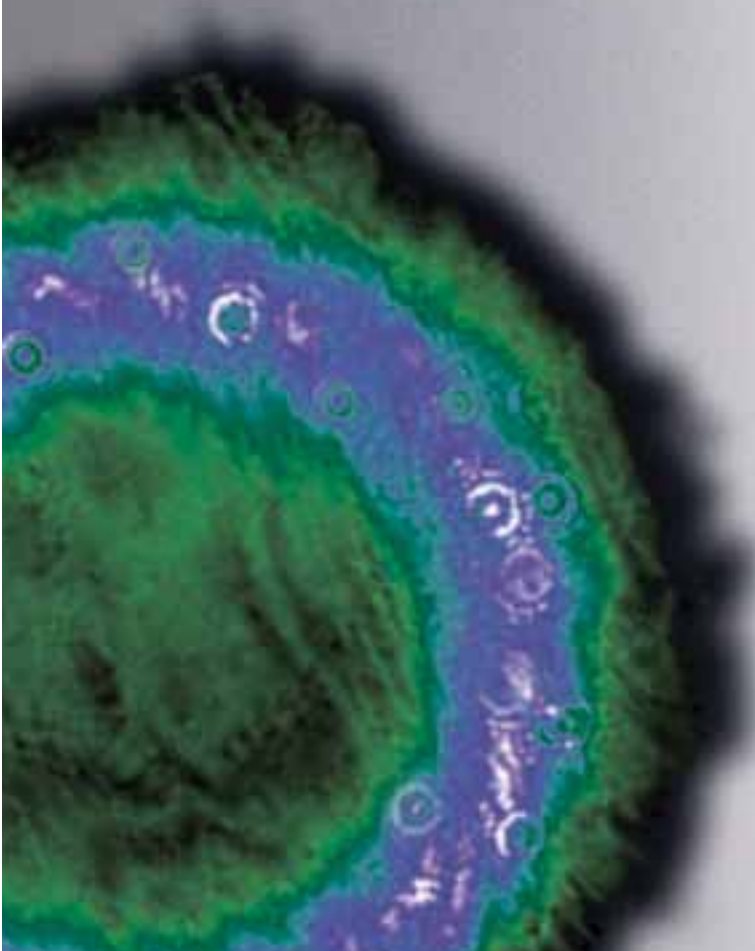


Technical Program

**SPIE**  
**Great Lakes**  
**Photonics Symposium**

*12–16 June 2006 Dayton Convention Center • Dayton, Ohio USA*



# Technical Program

## SPIE Great Lakes Photonics Symposium

12–16 June 2006 Dayton Convention Center • Dayton, Ohio USA

*2006 Symposium Chair*



**James G. Grote,**  
Air Force Research Lab.

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## Executive Committee

**Erik P. Blasch**, Air Force Research Lab.  
**Gary C. Catella**, Cleveland Crystals Inc.  
**Darnell E. Diggs**, Air Force Research Lab.  
**Larry R. Dosser**, Mound Laser & Photonics Ctr., Inc.  
**Michael T. Eismann**, Air Force Research Lab.  
**David G. Fischer**, NASA Glenn Research Ctr.  
**Joseph W. Haus**, Univ. of Dayton  
**Frank K. Hopkins**, Air Force Research Lab.  
**Oleg D. Lavrentovich**, Kent State Univ.

**Thomas R. Nelson, Jr.**, Air Force Research Lab.  
**Mark E. Oxley**, Air Force Institute of Technology  
**Peter Palffy-Muhoray**, Kent State Univ.  
**Stanley Rogers**, Air Force Research Lab.  
**Andrew M. Rollins**, Case Western Reserve Univ.  
**Andrew M. Sarangan**, Univ. of Dayton  
**Gunasekaran Seetharaman**, Air Force Institute of Technology  
**Ivan I. Smalyukh**, Kent State Univ.  
**Bahman Taheri**, AlphaMicron, Inc.

## Plenaries

**Tuesday, 13 June • 8:00 am to 12:00 pm**

### Plenary Session • Conv. Ctr. Theater

*Chair: James G. Grote*, Air Force Research Lab.

**8:00 am**



**Photonics research at NASA Glenn**, Woodrow Whitlow, Jr., NASA Glenn Research Ctr.

**9:30 am**



**Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, Richard Rosen, Battelle Memorial Institute

**11:30 am**

**Photo Not Available**

**Nonlinear materials for infrared nonlinear optics**, Gopal C. Bhar, Vivekananda Univ. (India)

**8:30 am**



**Magnetic properties of natural and modified DNA**, Jung-II Jin, Korea Univ. (South Korea)

**10:30 am**



**Interference, coherence, and polarization**, Emil Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida

**9:00 am**



**Soft matter for photonics (in ML): toward future aerospace technologies.**, Timothy J. Bunning, Air Force Research Lab.

**11:00 am**



**Nanostructured liquid crystals for photonic applications**, Hiroshi Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan)

# Special Events

## Great Lakes SPIE Regional Chapter Meeting

Conv. Ctr. Room 305

Monday 12 June, 6:00 to 7:30 pm

## Student Lunch with the Experts

Tuesday 13 June, 12:00 to 1:00 pm

Meet distinguished professionals in your field in a fun, informal setting. Make connections with experts, get a perspective on the industry, and ask those burning career questions. This lunch is sponsored by SPIE Student Services. A student lunch ticket is required, but lunch is complimentary. Space is limited, so please be prompt.

*Special Guest*

**Professor Emil Wolf**, Univ. of Rochester

## Posters

3rd Floor Balcony

Tuesday 13 June, 5:30 to 6:30 pm

Conference attendees are invited to attend the poster session Tuesday evening, 5:30 to 6:30 pm. Presenters of poster papers will be present to answer questions concerning their presentations. Poster presenters, see page 24 for setup instructions.

## Banquet

Wednesday 14 June, 5:30 pm

Open to attendees who RSVP'd by the preregistration date.

Additional banquet information available at Registration.

Before the banquet attendees will have ample time to explore the Dayton Ohio area. Below are a few options to consider.

Museum of the United States Air Force (Admission is Free)  
<http://www.wpafb.af.mil/museum/>

Carillon Park (Home of the 1905 Wright Flyer)  
<http://www.carillonpark.org/index.html>

Dayton Art Institute <http://www.daytonartinstitute.org/>

Packard Museum <http://www.americaspackardmuseum.org/>

Dayton Dragons Baseball <http://www.daytondragons.com/>

## Workshop: Fostering Entrepreneurship

Conv. Ctr. Room 304

Thursday 15 June, 3:30 to 6:00 pm

*Chair: Edward A. Watson*, Air Force Research Lab.

