Quantum heterostructure antennas: an efficient and effective means for future wireless scenario, R. Nakkeeran, Pondicherry Engineering College (India) [5118-97]

Monolayered rhodamine nanoparticles in laided silicates, S. Papp, I. Dékány, Univ. of Szeged (Hungary) .................................................. [5118-98]

Incorporation of silver nanoparticles in kaolinite clays, R. Patakalvi, I. Dékány, Univ. of Szeged (Hungary) ........................................ [5118-99]
SESSION 8 to run parallel with SESSION 9

Wednesday 21 May

Plenary Presentation .............. Wed. 8.30 to 9.30
Photons from the Universe
Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain)

SESSION 8  
Power of Computation for Nanotechnology
Chairs: Mauricio Terrones, Instituto Potosino de Investigación Científica y Tecnológica (Mexico); Robert Vajta, Rensselaer Polytechnic Institute (USA)

Coalescence and nanoscale welding of SWNTs and nano-peapods (Invited Paper, Keynote Presentation), J. Charlier, Univ. Catholique de Louvain (Belgium)  
Gas-surface interactions and charge-carrier dynamics in single-wall carbon nanotubes (Invited Paper), T. Hertel, Fritz-Haber-Institut (Germany)  
Molecular clusters of hydrogen, deuterium, and tritium, F. E. Leys, Univ. Antwerpen (Belgium); J. A. Alonso, Univ. de Valladolid (Spain); N. H. March, Univ. of Oxford (United Kingdom); A. Rubio, Univ. del País Vasco (Spain) and Centro Mixto CSIC - UPV/EHU (Spain)  
Terahertz photomixing using plasma oscillations in a two-dimensional heterostructure, V. Ryzhii, I. Khmyrova, A. Sato, Univ. of Aizu (Japan); M. Shur, Rensselaer Polytechnic Institute (USA); P. O. Vaccaro, T. Aida, ATR Adaptive Communications Research Labs. (Japan)

First-principles simulation of scanning tunneling microscopy images of individual molecules in alkanethiol self-assembled monolayers on Au(111), J. Yang, Univ. of Science and Technology of China (China)  
Optical and vibrational properties of BN-nanotubes (Invited Paper), L. Wirtz, Donostia International Physics Ctr. (Spain)

Vibrational properties of the hexagonal BN monolayer and of BN single-walled nanotubes (Invited Paper), E. Hernandez, Institut de Ciencia de Materials de Barcelona (Spain); D. Sanchez-Portal, Donostia International Physics Ctr. (Spain)

SESSION 9  
Metal Interconnects on the Nanoscale
Chairs: Sandip Tiwari, Cornell Univ. (USA); William H. Marlow, Texas A&M Univ. (USA)

Development of microstructure in nanostructures and thin films (Invited Paper, Keynote Presentation), T. S. Cale, M. O. Bloomfield, Y. H. Im, J. Wang, H. Huang, Rensselaer Polytechnic Institute (USA)  
Laser-induced surface modification on LTCC materials for chemical metallization (Invited Paper), K. Kordás, A. E. Pap, S. Leppävuori, Univ. of Oulu (Finland); L. Nánai, Univ. of Szeged (Hungary); J. Békési, Laser-Lab Göttingen e.V. (Germany)  
Novel organometallic nanomaterials exhibiting high nonlinearities including photorefractive at telecommunication wavelengths, W. E. Douglas, Univ. Montpellier II (France); L. G. Klapshina, G.A. Razuvaev Institute of Organometalic Chemistry (Russia); A. S. Kuzhelev, Canadian Space Agency (Canada); A. V. Almas’ev, Institute of Applied Physics (Russia); V. V. Semenov, G. A. Domrachev, G.A. Razuvaev Institute of Organometalic Chemistry (Russia)

Self-assembled cluster nanowires, J. G. Partridge, S. Scott, A. D. F. Dunbar, M. Schulze, S. A. Brown, A. Wurl, R. J. Blaikie, Univ. of Canterbury (New Zealand)

Electric-field-mediated fabrication of nano/microstructures, Y. J. Yuan, M. K. Andrews, M. Arnold, B. Marlow, Industrial Research Ltd. (New Zealand)

Electronic structure and transport properties of single molecules and metal nanoparticles (Invited Paper), J. G. Hou, Univ. of Science and Technology of China (China)

Metal and semiconductor nanomaterials stabilized in ultrathin nanofilms and layered structured materials (Invited Paper), I. Dékány, Univ. of Szeged (Hungary)

SESSION 10  
Limits(?) of Nanoscale Electronics
Chairs: Siegmar Roth, Max-Planck-Institut für Festkörperforschung (Germany); Peter Haszler, Uppsala Univ. (Sweden)

Are we there yet? Looking beyond the end of scaling in the Nanometer Era (Invited Paper, Keynote Presentation), S. Tiwari, Cornell Univ. (USA)  
Micro/nano/quantum-scale miniaturization and VLSI Integration of photonic devices and circuits: issues, challenges, and opportunities for 21st century (Invited Paper), E. Lee, S. Lee, B. O. S. Park, Inha Univ. (South Korea)

Nanometer-scale analysis of current limited stresses impact on SiO2 gate oxide reliability using C-AFM, M. Porti, M. Nafría, X. Aymerich, Univ. Autònoma de Barcelona (Spain)

Growth and magnetism of Co quantum dots on Si (111)-7x7 surface, Q. Xue, Institute of Physics (China)

Transfer of single crystalline silicon nanolayer onto alien substrate, A. Usenko, Silicon Wafer Technologies (USA); W. Carr, B. Chen, New Jersey Institute of Technology (USA)

AFM lithography approach to nanocell, T. S. Liu, P. Lu, National Chiao Tung Univ. (Taiwan)

