

# PROCEEDINGS OF SPIE

## ***Quantum Sensing and Nanophotonic Devices VI***

**Manijeh Razeghi**  
**Rengarajan Sudharsanan**  
**Gail J. Brown**  
*Editors*

**25–28 January 2009**  
**San Jose, California, United States**

*Sponsored and Published by*  
**SPIE**

**Volume 7222**

Proceedings of SPIE, 0277-786X, v. 7222

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Quantum Sensing and Nanophotonic Devices VI*, edited by Manijeh Razeghi, Rengarajan Sudharsanan, Gail J. Brown, Proceedings of SPIE Vol. 7222 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 0277-786X  
ISBN 9780819474681

Published by  
**SPIE**  
P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445  
[SPIE.org](http://SPIE.org)

Copyright © 2009, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/09/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



[SPIEDigitalLibrary.org](http://SPIEDigitalLibrary.org)

---

**Paper Numbering:** Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

# Contents

ix Conference Committee

---

## SESSION 1 QUANTUM CASCADE LASERS AND APPLICATIONS I

---

- 7222 02 **Airborne atmospheric research using mid-infrared laser spectroscopy (Invited Paper)** [7222-01]  
A. Fried, P. Weibring, D. Richter, J. Walega, National Ctr. for Atmospheric Research (United States)
- 7222 03 **The effect of hydrostatic pressure on the operation of quantum cascade lasers (Invited Paper)** [7222-03]  
A. R. Adams, I. P. Marko, S. J. Sweeney, Univ. of Surrey (United Kingdom); R. Teissier, A. N. Baranov, Institut d'Électronique du Sud, Univ. Montpellier II, CNRS (France); S. Tomić, STFC Daresbury Lab. (United Kingdom)

---

## SESSION 2 QUANTUM CASCADE LASERS AND APPLICATIONS II

---

- 7222 05 **Diagnostics of molecular plasmas and trace gas analysis using mid infrared lasers (Invited Paper)** [7222-05]  
J. Röpcke, INP Greifswald (Germany); P. B. Davies, Univ of Cambridge (United Kingdom); S. Glitsch, F. Hempel, N. Lang, INP Greifswald (Germany); M. Nägele, OptoPrecision GmbH (Germany); A. Rousseau, LPTP, Ecole Polytechnique, CNRS (France); S. Wege, Qimonda Dresden GmbH & Co. (Germany); S. Welzel, INP Greifswald (Germany)
- 7222 07 **Hot electron effects and nanoscale heat transfer in Terahertz quantum cascade lasers (Invited Paper)** [7222-07]  
M. S. Vitiello, G. Scamarcio, CNR-INFN Regional Lab. LIT<sup>3</sup> (Italy) and Univ. degli Studi di Bari (Italy); G. Scalari, J. Faist, C. Walther, Institute of Quantum Electronics, ETH Zürich (Switzerland); V. Spagnolo, CNR-INFN Regional Lab. LIT<sup>3</sup> (Italy) and Politecnico di Bari (Italy)

---

## SESSION 3 QUANTUM CASCADE LASERS AND APPLICATIONS III

---

- 7222 08 **Application of quantum cascade lasers for infrared spectroscopy of jet-cooled molecules and complexes (Invited Paper)** [7222-08]  
Y. Xu, X. Liu, Z. Su, R. M. Kulkarni, W. S. Tam, C. Kang, I. Leonov, L. D'Agostino, Univ. of Alberta (Canada)
- 7222 09 **A chip-scale microwave repetition rate frequency comb (Invited Paper)** [7222-09]  
P. Del'Haye, O. Arcizet, A. Schliesser, R. Holzwarth, Max-Planck-Institut für Quantenoptik (Germany); T. J. Kippenberg, Max-Planck-Institut für Quantenoptik (Germany) and Ecole Polytechnique Federale de Lausanne (Switzerland)

- 7222 0A **Single-mode 2.4 $\mu$ m InGaAsSb/AlGaAsSb distributed feedback lasers for gas sensing (Invited Paper) [7222-59]**  
J. A. Gupta, P. J. Barrios, J. Lapointe, G. C. Aers, D. Poitras, C. Storey, P. Waldron, National Research Council Canada (Canada)