Optics technology is key to a wide variety of products, both commercial and military, and is likely to continue to expand in importance and application since it offers low-cost solutions to many problems. The optics industry has a history of technology development and production by small businesses. This session will provide a forum for discussion on many aspects of transitioning technology from the research stage to production, including starting and operating a small business.

Invited speakers include

- **Dr. G. Michael Morris**, founder and CEO of Apollo Optics and founder of Rochester Photonics Corporation. Dr. Morris is also a recent past president of the Optical Society of America and former Professor of Optics at the University of Rochester. He will speak from practical experience on how to transition university research into active companies.
- **Ms. Barbara Hyde**, President of the Entrepreneurs Center, Dayton, OH. Ms. Hyde will speak on practical implementations and pitfalls for small businesses, and the resources available to mitigate entrepreneurship failures.
- University of Dayton School for Entrepreneurship will describe educational resources available and the means to enhance technical educations with business knowledge.

These presentations are followed by an interactive question and answer session.

## Career Workshop

Conv. Ctr. Room 305

Thursday 15 June, 6:00 to 7:00pm

*Organized and sponsored by the Great Lakes SPIE Regional Chapter*

The workshop includes presentations on "Conducting a Successful Job Search" and "Curriculum Vitae Writing", as well as an informal discussion. It is of special interest for young professionals such as students and postdoctoral researchers.



*Thanks to Science Applications International Corp. (SAIC)  
for their generous support of the Air Force  
Museum Banquet Speaker*

# Conference/Course Daily Overview

Monday 12 June	Tuesday 13 June	Wednesday 14 June	Thursday 15 June	Friday 16 June
<b>Conferences</b>				
	<b>Plenary Sessions</b> p.3 GL101 <b>Laser Sources and Enabling Materials</b> <i>(Hopkins, Catella)</i> p.6 GL102 <b>Aerospace Applications</b> <i>(Lei, Grote)</i> p.8			
			GL104 <b>Sensor-ATR Exploitation</b> <i>(Blasch, Eismann, Oxley, Seetharaman)</i> p.10	
GL105 <b>Biophotonics and DNA Photonics</b> <i>(Diggs, Fischer, Rollins)</i> p.11				
	GL106 <b>Emerging Photonics Technologies</b> <i>(Nelson)</i> p.13			
			GL107 <b>High Peak Power and Average Power Lasers</b> <i>(Haus, Stutz)</i> p.15	
	GL108 <b>Nano- and Microphotonics: Materials, Devices, Processing, and Applications</b> <i>(Rogers, Sarangan, Dosser)</i> p.17			
GL109 <b>Liquid Crystal Technology and Applications</b> <i>(Lavrentovich, Palfy-Muhoray, Smalyukh, Taheri)</i> p.19				
				GL110 <b>Quantum Optics, Advance Spectroscopy, and Terahertz Technology</b> <i>(Haus, Stutz)</i> p.23
<b>Courses</b>				
		SC791 <b>A Practical Course in Neural Networks</b> <i>(Priddy)</i> 8:30 am to 12:30 pm, \$260 / \$300	SC790 <b>Liquid Crystals: From Fundamentals to Applications</b> <i>(Smalyukh)</i> 1:30 to 5:30 pm, \$220 / \$260	
SC068 <b>Use of CCD and CMOS Sensors in Visible Imaging Applications</b> <i>(Lomheim)</i> 8:30 am to 12:30 pm, \$220 / \$260				
SC194 <b>Multispectral and Hyperspectral Image Sensors</b> <i>(Lomheim)</i> 1:30 to 5:30 pm, \$220 / \$260				
SC647 <b>Nanophotonics: Design, Fabrication and Characterization</b> <i>(Haus, Sarangan, Zhan)</i> 8:30 am to 12:30 pm, \$220 / \$260				
<b>Exhibition</b> 13 June, Tuesday      14 June, Wednesday 10:00 am to 4:00 pm      10:00 am to 1:30 pm				

# Conference GL101 • Conv. Ctr. Room 302

Tuesday-Wednesday 13-14 June 2006

## Laser Sources and Enabling Materials

Conference Chairs: **F. Kenneth Hopkins**, Air Force Research Lab.; **Gary C. Catella**, Cleveland Crystals Inc.

Program Committee: **Robert C. Eckardt**, Cleveland Crystals Inc.; **Kenton A. Green**, Northrop Grumman Corp.; **Chris N. Pannell**, Optronic Labs., Inc.; **Kenneth L. Schepler**, Air Force Research Lab.

### Monday 12 June

**Joint Session with Conference GL109:  
Liquid Crystal Technology and Applications and  
GL107: High Peak Power and Average Power Lasers**

#### Novel Lasing Media

Chair: **Bahman Taheri**, AlphaMicron, Inc.

Conv. Ctr. Rm 305 ..... Mon. 8:20 to 10:00 am

8:20 am: **Lasing in polymer dispersed liquid crystals and liquid crystal infiltrated random media** (*Invited Paper*), D. S. Wiersma, S. Gottardo, S. Cavaleri, S. Mujumdar, European Lab. for Non-linear Spectroscopy (Italy) ..... [GL109-53]

8:50 am: **Light controllable structural changes and tuning of lasing in chiral liquid crystals** (*Invited Paper*), P. V. Shibaev, L. R. Sanford, P. Rivera, Fordham Univ.; V. A. Belyakov, L.D. Landau Institute for Theoretical Physics ..... [GL109-43]

9:20 am: **Photonic crystal lasers from holographic polymer dispersed liquid crystals (H-PDLCs)**, R. Jakubiak, Air Force Research Lab.; V. P. Tondiglia, L. V. Natarajan, R. L. Sutherland, Science Applications International Corp.; P. F. Lloyd, UES, Inc.; R. A. Vaia, T. J. Bunning, Air Force Research Lab. .... [GL109-05]

9:40 am: **Random lasing in multidomain cholesteric liquid crystals**, M. F. Moreira, M. Gu, O. D. Lavrentovich, B. Taheri, P. Palffy-Muhoray, Kent State Univ. .... [GL109-52]

### Tuesday 13 June

#### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

#### Plenary Session

Chair: **James G. Grote**, Air Force Research Lab.

8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]

9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]

9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]

11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

### SESSION 1

Conv. Ctr. Room 302 ..... Tues. 1:30 to 3:20 pm

#### Nonlinear Optical Conversion

Chair: **Kenton A. Green**, Northrop Grumman Corp.