Low-frequency noise in GaN-based two-dimensional structures (Invited Paper), S. L. Rumyantsev, Rensselaer Polytechnic Institute (USA) and Ioffe Institute (Russia); M. S. Shur, Rensselaer Polytechnic Institute (USA)
Monday 19 May

Welcome and Opening Remarks .......... Mon. 8.30 to 9.00
Plenary Presentation ........................ Mon. 9.00 to 10.00

Program Committee: Dávid Bálya, Computer and Automation Research Institute (Hungary); Geoffrey L. Barrows, Centeye, Inc. (USA); Ralu Dogaru, Univ. Politehnica Bucuresti (Romania); Antoine Dupret, Univ. Paris-Sud XI (France); Servando Espejo, Ctr. Nacional de Microelectrónica (Spain); Ralph Ettiene-Cummings, Johns Hopkins Univ. (USA); Luigi Fortuna, Univ. di Catania (Italy); Roman Genov, Univ. of Toronto (Canada); Giacomo Indiveri, Eidgenössische Technische Hochschule Zürich (Switzerland); Gustavo Liljén-Cembrano, Ctr. Nacional de Microelectrónica (Spain); Robert W. Newcomb, Univ. of Maryland/College Park (USA); Luigi Occhipinti, STMicroelectronics (Italy); Alan S. Rudolph, DARPA (USA); Joseph Samitier, Univ. de Barcelona (Spain); Bertram Shi, Hong Kong Univ. of Science and Technology (Hong Kong); Tor Sverre Lande, Univ. of Oslo (Norway); Ronald Tetzlaff, Johann Wolfgang Goethe-Univ. (Germany); Maurizio Valle, Univ. degli studi di Genova (Italy); Fernando Vidal Verdu, Univ. of Málaga (Spain); Mona E. Zaghoul, George Washington Univ. (USA)

SESSION 1 ................................. Mon. 10.15 to 12.55

Biomimetics and Bioinspired Engineering

Chairs: Derek Abbott, Univ. of Adelaide (Australia); Tor Sverre Lande, Univ. of Oslo (Norway)

Biomimetic motion detector arrays based on insect neurobiology (Invited Paper, Keynote Presentation), D. C. O’Carroll, Univ. of Adelaide (Australia) .......................... [5119-01]

OCTAVE: biologically inspired control system for micro-air-vehicle, F. Ruffier, N. Franceschi, CNRS (France) and Univ. de la Méditerranée (France) .......................... [5119-02]

Biologically-inspired intelligent robots using artificial muscles: capabilities and challenges, Y. Bar-Cohen, Jet Propulsion Lab. (USA) .......................... [5119-03]

OSCAR: an optical scanning sensor for the control of autonomous robots, S. Violette, N. Franceschi, CNRS (France) and Univ Méditerranée (France) .......................... [5119-04]

Programmable retinal dynamics in a CMOS mixed-signal array processor chip, R. A. Carmona, Ctr. Nacional de Microelectrónica (Spain) and Univ. de Seville (Spain); F. J. Jiménez-Garrido, R. Domínguez-Castro, Ctr. Nacional de Microelectrónica (Spain); S. Espejo, A. Rodríguez-Vázquez, Ctr. Nacional de Microelectrónica (Spain) and Univ de Seville (Spain) .......................... [5119-05]

CMOS analog implementation of a simplified spinal cord neural model, G. Domenech-Ausensi, R. Ruiz-Merino, Univ. Politecnica de Cartagena (Spain); H. Hauer, J. A. Diaz-Madrid, Fraunhofer-Institut für Integrierte Schaltungen (Germany) .......................... [5119-06]

Programmable and Real-time Processing of Bio-inspired Neural Networks, J. Lopez-Alcántud, Univ. Politecnica de Cartagena (Spain); H. Hauer, J. A. Diaz-Madrid, Fraunhofer-Institut für Integrierte Schaltungen (Germany); R. Ruiz-Merino, Univ. Politecnica de Cartagena (Spain) .......................... [5119-07]

Lunch Break

SESSION 2 ................................. Mon. 14.15 to 17.10

BioMEMS and Microfluidics

Chairs: Fernando Vidal Verdu, Univ. of Málaga (Spain); Ralph Ettiene-Cummings, Johns Hopkins Univ. (USA)

Corti’s organ physiology-based cochlear model: a microelectronic prosthetic implant, F. Ríos, R. Fernández-Ramos, J. Romero-Sánchez, J. F. Martín, Univ. de Málaga (Spain) .......................... [5119-08]

Interactive light-powered lab-on-a-chip: simultaneous actuation of microstructures by optical manipulation, P. J. Rodríguez, R. L. Eriksen, V. R. Daria, J. Glückstad, Risø, National Lab. (Denmark) .......................... [5119-09]

Selective surface treatment for formation of a liquid sport array in a microfluidic biochip, H. Gong, Nanyang Technological Univ. (Singapore) and AtoGeneX Biosystems Pte Ltd (Singapore); X. Yang, L. Chen, Nanyang Technological Univ. (Singapore) .......................... [5119-10]

Methylation oligonucleotide microarray: a novel tool to analyze methylation patterns, P. Hou, Southeast Univ. (China) .......................... [5119-11]

Tuesday 20 May

Plenary Presentation ........................ Tues. 8.30 to 9.30

IC Technology Trends for Wireless Local Area Networks
Neil Weste, Cisco Systems, Inc. (Australia)

SESSION 3 ................................. Tues. 9.45 to 12.05

Biosensors

Chairs: Mona E. Zaghoul, George Washington Univ. (USA); Roman Genov, Univ. of Toronto (Canada)

Optical biosensing transducer based on silicon waveguide structure coated with polyelectrolyte nano layers, S. Haron, A. V. Nabok, A. K. Ray, Sheffield Hallam Univ. (United Kingdom) .......................... [5119-16]