---

**SESSION 4 QUANTUM CASCADE LASERS AND APPLICATIONS IV**

---

- 7222 0B **Explosive detection using infrared laser spectroscopy (Invited Paper) [7222-11]**  
J. Hildenbrand, J. Herbst, J. Wöllenstein, A. Lambrecht, Fraunhofer Institute for Physical Measurement Techniques (Germany)
- 7222 0C **Frequency metrology with quantum cascade lasers (Invited Paper) [7222-12]**  
S. Bartalini, S. Borri, I. Galli, D. Mazzotti, P. Cancio Pastor, G. Giusfredi, P. De Natale, Istituto Nazionale di Ottica Applicata (Italy) and Lab. Europeo di Spettroscopie Non-lineari (Italy)
- 7222 0D **Pressure broadening of the oxygen A-band measured by laser absorption spectroscopy [7222-10]**  
B. Scherer, J. Herbst, Fraunhofer Institute for Physical Measurement Techniques (Germany)
- 7222 0E **A novel active region concept for highly efficient GaSb-based optically in-well pumped semiconductor disk lasers [7222-13]**  
J. Wagner, B. Rösener, N. Schulz, M. Rattunde, R. Moser, C. Manz, K. Köhler, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)
- 7222 0F **Observation of whispering gallery modes in the mid-infrared with a quantum cascade laser: possible applications to nanoliter chemical sensing [7222-60]**  
S. Wu, A. Deev, California Institute of Technology (United States)

---

**SESSION 5 QUANTUM CASCADE LASERS AND APPLICATIONS V**

---

- 7222 0G **Compact widely tunable ECqCL and its applications for gas spectroscopy (Invited Paper) [7222-14]**  
T. Day, M. Weida, D. Arnone, S. Crivello, D. Caffey, V. Cook, R. Pritchett, Daylight Solutions, Inc. (United States)
- 7222 0H **Infrared QC laser applications to field measurements of atmospheric trace gas sources and sinks in environmental research: enhanced capabilities using continuous wave QCLs (Invited Paper) [7222-15]**  
M. S. Zahniser, D. D. Nelson, J. B. McManus, S. C. Herndon, E. C. Wood, J. H. Shorter, Aerodyne Research, Inc. (United States); B. H. Lee, G. W. Santoni, R. Jiménez, B. C. Daube, S. Park, E. A. Kort, S. C. Wofsy, Harvard Univ. (United States)
- 7222 0I **Compact ultrafast lasers based on quantum-dot structures (Invited Paper) [7222-16]**  
E. U. Rafailov, M. A. Cataluna, K. Wilcox, S. A. Zolotovskaya, Univ. of Dundee (United Kingdom)
- 7222 0J **GaN/AlGaN intersubband optoelectronic devices at telecommunication wavelengths (Invited Paper) [7222-61]**  
F. H. Julien, M. Tchernycheva, Institut d'Electronique Fondamentale, Univ. Paris-Sud, CNRS (France); E. Monroy, CEA-CNRS Nanophysique et Semiconducteurs (France)