1:30 pm: **Birefringent and QPM materials for NLO mid-IR frequency conversion** (*Invited Paper*), P. G. Schunemann, BAE Systems North America ..... [GL101-11]

2:00 pm: **Quasi-phaseshifted nonlinear optical materials for mid-infrared light generation**, G. S. Kanner, M. L. Marable, S. P. Kelley, K. A. Green, Northrop Grumman Corp.; K. L. Schepler, Air Force Research Lab. .... [GL101-12]

2:20 pm: **Optical characterization of orientation-patterned GaAs**, J. Meyer, Air Force Institute of Technology; R. D. Peterson, K. L. Schepler, Air Force Research Lab.; G. S. Kanner, M. L. Marable, Northrop Grumman Corp. .... [GL101-04]

2:40 pm: **Report on the reliability of a frequency-doubled external cavity semiconductor laser with an emission wavelength of 488 nm**, J. D. Evans, D. Burbidge, S. Wallace, C. J. Miner, Picarro Canada, Inc. (Canada) ..... [GL101-06]

3:00 pm: **Materials challenges for photon entanglement**, D. E. Zelmon, Air Force Research Lab. .... [GL101-13]

Coffee Break ..... 3:20 to 3:40 pm

### SESSION 2

Conv. Ctr. Room 302 ..... Tues. 3:40 to 6:10 pm

#### Materials for Nonlinear Infrared Fibers

Chair: **Kenneth L. Schepler**, Air Force Research Lab.

3:40 pm: **Laser diode based supercontinuum in mid-infrared fibers** (*Invited Paper*), M. N. Islam, Univ. of Michigan ..... [GL101-14]

4:10 pm: **Light-induced effects on AsxS1-x glasses examined in Raman scattering**, J. T. Goldstein, Air Force Research Lab.; P. Boolchand, Univ. of Cincinnati ..... [GL101-15]

4:30 pm: **Infrared continuum generation in multimaterial fibers**, Y. Fink, Massachusetts Institute of Technology ..... [GL101-16]

4:50 pm: **Chalcogenide glasses for infrared nonlinear optical fibers**, J. S. Sanghera, L. B. Shaw, I. D. Aggarwal, Naval Research Lab. .... [GL101-17]

5:10 pm: **Comparison of response of different oxysulfide and chalcogenide glasses to IR femtosecond laser exposure**, N. Carlie, L. C. Petit, Clemson Univ.; M. C. Richardson, T. Anderson, J. Choi, College of Optics and Photonics/Univ. of Central Florida; C. Maurel, T. Cardinal, P. Vinatier, Univ. Bordeaux 1 and Ctr. National de la Recherche Scientifique (France); M. Couzi, Univ. Bordeaux 1 (France) and Ctr. National de la Recherche Scientifique ..... [GL101-23]

5:30 pm: **Photo-induced processes in chalcogenide glass films: fundamentals and applications**, A. Ganjoo, A. Kovalskiy, H. Jain, Lehigh Univ. .... [GL101-24]

5:50 pm: **Photo-induced nanosecond and sub-nanosecond relaxation in As-Se chalcogenide glasses**, H. Najafov, I. Biaggio, H. Jain, Lehigh Univ. .... [GL101-25]

✓ **Poster-Tuesday**

Poster authors will begin displaying posters after 12:00 pm Tuesday. A poster session, with authors present at their posters, will be held Tuesday evening from 5:30 to 6:30 pm. Poster presenters, see page 24 for setup instructions.

- ✓ **Superresolution enhancement and restoration of a single image from blurred image sequence**, Z. Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate School of the Chinese Academy of Sciences (China); G. Jin, Q. Li, X. W. Sun, Changchun Institute of Optics, Fine Mechanics and Physics (China) ..... [GL101-01]

**Wednesday 14 June****SESSION 3**

**Conv. Ctr. Room 302 ..... Wed. 8:00 to 10:20 am**

**Enabling Technology for Solid State Lasers**

*Chair: Robert C. Eckardt, Cleveland Crystals Inc.*

8:00 am: **Acoustic ringing effects in Pockels cells**, G. C. Catella, Cleveland Crystals Inc. .... [GL101-07]

8:20 am: **Mixed Nd:Y1-xGdxVO4 crystals and their laser properties**, N. C. Fernelius, Air Force Research Lab.; X. Wang, Y. Tang, S. Tang, Crystal Research, Inc. .... [GL101-10]

8:40 am: **Spectroscopic study and observed laser amplification in Nd:PLZT**, F. Zhou, Y. Huang, Indiana Univ. of Pennsylvania; K. K. Li, Q. Chen, Y. K. Zou, H. Jiang, Boston Applied Technologies Inc. .... [GL101-05]

9:00 am: **Infrared Q-switch materials**, T. E. Stenger, Cleveland Crystals Inc. .... [GL101-08]

9:20 am: **Achromatic waveplates for the mid-infrared**, J. D. Beasley, Cleveland Crystals Inc. .... [GL101-18]

9:40 am: **An optimized structure for InGaAlAs spot-size converted lasers for direct fiber coupling fabricated without overgrowth**, D. J. Klotzkin, Univ. of Cincinnati; J. Huang, H. Lu, T. Nguyen, T. Pinnington, C. Tsai, Ortel-A Division of EMCORE Corp. .... [GL101-21]

10:00 am: **A materials perspective on enabling solid state laser sources**, F. K. Hopkins, Air Force Research Lab. .... [GL101-26]

Coffee Break ..... 10:20 to 10:40 am

**SESSION 4**

**Conv. Ctr. Room 302 ..... Wed. 10:40 am to 12:30 pm**

**Modeling and Characterization**

*Chair: Rita D. Peterson, U.S. Air Force*

10:40 am: **Infrared generation by nonlinear optical techniques (*Invited Paper*)**, G. C. Bhar, Vivekananda Univ. (India) .... [GL101-19]

11:10 am: **Numerical analysis of OPO pulse compression**, R. C. Eckardt, Cleveland Crystals Inc. .... [GL101-09]

11:30 am: **Acousto-optic tunable filters for hyperspectral imaging applications: materials and design challenges**, C. N. Pannell, Optronics Labs., Inc. .... [GL101-20]

11:50 am: **Characterization of temperature-dependent index of refraction and thermo-optic coefficient in infrared materials**, C. J. DiRocco, Univ. of Dayton; G. D. Gillen, S. Guha, Air Force Research Lab.; P. E. Powers, Univ. of Dayton ..... [GL101-03]

12:10 pm: **Stability analysis of an organic polymer optical multistable lasing device**, J. Feng, Guangdong Industrial Univ. (China) ..... [GL101-02]



# Conference GL102 • Conv. Ctr. Room 303

Tuesday-Thursday 13-15 June 2006

## Aerospace Applications

Conference Chairs: **Jih-Fen Lei**, NASA Glenn Research Ctr.; **James G. Grote**, Air Force Research Lab.