Noise reduction in high-sensitivity sensor based on superficial plasmon resonance, A. Medina Escuela, J. R. Sendra Sendra, Univ. de Las Palmas de Gran Canaria (Spain) .......................... [5119-17]

Integrated multichannel potentiostat for distributed electrode array nerve recording, R. Genov, Univ. of Toronto (Canada); G. Cauwenberghs, Johns Hopkins Univ. (USA) .......................... [5119-18]

Dual mode acoustic wave biosensors microarray, G. W. Auner, Wayne State Univ. (USA) .......................... [5119-19]

Integrated optical silicon IC compatible nanodevices for biosensing applications, F. J. Blanco, B. Sepulveda, A. Llobera, C. Ana, D. Carlos, L. Lechuga, Ctr. Nacional de Microelectrónica (Spain) .......................... [5119-20]

Porous–Si based biosensors for glucose monitoring, S. Libertino, M. Fichera, G. D’Arrigo, Consiglio Nazionale delle Ricerche (Italy) .......................... [5119-21]

New remote moisture infrared sensor for medical applications, E. Monacelli, Y. Alayli, Univ. de Versailles Saint-Quentin (France); F. Lofaso, Hôpital Raymond Poincaré de Garches (France) .......................... [5119-22]

Lunch Break
**SESSION 4**  
**Biomedical Engineering and Smart Drug Delivery**

*Chairs: Josep Samitier-Martí, Univ. de Barcelona (Spain); Dávid Bálya, Computer and Automation Research Institute (Hungary)*

- Human eye aberrations measured by curvature sensor: preliminary results.
  J. M. Rodríguez-Ramos, S. Ríos Rodríguez, Univ. de La Laguna (Spain)  
- Wireless patient monitoring on shoe for the assessment of foot dysfunction.
- Hand veins segmentation and matching under adverse conditions.
  S. Lopez, Univ. de Las Palmas de Gran Canaria (Spain); A. González, Univ. de La Laguna (Spain)  
- Test of a processing algorithm for NIR laser diodes based pulse oximetry.
  S. M. López Silva, Univ. de Las Palmas de Gran Canaria (Spain); J. P. Silveira, M. L. Dotor, Ctr. Nacional de Microelectrónica (Spain)  
- Pigmented skin lesions by VIS-NIR reflectance spectroscopy.
  M. Cordo China, J. R. Sendra Sendra, S. M. Lopez Silva, Univ. de Las Palmas de Gran Canaria (Spain); A. Viera Ramírez, Dermocanarias Medico-Quirurgica, S.L. (Spain)  
- Investigation into the future of RFID in biomedical applications.
  L. Ricciardi, I. Pitz, S. F. Al-Sarawi, Univ. of Adelaide (Australia); V. Varadan, The Pennsylvania State Univ. (USA); D. Abbott, Univ. of Adelaide (Australia)  
- Smart surface properties.
  P. Staszczuk, D. Sternek, Maria Curie-Skłodowska Univ. (Poland)  
- Micro-circulation of skin blood: optical monitoring by advanced photoplethysmography techniques.
  J. Sigpil, Univ. of Latvia (Latvia)  
- Smart drug delivery injector microsystem based on pyrotechnic.
  M. Puig-Vidal, J. Lopez-Sanchez, P. Miribel-Catala, J. Samitier-Marti, Univ. de Barcelona (Spain); C. Ross, LAAS-CNRS (USA)  
- Manipulation tools for biological applications using microrobots with nano-range accuracy.
  J. Samitier-Martí, M. Puig-Vidal, J. Lopez-Sanchez, P. Miribel-Catala, J. M. Lopez-Villegas, Univ. de Barcelona (Spain)  

**Wednesday 21 May**

**Plenary Presentation**  
**Wednesday 8.30 to 9.30**

**Phots from the Universe**  
**Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain)**

**SESSION 5**  
**Neural Information Processing**

*Chairs: Luigi Fortuna, Univ. di Catania (Italy); Ronald Tetzlaff, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany)*

- CNNs for sinusoidal signal recognition in hearing rehabilitation.
  L. Carnimeo, A. Giaquinto, Politecnico di Bari (Italy)  
- Signals voice biofeedback for speech fluency disorders.
  J. F. Martin, R. Fernández-Ramos, J. Romero-Sánchez, F. Ríos, Univ. de Málaga (Spain)  
- Pattern detection by CNN In epilepsy: recent results.
  C. Niederhöfer, P. Fischer, R. Tetzlaff, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany)  
- Natural learning of neural networks by reconfiguration.
  L. Spaanenburg, Lund Univ. (Sweden)  
- Toward a computational approach for collision avoidance with real-world.
  M. S. Keil, Instituto de Optica/CSIC (Spain); A. Rodríguez-Vázquez, Ctr. Nacional de Microelectrónica (Spain)  
- Multichannel spatio-temporal topographic processing for visual search and navigation.
  L. Szatmári, D. Bálya, G. Tímár, C. Rekeczky, T. Roska, Computer and Automation Research Institute (Hungary)  
- Model for reflectance perception in vision.
  V. Brajovic, Carnegie Mellon Univ. (USA)  
- Novel theory on mach-bands and gradient formation: in early vision.
  M. S. Keil, G. Cristobal, Instituto de Optica/CSIC (Spain); H. Neumann, Univ. Ulm (Germany)  
- Documents from malicious terminals.
  I. Z. Berta, I. Vajda, Budapest Univ. of Technology and Economics (Hungary)  