---

**SESSION 6 QUANTUM CASCADE LASERS AND APPLICATIONS VI**

---

- 7222 0K **Trace gas sensing using quantum cascade lasers and optoacoustic detection (Invited Paper)** [7222-17]  
V. Spagnolo, A. Elia, Univ. degli Studi di Bari (Italy), Politecnico di Bari (Italy), and CNR-INFM Regional Lab. LIT<sup>3</sup> (Italy); C. Di Franco, CNR-INFM Regional Lab. LIT<sup>3</sup> (Italy); P. M. Lugarà, M. S. Vitiello, G. Scamarcio, Univ. degli Studi di Bari (Italy), Politecnico di Bari (Italy), and CNR-INFM Regional Lab. LIT<sup>3</sup> (Italy)
- 7222 0L **Spectral and spatial modal control of photonic crystal broad area lasers (Invited Paper)** [7222-18]  
L. Zhu, Clemson Univ. (United States); A. Yariv, California Institute of Technology (United States)
- 7222 0M **Continuous monitoring of nitric oxide at 5.33 μm with an EC-QCL based Faraday rotation spectrometer: laboratory and field system performance** [7222-19]  
G. Wysocki, Princeton Univ. (United States); R. Lewicki, Rice Univ. (United States); X. Huang, Princeton Univ. (United States); R. F. Curl, F. K. Tittel, Rice Univ. (United States)
- 7222 0N **A MEMS device for measuring laser power and spot size** [7222-20]  
A. Ghosh, Univ. of Oklahoma (United States); S. Pal, Univ. of Florida (United States)
- 7222 0O **Mid-infrared quantum cascade lasers with high wall plug efficiency** [7222-21]  
Y. Bai, B. Gokden, S. Slivken, S. R. Darvish, S. A. Pour, M. Razeghi, Northwestern Univ. (United States)

---

**SESSION 7 SUPERLATTICE/QUANTUM DETECTORS I**

---

- 7222 0P **Infrared focal plane arrays based on dots in a well and strained layer superlattices (Invited Paper)** [7222-22]  
S. Krishna, The Univ. of New Mexico (United States)
- 7222 0Q **Theory and modeling of type-II strained-layer superlattice detectors (Invited Paper)** [7222-23]  
M. E. Flatté, The Univ. of Iowa (United States); C. H. Grein, Univ. of Illinois at Chicago (United States)
- 7222 0R **Engineered quantum dot structures: fabrication and applications (Invited Paper)** [7222-24]  
J. P. Reithmaier, E.-M. Pavelescu, C. Gilfert, A. Gushterov, Univ. Kassel (Germany); W. Kaiser, P. Weinmann, M. Kamp, A. Forchel, Univ. Würzburg (Germany); A. Martín-Míguez, I. Esquivias, Univ. Politécnica de Madrid (Spain)

---

**SESSION 8 SUPERLATTICE/QUANTUM DETECTORS II**

---

- 7222 0S **A novel opto-electro-mechanical photon sensor (Invited Paper)** [7222-25]  
H. Mohseni, J. Kohoutek, O. G. Memis, Northwestern Univ. (United States)
- 7222 0T **Status of mid-infrared superlattice technology in Germany (Invited Paper)** [7222-26]  
R. Rehm, M. Walther, J. Schmitz, F. Rutz, J. Fleissner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); R. Scheibner, J. Ziegler, AIM Infrarot-Module GmbH (Germany)

- 7222 0U **III-nitride avalanche photodiodes** [7222-27]  
R. McClintock, J. L. Pau, C. Bayram, B. Fain, P. Giedraitis, M. Razeghi, M. P. Ulmer, Northwestern Univ. (United States)
- 7222 0V **Angle and polarization dependent characteristics of colloidal quantum dot absorption in Fano filters on flexible substrates** [7222-28]  
L. Chen, H. Yang, Z. Qiang, The Univ. of Texas at Arlington (United States); H. Pang, Z. Ma, Univ. of Wisconsin, Madison (United States); J. Xu, The Pennsylvania State Univ. (United States); G. J. Brown, Air Force Research Lab. (United States); W. Zhou, The Univ. of Texas at Arlington (United States)