Program Committee: **George Y. Baaklini**, NASA Glenn Research Ctr.; **Roshanak Hakimzadeh**, NASA Glenn Research Ctr.; **Felix A. Miranda**, NASA Glenn Research Ctr.; **Gregory A. Zimmerli**, NASA Glenn Research Ctr.

### Monday 12 June

#### Joint Session with Conference GL109: Liquid Crystal Applications and Technologies

#### Flexible Liquid Crystal Devices for Aerospace, Automotive, and Other Applications

Chair: **Peter Palffy-Muhoray**, Kent State Univ.

Conv. Ctr. Rm. 305 ..... Mon. 10:20 am to 12:30 pm

10:20 am: **Flexible displays** (*Invited Paper*), J. L. West, Kent State Univ. .... [GL109-73]

10:50 am: **Ferroelectric liquid crystal polymer-dispersion technologies for flexible displays** (*Invited Paper*), H. Fujikake, H. Sato, T. Murashige, Japan Broadcasting Corp. (Japan) ..... [GL109-28]

11:20 am: **A review of advances in flexible cholesteric LCDs** (*Invited Paper*), A. A. Khan, I. Shiyonovskaya, E. N. Montbach, D. Davis, T. L. Schneider, F. Nicholson, N. Miller, D. W. Marhefka, T. Ernst, J. W. Doane, Kent Displays, Inc. .... [GL109-56]

11:50 am: **Liquid crystal digital mirror and discomfort glare reduction**, Y. Borenstein, AlphaMirror ..... [GL109-54]

12:10 pm: **High-performance active liquid crystalline shutters for stereo computer graphics and other 3D technologies**, V. Sergan, T. Sergan, California State Univ./Sacramento; B. MacNaughton, MacNaughton Inc. .... [GL109-63]

### Tuesday 13 June

#### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

#### Plenary Session

Chair: **James G. Grote**, Air Force Research Lab.

8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]

9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]

9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]

11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

#### Joint Session with Conference GL105: Biophotonics and DNA Photonics

#### DNA and Biopolymer Photonics II

Chair: **Daniel P. Campbell**, Georgia Tech Research Institute

Conv. Ctr. Rm. 303 ..... Tues. 1:30 to 3:00 pm

1:30 pm: **Nano and microsystems technology development for army applications** (*Invited Paper*), P. B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. .... [GL105-26]

2:00 pm: **UV lithography of biological substrates**, A. Sharma, Alabama A&M Univ. .... [GL105-27]

2:20 pm: **Electroluminescence from organic light-emitting diodes using deoxyribonucleic acid as an electron blocking layer**, J. A. Hagen, A. J. Steckl, Univ. of Cincinnati; J. G. Grote, Air Force Research Lab. .. [GL105-13]

2:40 pm: **Optical properties of lumophore-doped DNA thin films**, Z. Yu, J. A. Hagen, A. J. Steckl, Univ. of Cincinnati; J. G. Grote, Air Force Research Lab. .... [GL105-14]

#### ✓ Posters-Tuesday

Poster authors will begin displaying posters after 12:00 pm Tuesday. A poster session, with authors present at their posters, will be held Tuesday evening from 5:30 to 6:30 pm. Poster presenters, see page 24 for setup instructions.

✓ **An electro-optical fluid level sensor system**, W. A. Webb, M. A. Mentzer, Strube, Inc. .... [GL102-31]

### Wednesday 14 June

#### SESSION 1

Conv. Ctr. Room 303 ..... Wed. 8:30 to 10:10 am

#### Aerospace Applications

Chair: **Gregory A. Zimmerli**, NASA Glenn Research Ctr.

8:30 am: **Design of efficient filters for full-color displays**, R. R. Willey, Willey Optical, Consultants ..... [GL102-03]

8:50 am: **On the feasibility of a foliage-penetrating laser**, B. D. Rigling, D. Brown, J. Dowd, A. Halley, S. Stevens, B. Wirick, Wright State Univ. .... [GL102-01]

9:10 am: **Compact optical sensors for particulate detection and characterization**, P. S. Greenberg, NASA Glenn Research Ctr. ... [GL102-32]

9:30 am: **Considerations for aircraft orientation measurement from ground feature edges using an airborne laser scanner**, J. Dickman, Ohio Univ. .... [GL102-08]

9:50 am: **Intravital PIV of blood flow as a function of microvessel generational branching**, T. McKay, M. Vickerman, M. P. Wernet, K. Radhakrishnan, J. G. Myers, Jr., P. A. Parsons-Wingerter, NASA Glenn Research Ctr. .... [GL102-33]

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



## SESSION 2

Conv. Ctr. Room 303 ..... Wed. 10:40 to 11:40 am

## Photovoltaics

*Chairs: Roshanak Hakimzadeh, NASA Glenn Research Ctr.;  
John Dickman, NASA Glenn Research Ctr.*

- 10:40 am: **Photovoltaic technologies options and implementation**, A. Rockett, Univ. of Illinois at Urbana-Champaign ..... [GL102-21]  
 11:00 am: **Nanomaterials for poly PV**, R. P. Raffaele, B. Landi, Rochester Institute of Technology ..... [GL102-25]  
 11:20 am: **Scanning tunneling optical resonance microscopy**, D. P. Byrnes, Rochester Institute of Technology; S. G. Bailey, P. Tin, D. S. Wolford, NASA Glenn Research Ctr.; R. P. Raffaele, Rochester Institute of Technology ..... [GL102-23]