**Lunch Break**

**SESSION 6**  
**DNA Sequencing Technology**

*Chair: Paolo Arena, Univ. di Catania (Italy)*

- Detection of isochromes through recursive numerical segmentation of DNA sequences.
  P. A. Bernaola-Galvan, P. Carpena, Univ. de Málaga (Spain); R. Roman Roldán, J. L. Oliver, Univ. de Granada (Spain)  
- Characterization of thiol-derivatized DNA immobilization onto gold surfaces by fluorescence, biotinilation, radiolabelling, and biosensors based on microcantilevers.
  L. M. García, M. Alvarez, J. Tamayo, A. Calle, L. Chughia, Ctr. Nacional de Microelectrónica (Spain); K. Harshman, C. Martinez-A, Ctr. Nacional de Biotecnologia (Spain)  
- Integrated system and its thermal cycling for real-time PCR on microfluidic DNA chip.
  Q. Wang, L. Deng, H. T. Gong, Y. Tan, Nanyang Technological Univ. (Singapore)  
- Inverted repeats: computer analysis of microorganisms genome and imaging of cruciform structure in DNA by atomic force microscopy.
  A. Limansky, O. Y. Lianinskaya, Mekhnov Institute of Microbiology and Immunology (Ukraine)  

**Order Proceedings now and take advantage of the special prepublication price.**

Bioengineered and Bioinspired Systems  
*Editor: Ángel Rodríguez-Vázquez, Univ. de Sevilla (Spain)*  
and Ctr. Nacional de Microelectrónica (Spain)  
Proceedings of SPIE Vol. 5119  
Prepublication price: $18 USD 70  
See page 25 to order.
<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strømme, Maria</td>
<td>SPIE Member</td>
<td><a href="http://www.spie.org/info/emt">www.spie.org/info/emt</a></td>
</tr>
<tr>
<td>Sturm, Heinz</td>
<td>5118 ProgComm</td>
<td>TEL +1 360 676 3290</td>
</tr>
<tr>
<td>Summonte, Caterina</td>
<td>[5116-113]S11,</td>
<td>FAX +1 360 647 1445</td>
</tr>
<tr>
<td>Sun, Chang Q.</td>
<td>[5118-43]S5</td>
<td><a href="mailto:spie@spie.org">spie@spie.org</a></td>
</tr>
<tr>
<td>Sun, Hufang</td>
<td>[5117-37]S10</td>
<td></td>
</tr>
<tr>
<td>Sun, Yi T.</td>
<td>[5116-26]S4</td>
<td></td>
</tr>
<tr>
<td>Suresh Kumar, P</td>
<td>[5116-46]S6</td>
<td></td>
</tr>
<tr>
<td>Svensson, Christer M.</td>
<td>[5117-14]S4</td>
<td></td>
</tr>
<tr>
<td>Sverre Lande, Tor</td>
<td>5119 S1 SessChr,</td>
<td></td>
</tr>
<tr>
<td>Swoboda, Robert</td>
<td>[5117-71]S14</td>
<td></td>
</tr>
<tr>
<td>Szatmári, István</td>
<td>[5119-38]S11</td>
<td></td>
</tr>
<tr>
<td>Tai, Wen-Chuan</td>
<td>[5116-40]S5</td>
<td></td>
</tr>
<tr>
<td>Taillaert, Dirk</td>
<td>[5117-12]S3</td>
<td></td>
</tr>
<tr>
<td>Takahashi, Satoshi</td>
<td>[5116-91]S11</td>
<td></td>
</tr>
<tr>
<td>Takeda, Yoshihiko</td>
<td>[5118-44]S7</td>
<td></td>
</tr>
<tr>
<td>Tan, Yin</td>
<td>[5119-44]S6</td>
<td></td>
</tr>
<tr>
<td>Tao, Ye</td>
<td>[5116-16]S2</td>
<td></td>
</tr>
<tr>
<td>Tayeb, Mohammed-Brahim</td>
<td>[5116-22]S3</td>
<td></td>
</tr>
<tr>
<td>Tejera, Efrain</td>
<td>[5117-12]S3</td>
<td></td>
</tr>
<tr>
<td>Terranova, Maria Letizia</td>
<td>[5118-37]S6,</td>
<td></td>
</tr>
<tr>
<td>Terrones, Humberto</td>
<td>[5118-01]S1</td>
<td></td>
</tr>
<tr>
<td>Terrones, Mauricio</td>
<td>5118 S8 SessChr,</td>
<td></td>
</tr>
<tr>
<td>Tetzlaff, Ronald</td>
<td>[5117-52]S13</td>
<td></td>
</tr>
<tr>
<td>Tewari, Sjandip</td>
<td>5118 S9 SessChr,</td>
<td></td>
</tr>
<tr>
<td>Tewari, Sandip</td>
<td>[5118-62]S10</td>
<td></td>
</tr>
<tr>
<td>Tixier-Mita, Agnes</td>
<td>[5119-12]S2</td>
<td></td>
</tr>
<tr>
<td>Tobajas, Felix</td>
<td>[5117-12]S3,</td>
<td></td>
</tr>
<tr>
<td>Toca, Luigino</td>
<td>[5118-37]S6</td>
<td></td>
</tr>
<tr>
<td>Tokar, Vadin</td>
<td>[5118-15]S3</td>
<td></td>
</tr>
<tr>
<td>Tretyakov, Sergei A.</td>
<td>[5116-72]S9</td>
<td></td>
</tr>
<tr>
<td>Tsay, Jini</td>
<td>[5116-87]S1</td>
<td></td>