---

**SESSION 9 SUPERLATTICE/QUANTUM DETECTORS III**

---

- 7222 0W **Background limited performance of long wavelength infrared focal plane arrays fabricated from M-structure InAs/GaSb superlattices (Invited Paper)** [7222-29]  
P.-Y. Delaunay, B. M. Nguyen, D. Hoffman, E. K. Huang, P. Manurkar, S. Bogdanov, M. Razeghi, Northwestern Univ. (United States)
- 7222 0X **Designing phonons for active use in terahertz devices (Invited Paper)** [7222-30]  
H. C. Liu, C. Y. Song, Z. R. Wasilewski, J. A. Gupta, M. Buchanan, National Research Council Canada (Canada)
- 7222 0Y **Control of residual background carriers in undoped mid-infrared InAs/GaSb superlattices** [7222-31]  
H. J. Haugan, Air Force Research Lab. (United States); S. Elhamri, Univ. of Dayton (United States); W. C. Mitchel, Air Force Research Lab. (United States); B. Ullrich, Bowling Green State Univ. (United States); G. J. Brown, L. Grazulis, S. Houston, Air Force Research Lab. (United States)
- 7222 0Z **Inductively coupled plasma etching and processing techniques for type-II InAs/GaSb superlattices infrared detectors toward high fill factor focal plane arrays** [7222-32]  
E. K. Huang, B.-M. Nguyen, D. Hoffman, P.-Y. Delaunay, M. Razeghi, Northwestern Univ. (United States)

---

**SESSION 10 SUPERLATTICE/QUANTUM DETECTORS IV**

---

- 7222 10 **A review of UV detectors for astrophysics: past, present, and future (Invited Paper)** [7222-34]  
M. P. Ulmer, Northwestern Univ. (United States)
- 7222 11 **Self-consistent electronic structure method for broken-gap superlattices (Invited Paper)** [7222-41]  
T. Andlauer, T. Zibold, P. Vogl, Walter Schottky Institut, Technische univ. München (Germany)
- 7222 12 **Pulsed metalorganic chemical vapor deposition of high quality AlN/GaN superlattices for intersubband transitions** [7222-35]  
C. Bayram, B. Fain, N. Péré-Laperne, R. McClintock, M. Razeghi, Northwestern Univ. (United States)

---

**SESSION 11 SUPERLATTICE/QUANTUM DETECTORS V**

---

- 7222 14 **GaN-based nanostructured photodetectors** [7222-38]  
J. L. Pau, C. Bayram, P. Giedraitis, R. McClintock, M. Razeghi, Northwestern Univ. (United States)
- 7222 15 **The importance of band alignment in VLWIR type-II InAs/GaSb heterodiodes containing the M-structure barrier** [7222-39]  
D. Hoffman, B.-M. Nguyen, E. K. Huang, P.-Y. Delaunay, S. Bogdanov, P. Manurkar, M. Razeghi, Northwestern Univ. (United States); V. Nathan, Air Force Research Lab. (United States)
- 7222 16 **A monolithically integrated multi-spectral polarimetric quantum dot infrared photodetector** [7222-40]  
J. Vaillancourt, X. Lu, Univ. of Massachusetts Lowell (United States)

---

**SESSION 12 NANOPHOTONIC DEVICES I**

---

- 7222 18 **Mid/far-infrared semiconductor devices exploiting plasmonic effects (Invited Paper)** [7222-43]  
R. Colombelli, Y. Chassagneux, A. Bousseksou, V. Moreau, Institut d'Electronique Fondamentale, Univ. Paris Sud, CNRS (France); S. Barbieri, C. Sirtori, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris-VII, CNRS (France); G. Patriarche, G. Beaudoin, I. Sagnes, Lab. de Photonique et de Nanostructures, CNRS (France); H. E. Beere, D. A. Ritchie, Cavendish Lab., Univ. of Cambridge (United Kingdom)
- 7222 19 **Potential of semiconductor nanowires for single photon sources (Invited Paper)** [7222-46]  
J.-C. Harmand, L. Liu, G. Patriarche, M. Tchernycheva, Lab. de Photonique et de Nanostructures, CNRS (France); N. Akopian, U. Perinetti, V. Zwiller, Kavli Institute of Nanoscience, Delft Univ. of Technology (Netherlands)

---

**SESSION 13 NANOPHOTONIC DEVICES II**

---

- 7222 1A **Optical Lévy flights and super diffusion of light (Invited Paper)** [7222-47]  
D. Wiersma, P. Barthelemy, J. Bertolotti, European Lab. for Non-linear Spectroscopy, Univ. of Florence (Italy)
- 7222 1B **Electron beam projection nanopatterning using crystal lattice images obtained from high resolution transmission electron microscopy (Invited Paper)** [7222-49]  
H.-S. Lee, B.-S. Kim, H.-M. Kim, J.-S. Wi, S.-W. Nam, K.-B. Jin, K.-B. Kim, Seoul National Univ. (Korea, Republic of); Y. Arai, JEOL Ltd. (Japan)
- 7222 1C **A nanophotonic sensor for large electric current measurements** [7222-45]  
A. K. Ghosh, D. P. Arora, P. Verma, R. C. Huck, J. Fagan, Univ. of Oklahoma (United States)