Thursday 15 June

## SESSION 3

Conv. Ctr. Room 303 ..... Thurs. 8:30 am to 12:00 pm

## Optical Instrumentation

*Chair: George Y. Baaklini, NASA Glenn Research Ctr.*

- 8:30 am: **Moving designs from the electron to the photon**, K. H. Applebaum, Champion Optical Technology Services ..... [GL102-05]  
 8:50 am: **Dynamic light scattering in turbulent flow**, G. A. Zimmerli, NASA Glenn Research Ctr. .... [GL102-24]  
 9:10 am: **Fiber optic low-coherence interferometry for in situ and ex situ dimensional metrology of machined parts**, W. J. Walecki, M. Santos II, A. Pravdivtsev, J. Ryu, T. Azfar, A. Koo, Frontier Semiconductor Inc. .... [GL102-101]  
 9:30 am: **Morphology dependent resonances in microspheres over extended range of wavelengths**, G. Adamovsky, J. R. Juergens, J. Wagner, NASA Glenn Research Ctr.; B. Floyd, Sierra-Lobo, Inc. .... [GL102-12]  
 9:50 am: **Using microelectromechanical system technology to develop a miniature hyperspectral imaging module**, D. Zander, Infotonics Technology Ctr. .... [GL102-13]  
 Coffee Break ..... 10:10 to 10:40 am  
 10:40 am: **Optical analysis of the emissive plume structure during pulsed laser deposition of YBCO**, C. Phelps, C. Druffner, Air Force Institute of Technology; R. R. Biggers, Air Force Research Lab.; G. P. Perram, Air Force Institute of Technology ..... [GL102-07]  
 11:00 am: **Rayleigh scattering diagnostic for measurement of temperature, velocity, and density fluctuations in turbulent flows**, A. F. Mielke, NASA Glenn Research Ctr.; K. A. Elam, Jacobs Sverdrup; C. Sung, Case Western Reserve University ..... [GL102-10]  
 11:20 am: **Health monitoring of coatings using embedded luminescent sensors**, T. J. Bencic, NASA Glenn Research Ctr. .... [GL102-14]  
 11:40 am: **Particle imaging velocimetry innovations for increased facility productivity**, M. P. Wernet, NASA Glenn Research Ctr. .... [GL102-15]  
 Lunch Break ..... 12:00 to 1:20 pm

## SESSION 4

Conv. Ctr. Room 303 ..... Thurs. 1:20 to 5:10 pm

## Optical Networking and Communications

*Chair: Félix A. Miranda, NASA Glenn Research Ctr.*

- 1:20 pm: **Liquid crystal-based beam steering technologies for NASA applications**, J. J. Pouch, NASA Glenn Research Center; H. Nguyen, F. A. Miranda, NASA Glenn Research Ctr.; P. J. Bos, O. D. Lavrentovich, X. Wang, O. P. Pishnyak, L. Kremenska, A. B. Golovin, Kent State Univ. .... [GL102-26]  
 1:40 pm: **Investigation of VCSEL and MSM Photodetectors with GHz Bandwidth for Data Transmission in Optical Interconnects**, R. N. Simons, NASA Glenn Research Ctr.; G. R. Savich, University of Rochester ..... [GL102-11]  
 2:00 pm: **Through clouds fractal ultrashort pulse laser communications**, M. Kavehrad, The Pennsylvania State Univ. .... [GL102-02]  
 2:20 pm: **Optical networking architecture systems for onboard an aircraft**, H. Nguyen, NASA Glenn Research Ctr.; M. Atiqzaman, J. J. Sluss, Jr., Univ. of Oklahoma; M. F. Alam, Lucent Technologies; H. H. Refai, Univ. of Oklahoma; B. D. Duncan, Univ. of Dayton ..... [GL102-18]  
 2:40 pm: **Applications of self-powered modulating retroreflectors**, K. S. Chun, N. Theofylaktos, NASA Glenn Research Ctr. .... [GL102-19]  
 Coffee Break ..... 3:00 to 3:30 pm  
 3:30 pm: **Airborne laser communications based on filterbank transceivers**, S. Lee, M. Kavehrad, The Pennsylvania State Univ. .... [GL102-04]  
 3:50 pm: **RF microphotronics for NASA space communications applications**, J. J. Pouch, H. Nguyen, R. Q. Lee, F. A. Miranda, NASA Glenn Research Ctr.; M. Hossein-Zadeh, California Institute of Technology; A. F. J. Levi, Univ. of Southern California; D. Cohen, NanoPrecision Products, Inc. .... [GL102-27]  
 4:10 pm: **Dual airborne laser scanner (DALs) aided inertial for aircraft navigation**, J. L. Campbell, M. Miller, Air Force Research Lab.; M. Uijt de Haag, A. Vadlamani, Ohio Univ. .... [GL102-06]  
 4:30 pm: **Highly dispersive photonic crystal fibers for true time delay beamforming**, M. Y. Chen, Omega Optics, Inc. .... [GL102-29]  
 4:50 pm: **Optical phased array antennas using coupled vertical cavity surface emitting lasers**, C. H. Mueller, Analex Corp.; R. G. Rojas, The Ohio State Univ.; J. A. Nessel, F. A. Miranda, NASA Glenn Research Ctr. .... [GL102-30]

Thursday 15 June 2006

# Sensor-ATR Exploitation

Conference Chairs: **Erik P. Blasch**, Air Force Research Lab.; **Michael T. Eismann**, Air Force Research Lab.; **Mark E. Oxley**, Air Force Institute of Technology; **Gunasekaran Seetharaman**, Air Force Institute of Technology

## Tuesday 13 June

### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

### Plenary Session

Chair: **James G. Grote**, Air Force Research Lab.

- 8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]
- 8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]
- 9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]
- 9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]
- Coffee Break ..... 10:00 to 10:30 am
- 10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]
- 11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]
- 11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

## Thursday 15 June

### SESSION 1

Conv. Ctr. Room 302 ..... Thurs. 8:30 to 10:10 am

### Imagery Exploitation for ATR

Chair: **Gunasekaran Seetharaman**, Air Force Institute of Technology

- 8:30 am: **Defective pixel correction and restoration in staring remote sensor focal plane arrays**, A. Ferro, L. A. Vettel, B. S. Everding, A. J. Merrelli, Ball Aerospace & Technologies Corp. .... [GL104-04]
- 8:50 am: **Multiband imagery of detonation fireballs for event classification**, B. J. Steward, T. Warren, K. Gross, G. P. Perram, Air Force Institute of Technology ..... [GL104-05]
- 9:10 am: **Virtual confocal microscopy**, P. M. Hanna, U.S. Air Force .... [GL104-17]
- 9:30 am: **Radar through the pipe imaging experimentation**, U. K. Majumder, Air Force Research Lab. .... [GL104-07]
- 9:50 am: **Real-time SAR image generation for Gotcha radar using SRC MAP processor**, U. K. Majumder, Air Force Research Lab. .... [GL104-15]
- Coffee Break ..... 10:10 to 10:40 am

### SESSION 2

Conv. Ctr. Room 302 ..... Thurs. 10:40 am to 12:20 pm

### Target Detection, Tracking, and Recognition

Chair: **Erik P. Blasch**, Air Force Research Lab.