</tr>
<tr>
<td>Tung, Cheng Y.</td>
<td>[5118-17]S3</td>
<td></td>
</tr>
<tr>
<td>Tung, Frankie</td>
<td>[5116-64]S8</td>
<td></td>
</tr>
<tr>
<td>Unger, Eugen</td>
<td>[5118-21]S4</td>
<td></td>
</tr>
<tr>
<td>Usenko, Alexander</td>
<td>[5116-19]S3,</td>
<td></td>
</tr>
<tr>
<td>Vacciareo, Maria</td>
<td>[5116-01]S1</td>
<td></td>
</tr>
<tr>
<td>Viollet, Stéphane</td>
<td>[5119-04]S1</td>
<td></td>
</tr>
<tr>
<td>Vitali, Lucia</td>
<td>[5118-22]S4</td>
<td></td>
</tr>
<tr>
<td>Volkov, Valerian S.</td>
<td>[5116-76]S11</td>
<td></td>
</tr>
<tr>
<td>Vrtacnik, Danilo</td>
<td>[5116-24]S11</td>
<td></td>
</tr>
<tr>
<td>Wahl, Martin</td>
<td>[5117-33]S9</td>
<td></td>
</tr>
<tr>
<td>Walter, Kevin C.</td>
<td>5118 ProgComm</td>
<td></td>
</tr>
<tr>
<td>Wang, Jian</td>
<td>[5118-53]S9</td>
<td></td>
</tr>
<tr>
<td>Wang, Kerwin</td>
<td>[5116-53]S9</td>
<td></td>
</tr>
<tr>
<td>Wang, Qi</td>
<td>[5117-53]S3</td>
<td></td>
</tr>
<tr>
<td>Wang, Qinghui</td>
<td>[5119-13]S2,</td>
<td></td>
</tr>
<tr>
<td>Wang, Yu</td>
<td>[5118-24]S4</td>
<td></td>
</tr>
<tr>
<td>Wang, Zhong L.</td>
<td>[5118-02]S1</td>
<td></td>
</tr>
<tr>
<td>Warrier, K.G.K.</td>
<td>[5118-31]S5</td>
<td></td>
</tr>
<tr>
<td>Wachsung, Reiner W.</td>
<td>[5118-12]S2</td>
<td></td>
</tr>
<tr>
<td>Wecker, Joachim</td>
<td>[5116-12]S2</td>
<td></td>
</tr>
<tr>
<td>Wei, Bingping</td>
<td>[5118-35]S6</td>
<td></td>
</tr>
<tr>
<td>Weng, Fu-Tien</td>
<td>[5116-81]S10,</td>
<td></td>
</tr>
<tr>
<td>Whatmore, Roger W.</td>
<td>[5116-23]S3</td>
<td></td>
</tr>
<tr>
<td>Whitchurch, Ashwin K.</td>
<td>[5119-24]S4</td>
<td></td>
</tr>
<tr>
<td>Wieder, Bernhard</td>
<td>[5116-11]S3</td>
<td></td>
</tr>
<tr>
<td>Wijersirwadana, Ravindra</td>
<td>[5116-31]S4,</td>
<td></td>
</tr>
<tr>
<td>Wilke, Ralph</td>
<td>[5116-11]S1</td>
<td></td>
</tr>
<tr>
<td>Wirtz, Ludger</td>
<td>5118 S3 SessChr,</td>
<td></td>
</tr>
<tr>
<td>Wollenstein, Juerguen</td>
<td>[5116-10]S1</td>
<td></td>
</tr>
<tr>
<td>Won, Taek Y.</td>
<td>[5116-12]S11,</td>
<td></td>
</tr>
<tr>
<td>Wulff, Ralph</td>
<td>[5116-11]S1</td>
<td></td>
</tr>
<tr>
<td>Xu, Dan-Xia</td>
<td>[5117-16]S4</td>
<td></td>
</tr>
<tr>
<td>Yamanouchi, Kazuhiko</td>
<td>[5116-120]S11</td>
<td></td>
</tr>
<tr>
<td>Yang, Xinhao</td>
<td>[5119-10]S2</td>
<td></td>
</tr>
<tr>
<td>Yen, Lin S.</td>
<td>[5118-17]S3</td>
<td></td>
</tr>
<tr>
<td>Yoon, Seoung G.</td>
<td>[5116-104]S11</td>
<td></td>
</tr>
<tr>
<td>Yoon, Sukin</td>
<td>[5117-55]S13</td>
<td></td>
</tr>
<tr>
<td>Yu, Liiujang</td>
<td>[5118-80]S11</td>
<td></td>
</tr>
<tr>
<td>Yu, N.</td>
<td>[5116-35]S5</td>
<td></td>
</tr>
<tr>
<td>Yuan, Yong J.</td>
<td>[5118-59]S9</td>
<td></td>
</tr>
<tr>
<td>Yuferev, Valentini S.</td>
<td>[5116-97]S11</td>
<td></td>
</tr>
<tr>
<td>Zagicloul, Mona E.</td>
<td>5119 ProgComm</td>
<td></td>
</tr>
<tr>
<td>Zalalutdinov, Maxim</td>
<td>[5116-30]S4,</td>
<td></td>
</tr>
<tr>
<td>Zavats, Anatoly V.</td>
<td>[5118-91]S11</td>
<td></td>
</tr>
<tr>
<td>Zehnder, Alan T.</td>
<td>[5116-30]S4,</td>
<td></td>
</tr>
<tr>
<td>Zengerle, Roland</td>
<td>5116 ProgComm</td>
<td></td>
</tr>
<tr>
<td>Zoers, Nicholas</td>
<td>[5117-10]S3</td>
<td></td>
</tr>
<tr>
<td>Zhang, Qi</td>
<td>[5116-23]S3</td>
<td></td>
</tr>
<tr>
<td>Zhu, Jing</td>
<td>5118 S5 SessChr,</td>
<td></td>
</tr>
<tr>
<td>Zhir, ProgComm</td>
<td>5118 ProgComm</td>
<td></td>
</tr>
<tr>
<td>Zhou, Yingbo</td>
<td>[5118-21]S2</td>
<td></td>
</tr>
<tr>
<td>Zimmermann, Horst</td>
<td>[5117-21]S14</td>
<td></td>
</tr>
<tr>
<td>Zieroff, Johannes</td>
<td>[5118-04]S1</td>
<td></td>
</tr>
<tr>
<td>Zorian, Yervant</td>
<td>5117 ProgComm</td>
<td></td>
</tr>
</tbody>
</table>
General Information