---

**SESSION 14 SINGLE PHOTON DETECTORS/SOURCES I**

---

- 7222 1D **InGaAs communication photodiodes: from low to high power level designs (Invited Paper)** [7222-50]  
M. Achouche, Alcatel-Thales III-V Lab. (France)
- 7222 1E **Development of single photon counting sensors operating at short wavelength infrared wavelengths (Invited Paper)** [7222-51]  
J. Boisvert, R. Sudharsanan, P. Yuan, T. Isshiki, P. McDonald, Spectrolab, Inc. (United States)
- 7222 1G **InGaAs/InP single-photon avalanche diodes show low dark counts and require moderate cooling** [7222-53]  
A. Tosi, A. Dalla Mora, F. Zappa, S. Cova, Politecnico di Milano (Italy); M. A. Itzler, X. Jiang, Princeton Lightwave, Inc. (United States)
- 7222 1H **SPAD detection head with 32 fully parallel channels for time-tagging single-photons at 3μs** [7222-58]  
S. Tisa, Micro Photon Devices (Italy); F. Guerrieri, F. Zappa, Politecnico di Milano (Italy)

---

**SESSION 15 SINGLE PHOTON DETECTORS/SOURCES II**

---

- 7222 1I **Single photon sources using InAs/InP quantum dots (Invited Paper)** [7222-54]  
R. Hostein, N. Gogneau, A. Michon, L. Le Gratiet, E. Cambril, G. Beaudoin, G. Patriarche, I. Robert-Phillip, J. Y. Marzin, A. Beveratos, I. Sagnes, Lab. of Photonics and Nanostructures, CNRS (France)
- 7222 1J **A semiconductor ridge micro cavity to generate counterpropagating twin photons (Invited Paper)** [7222-55]  
X. Caillet, V. Berger, G. Leo, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris-VII, CNRS (France); I. Sagnes, Lab. de Photonique et Nanostructures, CNRS (France); S. Ducci, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris-VII, CNRS (France)
- 7222 1K **InP-based negative feedback avalanche diodes** [7222-56]  
M. A. Itzler, X. Jiang, B. Nyman, K. Slomkowski, Princeton Lightwave, Inc. (United States)
- 7222 1L **GHz-rate single-photon-sensitive linear-mode APD receivers** [7222-57]  
G. M. Williams, Voxtel Inc. (United States)