- 10:40 am: **Using temporal history to constrain the search space for multitarget tracking in a non-real-time environment**, J. A. Grigsby, L. A. Vettel, M. L. McHale, Ball Aerospace & Technologies Corp. . [GL104-08]
- 11:00 am: **Efficient multitarget detection, tracking, and spectrum estimation from rotational spectrometer data**, R. W. Deming, S. D. Higbee, D. Dwyer, M. Welsler, L. I. Perlovsky, P. W. Pellegrini, Air Force Research Lab. .... [GL104-10]
- 11:20 am: **On finding range correspondences in HRR measurements and its application in target tracking and recognition**, S. Wu, Sarnoff Corp. and Wright State Univ.; L. Hong, Wright State Univ. .... [GL104-03]
- 11:40 am: **Nonlinear tracking evaluation using absolute and relative metrics**, E. P. Blasch, A. C. Rice, Air Force Research Lab. .... [GL104-12]
- 12:00 pm: **Staring mode airborne radar techniques to track and geolocate target for Gotcha radar**, U. K. Majumder, Air Force Research Lab. .... [GL104-16]
- Lunch Break ..... 12:20 to 1:40 pm

### SESSION 3

Conv. Ctr. Room 302 ..... Thurs. 1:40 to 3:00 pm

### Hyperspectral Exploitation for ATR

Chair: **Michael T. Eismann**, Air Force Research Lab.

- 1:40 pm: **Hyperspectral mid-infrared imagery of transient emissive events using chromotomography**, R. L. Bostick, G. P. Perram, Air Force Institute of Technology ..... [GL104-06]
- 2:00 pm: **Simulation of hyperspectral thermal IR imaging sensors**, U. Bernstein, Technology Service Corp.; S. C. Sawtelle, Air Force Research Lab.; W. E. Pereira, ThermoAnalytics, Inc.; Y. Kwan, Technology Service Corp.; D. M. Less, ThermoAnalytics, Inc ..... [GL104-14]
- 2:20 pm: **Target and change detection in hyperspectral imagery**, J. Meola, Univ. of Dayton ..... [GL104-11]
- 2:40 pm: **Hyperspectral change detection from airborne sensors**, M. T. Eismann, Air Force Research Lab.; R. C. Hardie, Univ. of Dayton [GL104-18]
- Coffee Break ..... 3:00 to 3:30 pm

### SESSION 4

Conv. Ctr. Room 302 ..... Thurs. 3:30 to 5:10 pm

### Fusion for Improved ATR Performance

Chair: **Mark E. Oxley**, Air Force Institute of Technology

- 3:30 pm: **EO/IR track and identification fusion**, E. P. Blasch, Air Force Research Lab.; B. Kahler, General Dynamics ..... [GL104-13]
- 3:50 pm: **A distributed sensor network for wide-area video surveillance**, G. Seetharaman, Air Force Institute of Technology; J. R. Morrison, Air Force Research Lab. .... [GL104-20]
- 4:10 pm: **An ensemble approach to information fusion for ATR**, C. Barbu, R. T. Iqbal, J. Peng, Tulane Univ. .... [GL104-21]
- 4:30 pm: **Quantifying the performance of multiple label-fused automatic target classification systems**, C. M. Schubert, Virginia Commonwealth Univ.; M. E. Oxley, Air Force Institute of Technology ..... [GL104-09]
- 4:50 pm: **The best operating point on a ROC for ATR systems**, M. E. Oxley, S. N. Thorsen, Air Force Institute of Technology ..... [GL104-19]

# Conference GL105 • Conv. Ctr. Room 303

Monday-Tuesday 12-13 June 2006

## Biophotonics and DNA Photonics

*Conference Chairs:* **Darnell E. Diggs**, Air Force Research Lab.; **David G. Fischer**, NASA Glenn Research Ctr.; **Andrew M. Rollins**, Case Western Reserve Univ.

*Program Committee:* **Daniel P. Campbell**, Georgia Tech Research Institute; **Maryann Fitzmaurice**; **Bruce H. Robinson**, Univ. of Washington; **Paul B. Ruffin**, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; **Kenneth D. Singer**, Case Western Reserve Univ.

### Monday 12 June

#### SESSION 1

Conv. Ctr. Room 303 ..... Mon. 8:40 to 10:00 am

#### DNA and Biopolymer Photonics I

*Chair:* **Paul B. Ruffin**, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.

8:40 am: **Investigating the interaction of nonlinear electro-optical chromophores with DNA (Invited Paper)**, B. H. Robinson, Univ. of Washington ..... [GL105-16]

9:10 am: **A novel capacitive test structure for characterization of electro-optic, bio-dielectric, and ferroelectric thin films (Invited Paper)**, G. Subramanyam, Univ. of Dayton ..... [GL105-17]

9:40 am: **Microwave dielectric properties of biopolymers**, C. M. Bartsch, Univ. of Dayton and Anteon Corp.; G. Subramanyam, Univ. of Dayton ..... [GL105-05]

Coffee Break ..... 10:00 to 10:20 am

#### SESSION 2

Conv. Ctr. Room 303 ..... Mon. 10:20 am to 12:00 pm

#### Biophotonics I

*Chair:* **Andrew M. Rollins**, Case Western Reserve Univ.

10:20 am: **Imaging system for creating 3D block face cryo-images of whole mice (Invited Paper)**, D. L. Wilson, D. Roy, Case Western Reserve Univ. .... [GL105-18]

10:50 am: **Multimodality imaging platform to characterize mechanical and physiological characteristics of ocular tissue (Invited Paper)**, R. X. Xu, A. Rana, B. Qiang, J. Liu, R. J. Lee, C. J. Roberts, The Ohio State Univ. .... [GL105-19]

11:20 am: **Comparison of three bioluminescent cameras utilizing two different electronic phantoms**, J. P. Molter, Case Western Reserve Univ.; S. Majewski, A. G. Weisenberger, C. Zorn, Thomas Jefferson National Accelerator Facility; J. Dale, Z. Lee, Case Western Reserve Univ. .... [GL105-02]

11:40 am: **Supercontinuum light sources with convex dispersion photonic crystal fiber for OCT application**, H. Wang, A. M. Rollins, Case Western Reserve Univ. .... [GL105-12]

Lunch Break ..... 12:00 to 1:00 pm

#### SESSION 3

Conv. Ctr. Room 303 ..... Mon. 1:00 to 3:10 pm

#### Biophotonics II

*Chair:* **David G. Fischer**, NASA Glenn Research Ctr.