Symposium Location
Gran Hotel Costa Meloneras
Mar Mediterráneo, nº 1
35100 Maspalomas
Gran Canaria
Canary Islands

Information
Tel: +34 928 128 100
Fax: +34 928 128 122
www.ghcmeloneras.com

Registration and Information Desk Hours
Location: Conference Area Hallway
Sunday .............................................. 15.00 to 19.00
Monday through Wednesday ............................. 7.30 to 17.00

Sunday Evening Welcome Reception
Location: Conference Area Hallway
Sunday .................................................. 19.00 to 21.00
All attendees are invited to relax, socialize, and enjoy light refreshments. Please remember to wear your conference registration badges. Dress is casual.

Tuesday Evening Poster Session
Posters will be displayed in the Conference Area Hallway. Poster presenters will stand by their posters from 17.30 to 19.00 to answer questions. Posters must be removed at the end of the poster session.

Tuesday Evening Conference Dinner
Location: Congress Palace of Maspalomas,
located in front of the Gran Hotel Costa Meloneras
Tuesday ............................................. 20.00 to 24.00

Tea/Coffee and Lunch Breaks
Breaks will be in the Conference Area Hallway. See the individual conference program for times.

Tabletop Exhibition
Location: Conference Area Hallway
A tabletop exhibition will take place to augment the technical program. Interested companies and vendors should contact spiesales@spie.org for more information.

Passports/Visas
The Canary Islands are part of Spain; therefore, all rules on passports and visas which apply to Spain apply to the Canary Islands. Please contact your travel agent to obtain current information about passport and visa requirements.

Letters of Invitation
Individuals requiring letters of invitation to obtain travel visas may access and print an invitation letter request form found at this website: http://spie.org/forms/invitationrequest.pdf
Please fill out a separate form for each person requesting a letter. All letters of invitation will be sent by airmail and by PDF e-mail attachment unless a courier account number or credit card number with expiration date is provided with the original request. Please allow 15 business days for processing requests.

Foreign Currency/Exchanging Money
The Canary Islands’ currency is the euro. The new currency and coins became official on 1 January 2002, replacing Spain’s peseta and other national currencies.
Credit/Debit cards are widely used and the exchange rate is often the best. You pay a charge for each cash advance and ATM transaction – so don’t withdraw small amounts often. Travelers checks are safe and easily cashed at banks and exchange offices throughout Gran Canaria. You will always require your passport to change money and banks will always charge a commission fee. Most hotels, travel agents, and Exchange offices ‘Cambio’ will also change your money but at a lower exchange rate than the bank.

Overseas Visitors
Overseas visitors should be aware of the following facts:
Time: The Canary Islands operate on the 24-hour clock.
Business Hours: Banks are open weekdays from 9.00 to 14.00. Shops are open Monday-Saturday from 9.00 to 13.00. Most shops open again from 16.00 or a little later for another 3 or 4 hours. Many do not reopen on Saturday afternoon. The big supermarkets and department stores are typically open from 9.00 to 21.00 six days a week.
Water: Tap water is safe to drink but not recommended for its taste. Most locals drink bottled water.
Electricity: 220 volts AC 50 Hz and plugs have 2 round pins as found on the European continent. Many of the more expensive hotels have provision for 110V appliances such as shavers, but if you are from the USA you will need to bring a voltage converter. Make sure you bring plug adapters for your appliances.

Register by 9 May 2003 and Save US$100!
www.spie.org/info/emt
The Gran Hotel Costa Meloneras is situated on the southern coast of Gran Canaria Island in Maspalomas. It is close to the famous Maspalomas lighthouse. The popular Las Meloneras beach and the Natural Dunes Park of Maspalomas are just a few minutes walk away. Close to the hotel you will find the shopping center Varadero as well as the new Congress Palace of Maspalomas. The golf course is about 2 kilometers away from the hotel. The hotel is built in the typical colonial Canarian architecture style, with different levels, seven inner patios, and some miradors to enjoy the marvelous views of the area. It offers large and comfortable rooms with modern decoration, air conditioning, telephone, minibar, safe deposit box for rent, satellite TV, fully furnished bathroom with hairdryer and telephone, and a terrace with mountain view or garden/pool view. The hotel offers 2 heated swimming pools with different sizes and temperatures, and a heated pool with a central island where the children's pool is located. The Laguna swimming pool has a 5-meter waterfall, solarium terrace with Jacuzzis, a large garden area with 700 palm trees, 4 tennis courts, 2 paddle courts, shuffleboard, and French bowls. The hotel also has an entertainment program for adults and children with activities during the daytime and in the evening too, with sports, competitions, contests and many other activities with the participation of guests.
Travel/Local Area Information

Area Information
The symposium will take place in Maspalomas, famous world-wide not only for its NASA and ESA Space Stations, but for its beaches and range of leisure activities. The center of the Island is a mountainous massif crowned by Las Nieves peak (1,949 meters). The southern part is made up of sandy coastal flats like Maspalomas. The north is rugged with cliffs like Farroque and Anden Verde that rise up to 1,000 meters. The climate is sub-tropical oceanic.

The Island’s charms reside in its constant contrasts, apparent even in the modern and cosmopolitan capital city of Las Palmas de Gran Canaria with its busy harbor—an open window into the world. The population of the Island (1.8 million) enjoys the most advanced services in consumer foods, health, leisure, and culture. The region has residential and business areas appropriate for executives, along with modern highway and communication infrastructures. All these facilities allow the island to enjoy the quality of life that characterize modern societies, and to share this lifestyle with over 9 million visitors every year.