Author Index

# Conference Committee

## Symposium Chair

**James G. Grote**, Air Force Research Laboratory (United States)

## Symposium Cochair

**E. Fred Schubert**, Rensselaer Polytechnic Institute (United States)

## Conference Chair

**Manijeh Razeghi**, Northwestern University (United States)

## Conference Cochairs

**Rengarajan Sudharsanan**, Spectrolab, Inc. (United States)

**Gail J. Brown**, Air Force Research Laboratory (United States)

## Program Committee

**Jagmohan Bajaj**, Teledyne Imaging Sensors (United States)

**Alexei N. Baranov**, Université Montpellier II (France)

**Matthew Grayson**, Northwestern University (United States)

**Sarath D. Gunapala**, Jet Propulsion Laboratory (United States)

**Jean-Pierre Huignard**, Thales Research & Technology (France)

**Mark A. Itzler**, Princeton Lightwave, Inc. (United States)

**Christopher Jelen**, Northrop Grumman Corporation (United States)

**Christine A. Jhabvala**, NASA Goddard Space Flight Center (United States)

**Armin Lambrecht**, Fraunhofer-Institut für Physik Messtechnik (Germany)

**Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China)

**Chang Liu**, Northwestern University (United States)

**Ryan P. McClintock**, Northwestern University (United States)

**Jerry R. Meyer**, Naval Research Laboratory (United States)

**Konstantin D. Moiseev**, A.F. Ioffe Physico-Technical Institute (Russian Federation)

**Vaidya Nathan**, Air Force Research Laboratory (United States)

**Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate (United States)

**Abderrahim Ramdane**, Centre National de la Recherche Scientifique (France)

**Robert R. Rice**, Northrop Grumman Space Technology (United States)

**Antoni Rogalski**, Wojskowa Akademia Techniczna (Poland)

**Gaetano Scamarcio**, Università degli Studi di Bari (Italy)

**Donald J. Silversmith**, Air Force Office of Scientific Research (United States)  
**Steven Slivken**, Northwestern University (United States)  
**Marija Strojnik**, Centro de Investigaciones en Óptica, A.C. (Mexico)  
**Ferechteh Hosseini Teherani**, Nanovation SARL (France)  
**Meimei Z. Tidrow**, Missile Defense Agency (United States)  
**Michael Wraback**, Army Research Laboratory (United States)

Session Chairs

- 1 Quantum Cascade Lasers and Applications I  
**Manijeh Razeghi**, Northwestern University (United States)  
**Marija Strojnik**, Centro de Investigaciones en Óptica, A.C. (Mexico)
- 2 Quantum Cascade Lasers and Applications II  
**Jerry R. Meyer**, Naval Research Laboratory (United States)  
**Robert R. Rice**, Northrop Grumman Space Technology (United States)
- 3 Quantum Cascade Lasers and Applications III  
**Armin Lambrecht**, Fraunhofer-Institut für Physik Messtechnik (Germany)  
**Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China)
- 4 Quantum Cascade Lasers and Applications IV  
**Jean-Pierre Huignard**, Thales Research & Technology (France)  
**Chang Liu**, Northwestern University (United States)
- 5 Quantum Cascade Lasers and Applications V  
**Gaetano Scamarcio**, Università degli Studi di Bari (Italy)  
**Christopher Jelen**, Northrop Grumman Electronic Systems (United States)
- 6 Quantum Cascade Lasers and Applications VI  
**Donald J. Silversmith**, Air Force Office of Scientific Research (United States)  
**Konstantin D. Moiseev**, A.F. Ioffe Physico-Technical Institute (Russian Federation)
- 7 Superlattice/Quantum Detectors I  
**Gail J. Brown**, Air Force Research Laboratory (United States)  
**Jagmohan Bajaj**, Teledyne Imaging Sensors (United States)
- 8 Superlattice/Quantum Detectors II  
**Sarath D. Gunapala**, Jet Propulsion Laboratory (United States)  
**Ryan P. McClintock**, Northwestern University (United States)

- 9 Superlattice/Quantum Detectors III  
**Meimei Z. Tidrow**, Missile Defense Agency (United States)  
**Steven Slivken**, Northwestern University (United States)
- 10 Superlattice/Quantum Detectors IV  
**Antoni Rogalski**, Wojskowa Akademia Techniczna (Poland)  
**Michael Wraback**, Army Research Laboratory (United States)
- 11 Superlattice/Quantum Detectors V  
**Vaidya Nathan**, Air Force Research Laboratory (United States)  
**Christine A. Jhabvala**, NASA Goddard Space Flight Center (United States)
- 12 Nanophotonic Devices I  
**Alexei N. Baranov**, Université Montpellier II (France)  
**Ferechteh Hosseini Teherani**, Nanovation SARL (France)
- 13 Nanophotonic Devices II  
**Abderrahim Ramdane**, Centre National de la Recherche Scientifique (France)  
**Matthew Grayson**, Northwestern University (United States)
- 14 Single Photon Detectors/Sources I  
**Mark A. Itzler**, Princeton Lightwave, Inc. (United States)  
**Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate (United States)
- 15 Single Photon Detectors/Sources II  
**Rengarajan Sudharsanan**, Spectrolab, Inc. (United States)  
**Gail J. Brown**, Air Force Research Laboratory (United States)