1:00 pm: **Quantum dot tumor co-localization in optical spectroscopic-guided biopsy of tumors (Invited Paper)**, S. A. Toms, The Cleveland Clinic Foundation ..... [GL105-20]

1:30 pm: **The BioCD: high-speed optical assays with spinning-disk interferometry (Invited Paper)**, D. D. Nolte, Purdue Univ. .... [GL105-21]

2:00 pm: **Optode technology for monitoring (bio)chemicals in vitro and in vivo (Invited Paper)**, M. Gratzl, Case Western Reserve Univ. .... [GL105-22]

2:30 pm: **Diagnosis of breast cancer using multimodal spectroscopy**, Z. Volynskaya, A. S. Haka, Massachusetts Institute of Technology; M. Fitzmaurice, R. Shenk, N. Wang, Case Western Reserve Univ. and Univ. Hospitals of Cleveland; J. Gardecki, J. Nazemi, R. R. Dasari, M. S. Feld, Massachusetts Institute of Technology ..... [GL105-10]

2:50 pm: **Electro-optical waveguide chemical sensor**, C. Boykin, Alabama A&M Univ. .... [GL105-23]

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

#### SESSION 4

Conv. Ctr. Room 303 ..... Mon. 3:30 to 5:30 pm

#### Biophotonics III

*Chair:* **Darnell E. Diggs**, Air Force Research Lab.

3:30 pm: **Photodynamic therapy: applications of biophotonics in cells and tissues (Invited Paper)**, N. L. Oleinick, Case Western Reserve Univ. .... [GL105-24]

4:00 pm: **Planar waveguide interferometric sensors: optical design, sensing chemistries, applications (Invited Paper)**, D. P. Campbell, Georgia Tech Research Institute ..... [GL105-15]

4:30 pm: **Design of nanoporous glass biosensors: role of molecular diffusion**, M. Asipauskas, G. A. Zimmerli, NASA Glenn Research Ctr.; K. Schweiker, Penn State College of Medicine; N. Compitello, D. G. Fischer, NASA Glenn Research Ctr. .... [GL105-25]

4:50 pm: **Phenotyping developing transgenic murine hearts using optical coherence tomography**, M. W. Jenkins, D. Roy, D. L. Wilson, H. Deng, M. M. Montano, M. Watanabe, A. M. Rollins, Case Western Reserve Univ. .... [GL105-11]

5:10 pm: **Fractal analysis with classification tree for classification of dysplasia in Barrett's esophagus using multiple endoscopic optical coherence tomography images**, X. Qi, D. Y. Rowland, M. V. Sivak, Jr., A. M. Rollins, Case Western Reserve Univ. .... [GL105-08]

**Tuesday 13 June**

**Plenary Session**

**Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm**

**Plenary Session**

*Chair: James G. Grote, Air Force Research Lab.*

8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]

9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]

9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]

11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

**Joint Session with Conference GL102:  
Aerospace Applications**

**SESSION 5**

**Conv. Ctr. Room 303 ..... Tues. 1:30 to 3:00 pm**

**DNA and Biopolymer Photonics II**

*Chair: Daniel P. Campbell, Georgia Tech Research Institute*

1:30 pm: **Nano and microsystems technology development for army applications (Invited Paper)**, P. B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. .... [GL105-26]

2:00 pm: **UV lithography of biological substrates**, A. Sharma, A. Kassu, J. Taguenang, Alabama A&M Univ. .... [GL105-27]

2:20 pm: **Electroluminescence from organic light-emitting diodes using deoxyribonucleic acid as an electron blocking layer**, J. A. Hagen, A. J. Steckl, Univ. of Cincinnati; J. G. Grote, Air Force Research Lab. .... [GL105-13]

2:40 pm: **Optical properties of lumophore-doped DNA thin films**, Z. Yu, J. A. Hagen, A. J. Steckl, Univ. of Cincinnati; J. G. Grote, Air Force Research Lab. .... [GL105-14]

Coffee Break ..... 3:00 to 3:30 pm

**SESSION 6**

**Conv. Ctr. Room 303 ..... Tues. 3:30 to 5:20 pm**

**DNA and Biopolymer Photonics III**

*Chair: Bruce H. Robinson, Univ. of Washington*

3:30 pm: **Nonlinear optical properties of biopolymers**, G. J. Simpson, Purdue Univ. .... [GL105-01]

3:50 pm: **Optical and resistivity measurements on DNA-based biopolymer films**, P. P. Yaney, E. M. Heckman, Univ. of Dayton; J. G. Grote, F. K. Hopkins, Air Force Research Lab. .... [GL105-28]

4:10 pm: **Demonstration of an all DNA-based electro-optic waveguide modulator**, E. M. Heckman, Univ. of Dayton ..... [GL105-29]

4:30 pm: **Biomolecules for optical applications (Invited Paper)**, R. R. Naik, Air Force Research Lab. .... [GL105-31]

5:00 pm: **A bench-top microorganism detection technique that utilizes fluorescent dyes which emit and absorb light in the near infrared**, M. C. Scardelletti, NASA Glenn Research Ctr.; V. M. Varaljay, NASA Glenn Research Ctr. and Cleveland State Univ. .... [GL105-07]

**✓ Posters-Tuesday**

*Poster authors will begin displaying posters after 12:00 pm Tuesday. A poster session, with authors present at their posters, will be held Tuesday evening from 5:30 to 6:30 pm. Poster presenters, see page 24 for setup instructions.*

✓ **Electromagnetic radiation application for fighting pathogenic microorganisms**, E. G. Aznakayev, A. V. Narozhnov, National Aviation Univ. (Ukraine) ..... [GL105-04]

✓ **Investigating the interaction of nonlinear electro-optical chromophores with DNA**, T. W. Chung, D. P. Rangel, A. L. Smith, B. H. Robinson, Univ. of Washington ..... [GL105-03]

✓ **Quantum medicine and strategy of useful sun: sun protection, heliotherapy, health improvement, and adaptation**, R. N. Khramov, Institute for Theoretical and Experimental Physics (Russia) and Polysvetan, Ltd. (Russia) ..... [GL105-09]

✓ **Properties and applications of circularly polarized vortex beams**, Q. Zhan, Univ. of Dayton ..... [GL105-06]

✓ **Z-scan technique, a new tool for probing modifications by oxidative stress of lipoproteins**, S. L. Gómez, M. Jurado, G. Tonini, A. Monteiro, E. Sanchez, F. Oliveira Rios, Univ. de São Paulo (Brazil); P. Boschov, Univ. Federal de São Paulo (Brazil); A. M. Figueiredo Neto, M. Gidlund, Univ. de São Paulo (Brazil) ..... [GL105-30]

✓ **Real-time differential refractometry without interferometry at a sensitivity level of 10<sup>-6</sup>**, M. McClimans, C. Laplante, D. Bonner, S. Bali, Miami Univ. .... [GL105-32]



# Emerging Photonics Technologies

Conference Chair: **Thomas R. Nelson, Jr.**, Air Force Research Lab.