From the observatories of the Astrophysics Institute, the Universe is within the reach of visitors and residents. Amazing images being received from Earth Observation Satellites can also be admired at Maspalomas Space Station. The famous Botany Garden at Talía, the Bandama volcano crater, or Roque Nuble, one of the highest peaks, are worth a visit. The diverse research institutes in the island are proud to receive scientists from all over the world to exchange knowledge and contribute to the advancement of science and technology.

Air Travel
Las Palmas de Gran Canaria is the international airport of Gran Canaria, with daily connections to mainland Europe. Be sure to use the airport code when booking your flight: LPA.

The airport offers a full service bank, open 8.00 to 14.15 Monday-Friday, which is located on the ground floor, and ATMs are situated on the first floor. There are bureaux de change in the EU Arrivals hall and in the check-in halls on the ground floor. There is a post office in the main hall.

Transportation
The distance between Las Palmas de Gran Canaria International Airport and the Gran Hotel Costa Meloneras is about 40 km.

Taxis are available from stands at the airport. Taxis are recognizable by a green light in the windshield or on a white roof, and an official license plate with the letters SP.

Gran Hotel Costa Meloneras offers a pick-up service to their guests for 62,00 Euros (both ways / max. 4 persons).

Car hire companies at the airport include Avis and Hertz. Car hire desks can be found on the ground floor of the airport. You will find other international car rental companies on Gran Canaria and many local companies as well. Generally, you will always get a better price if you book in advance and Internet bookings are often the most competitively priced. To rent a car you will need a valid driver’s license, passport, and you must be at least 21 years old. Make sure the price you pay includes mileage and insurance. Some companies may require an International Drivers license.

Traveling to Gran Hotel Costa Meloneras by car: Leaving the airport take the highway direction south, exit Maspalomas or El Tablero. The hotel is situated next to the Lighthouse of Maspalomas and you can see the two towers of the hotel already driving on the highway.

Local Attractions/Excursions
Gran Canaria offers many different activities from sun and relaxation to adventure sports.

The Spa Centre, which is located at the Gran Hotel Costa Meloneras, offers an array of facilities for fitness, relaxation, pamper, and thermal suites. Please visit their website under “a world of sensations” for more information about spa services: www.ghcmeloneras.com

The Gran Hotel Costa Meloneras also offers a wide range of tours:

Gran Canaria:
- **Guided Bus Tour** (to the inner island): lunch included, 32,00 Euros/person
- **Guided Bus Tour** (from the south to north of island): lunch included, 42,00 Euros/person
- **Jeep-Safari**: lunch included, 30,00 Euros/person
- **Camel Safari** (1/2 day): lunch included, 25,00 Euros/person
- **Horse-Back Riding** (1/2 day): lunch included, 37,00 Euros/person
- **Mountain Biking**: 39.90 - 42.90 Euros/person
- **Hiking Tours**: 36.90 - 39.90 Euros/person
- **Quad Safari**: 49.90 - 59.90 Euros/person

Sea Tours:
- **Catamaran Trip**: lunch included, 38.00 Euros/person
- **Sailing Ship San Miguel**: lunch included, 36.00 Euros/person
- **Submarine, Puerto de Mogán** (1/2 day): 26.50 Euros/person

Other islands:
- **Day trip to Tenerife**: 42.70 - 69.00 Euros/person
- **Day trip to Lanzarote**: lunch included, 120,00 Euros/person

For further information, please do not hesitate to contact the hotel directly by telephone+34 928 128 100, or e-mail info@ghcmeloneras.com

You can find additional information on the Web at http://gias720.dis.ulpgc.es/Canarias/turista.html

Shopping
The main tourist and commercial centers are located on the southern coast of Gran Canaria, such as Playa del Inglés, Maspalomas and San Agustín. Las Palmas is also good for shopping in areas such as Triana and Avenida Mesa y Lopez, in the center of the city.

Climate
Averages for May:
- Highs: 24°C (75°F)
- Lows: 17°C (63°F)
- Precipitation: 5mm (0.2 inches)

Sun Protection
Don’t risk harmful exposure to the sun. Skin protection is simple—wear a broad-brimmed hat, a shirt with collar and sleeves, and SPF 15+ broad-spectrum, water-resistant sunscreen on exposed skin. Try to avoid the sun during the middle of the day when ultra-violet rays are strongest.

Averages for May:
- Precipitation: 5mm (0.2 inches)

Precipitation: 5mm (0.2 inches)
Proceedings of SPIE

Order Proceedings volumes now and receive low prepublication prices. Use order form on p. 25 or order on the Web.

✓ Smart Sensors, Actuators, and MEMS
Editor: Jung-Chih Chiao, Univ. of Texas/Arlington (USA)
Proceedings of SPIE Vol. 5116
Prepublication price: $USD 135

✓ VLSI Circuits and Systems
Editor: José Fco. López, Univ. de Las Palmas de Gran Canaria (Spain)
Proceedings of SPIE Vol. 5117
Prepublication price: $USD 100

✓ Nanotechnology
Editor: Robert Vajtai, Rensselaer Polytechnic Institute (USA)
Proceedings of SPIE Vol. 5118
Prepublication price: $USD 125

✓ Bioengineered and Bioinspired Systems
Editor: Angel Rodríguez-Vázquez, Univ. de Sevilla (Spain) and Ctr. Nacional de Microelectrónica (Spain)
Proceedings of SPIE Vol. 5119
Prepublication price: $USD 70

✓ Indicates volumes that will be available at the meeting.

NEW!

Microtechnologies for the New Millennium 2003

Proceedings on CD-ROM
Full-text papers from all four Proceedings volumes. PC, Macintosh, and Unix compatible.

International Symposium on Microtechnologies for the New Millennium 2003
(Includes Vols. 5116-5119)
Order No. CDS94 • Est. Pub. November 2003
Meeting attendee price: $USD 120
Nonattendee member prepublication price: $USD 245
Nonattendee nonmember prepublication price: $USD 325

Can’t Attend?

Don’t miss out on the latest technical discoveries and education opportunities presented at SPIE’s International Symposium on Microtechnologies for the New Millennium 2003. Now you can order the Proceedings of SPIE volumes and CD-ROM from this meeting using the registration form on p. 25. It’s the next best thing to being there.
1. Name and Address

First Name  MI.  Last Name
Title
Company
Address (include Mail Stop)
City  State  Zip/Postal Code
Country other than USA
Phone  Fax
E-Mail Address  Date of Birth

2. Membership

☐ Annual SPIE Membership $USD95:  Student membership ☐ $USD40 with print journal ☐ $USD20 online journal only

Journal Option (choose one):  ☐ Optical Engineering  ☐ Electronic Imaging  ☐ Biomedical Optics  (choose journal format):  ☐ print  ☐ online

3. Symposium Registration ✓ Check box to indicate appropriate symposium registration fee.

Includes the Sunday conference reception, Monday hosted lunch, Tuesday conference dinner, refreshment breaks and
Proceedings (except student optional A).

☐ Attendee (TE)  ☐ Author (AU) or  ☐ Session Chair/Committee (CH)
Includes one proceedings volume
Includes one proceedings volume plus CD-ROM

☐ SPIE Member ☐ Nonmember
☐ $ USD 520  ☐ $ USD 580
☐ $ USD 640  ☐ $ USD 700

☐ Full-time student (ST)
No proceedings volume
Includes one proceedings volume
Includes one CD-ROM

☐ SPIE Member ☐ Nonmember
☐ $ USD 150  ☐ $ USD 210
☐ $ USD 220  ☐ $ USD 280
☐ $ USD 270  ☐ $ USD 330

☐ Additional Conference Dinner Tickets. Reserve ______ Guests(s) Tickets @ $60 each.

4. Additional Proceedings

See p. 24 for a complete list of proceedings for this event.

Vol. _______ @ $ _______ Vol. _______ @ $ _______

5. Payment Method

☐ Check #__________  Amount____________________ (payable to SPIE)  Date:__________

Credit Card:  Card Number:__________  Expiration Date _______ / _______  Signature____________________

☐ VISA  ☐ MasterCard  ☐ American Express  ☐ Diners Club  ☐ Discover

I authorize SPIE to charge total payment fee (as indicated on this form) to my credit card.

Payment must accompany registration.

Fees will increase $100 after 9 May 2003
Register & Pay Today!

Preregistration for
SPIE’s First International Symposium
Microtechnologies for the
New Millennium 2003
19-21 May 2003
Gran Hotel Costa Meloneras
Maspalomas, Gran Canaria, Canary Islands, Spain
Mail or fax this form to
SPIE, PO Box 10,
Bellingham, WA 98227-0010 USA
Phone +1 360 676 3290; Fax +1 360 647 1445
Web: www.spie.org/info/emt/
Submit one form per person.
Reference Code: 3604
 SPIE Continuing Education . . .

Short Courses on Video, CD-ROM, Webcast

You can view complete descriptions and order information for these and more than 100 other courses online at www.spie.org/education.

Optoelectronics and MEMS Packaging

Y. C. Lee, University of Colorado/Boulder

CD-ROM: CDV100 • SPIE Member $425
List price: $475
Webcast: WCE100 • SPIE Member $425
List price: $475

Developments in Vertical-Cavity-Surface-Emitting-Lasers (VCSELS)

Kent Choquette, University of Illinois at Urbana-Champaign

Video: VT10501 • SPIE Member $400;
List price $445

Advanced Materials for Optoelectronic and MEMS Packaging

Carl Zweben, Advanced Composites and Packaging Materials Consultant

Part A—Properties of Traditional Advanced Materials
Video: VT3861 • SPIE Member $400
List price $445
CD-ROM: CDV3861 • SPIE Member $425
List price $475
Webcast: WCE3861 • SPIE Member $425
List price $475

Part B—Manufacturing Processes, Applications, Costs and Future Trends
Video: VT3862 • SPIE Member $400
List price $445
CD-ROM: CDV3862 • SPIE Member $425
List price $475
Webcast: WCE3862 • SPIE Member $425; List price $475

Full Series, Parts A and B
Video: VT386Z • SPIE Member $720
List price $800
CD-ROM: CDV386Z • SPIE Member $760
List price $855

Order Today: spie.org/education

Get smart
Read oemagazine.
subscribe at oemagazine.com

The monthly publication of}

SPIE The International Society for Optical Engineering
SPIE Members represent the highest levels of learning, expertise, and achievement in engineering and science. Join SPIE and you’ll learn what your peers and competitors are doing to reach the next level.

SPIE Membership Benefits:

• Stay connected to your professional community. Learn from others willing to share their ideas, and gain access to the people who can help you grow.

• Save money on conference and continuing education fees, SPIE publications, and distance education.

• Choose one of SPIE’s peer-reviewed journals—available online or in print.

• Receive oemagazine, SPIE’s monthly publication and resource for the worldwide optics and photonics community.

• Help shape your profession by participating in Society business or take advantage of leadership opportunities.

• Visit SPIEWorks.com, SPIE’s innovative online career services website.

• Apply for scholarships and grants to forward your education.

Join SPIE Today:

www.spie.org/membership/
SPIE’s First International Symposium on
Microtechnologies for the New Millennium 2003

19-21 May 2003
Gran Hotel Costa Meloneras
Maspalomas, Gran Canaria, Canary Islands, Spain

Conferences • Tabletop Exhibition

• Network with your colleagues
• Hear cutting-edge research
• Stay informed

www.spie.org/info/emt

Register Today and Save $100!