Program Committee: **Kent L. Averett**, Air Force Research Lab.; **Robert G. Bedford**, Air Force Research Lab.; **Kevin Leedy**, Air Force Research Lab.; **Paul Sotirelis**, Aeronautical System Ctr.

## Tuesday 13 June

### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

### Plenary Session

Chair: **James G. Grote**, Air Force Research Lab.

8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]

9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]

9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]

11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

### SESSION 1

Conv. Ctr. Room 304 ..... Tues. 1:40 to 3:00 pm

### Silicon-based Photonics

Chair: **Kevin Leedy**, Air Force Research Lab.

1:40 pm: **Development of amorphous silicon photonic platforms**, R. D. Whaley, Jr., Ohio Univ. .... [GL106-03]

2:00 pm: **Porous silicon optical filters for far-IR and low-temperature applications**, W. R. McGovern, V. Kochergin, M. R. Sanghavi, P. R. Swinehart, Lake Shore Cryotronics, Inc. .... [GL106-23]

2:20 pm: **Development and analysis of technology transfer issues of silicon photodetectors that use electromagnetic resonance modes to enhance performance**, D. T. Crouse, P. Keshavareddy, City College/CUNY; S. Mahapatra, Phoebus Optoelectronics LLC ..... [GL106-11]

2:40 pm: **Light emission from high aspect ratio metal-insulator-metal structures with device applications**, D. T. Crouse, City College/CUNY; S. Mahapatra, Phoebus Optoelectronics LLC ..... [GL106-13]

Coffee Break ..... 3:00 to 3:30 pm

### SESSION 2

Conv. Ctr. Room 304 ..... Tues. 3:30 to 5:20 pm

### Photonic Integration

Chair: **Robert G. Bedford**, Air Force Research Lab.

3:30 pm: **Micro and nano-optics for passive and active devices (Invited Paper)**, E. G. Johnson, College of Optics and Photonics/Univ. of Central Florida ..... [GL106-26]

4:00 pm: **Vertical evanescent coupling from channel waveguide to photonic crystal waveguide**, Z. R. Huang, J. Li, Rensselaer Polytechnic Institute ..... [GL106-05]

4:20 pm: **Electrowetting for optical devices with improved speed, operation angle, and transmission efficiency**, J. C. Heikenfeld, A. J. Steckl, Univ. of Cincinnati ..... [GL106-14]

4:40 pm: **Small-area low-loss right-angle bends fabricated with photonic areas lithographically mapped (PALM) techniques**, Y. Zhou, H. Tan, D. J. Klotzkin, Univ. of Cincinnati ..... [GL106-19]

5:00 pm: **Strength evaluation and residual stresses in field-assisted anodic and cathodic bonding of optical fibers for low-cost optoelectronic packaging**, V. Ranatunga, Miami Univ.; D. C. Abeysinghe, Taitech Inc. AMC; A. Banerjee, D. J. Klotzkin, Univ. of Cincinnati . [GL106-08]

### ✓ Posters-Tuesday

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✓ **Optimization of electro-absorption modulator performance**, Y. Sikorski, A. L. Sala, Kettering Univ. .... [GL106-06]

✓ **Optical switching in a bistable erbium doped fiber ring resonator**, S. C. Granieri, S. Teferra, A. Cole, A. Siahmakoun, Y. Tang, Rose-Hulman Institute of Technology ..... [GL106-10]

✓ **Optical bistability of a semiconductor optical amplifier in ring resonator geometry**, S. C. Granieri, A. Siahmakoun, S. Teferra, A. Cole, Y. Tang, Rose-Hulman Institute of Technology; M. R. Sayeh, Southern Illinois Univ. .... [GL106-12]

✓ **Luminescence of AlN/GaN superlattices implanted with Tb and Tm ions**, W. M. Jadwisieniczak, J. Ramani, H. J. Lozykowski, Ohio Univ.; J. Xie, H. Morko, Virginia Commonwealth Univ.; A. Anders, Lawrence Berkeley National Lab. .... [GL106-18]

Wednesday 14 June

SESSION 3

Conv. Ctr. Room 304 ..... Wed. 8:30 to 10:10 am

**Systems, Communications, and Components**

*Chair: Paul Sotirelis, Aeronautical System Ctr.*

8:30 am: **Telepiloted vehicles using a newly developed free-space optical communication system**, G. R. Baiden, Laurentian Univ. (Canada) ..... [GL106-01]

8:50 am: **Bipolar cascade lasers: direct-drive lasers for RF-photonics links**, W. J. Siskaninetz, J. E. Ehret, J. C. Griffith, Air Force Research Lab. .... [GL106-24]

9:10 am: **A novel self-aligned process to fabricate high-index contrast ridge waveguide lasers**, D. Liang, J. Wang, D. C. Hall, Univ. of Notre Dame ..... [GL106-15]

9:30 am: **Low-loss high-index contrast AlGaAs/GaAs S-bend waveguide lasers**, J. Wang, D. Liang, D. C. Hall, Univ. of Notre Dame ..... [GL106-20]

9:50 am: **Photonic crystal based delay lines for optical clocking applications**, A. Gujjula, J. Sabarinathan, The Univ. of Western Ontario (Canada) ..... [GL106-21]

Coffee Break ..... 10:10 to 10:30 am

SESSION 4

Conv. Ctr. Room 304 ..... Wed. 10:30 am to 12:20 pm

**Materials for Photonics**

*Chair: Kent L. Averett, Air Force Research Lab.*

10:30 am: **ZnO photonic devices: materials issues (Invited Paper)**, D. C. Look, Wright State Univ. and Air Force Research Lab. .... [GL106-27]

11:00 am: **CdTe thin films grown by PLD on patterned substrates**, S. Neretina, R. A. Hughes, McMaster Univ. (Canada); N. V. Sochinskii, Ctr. Nacional de Microelectrónica (Spain); J. H. Britten, J. S. Preston, P. Mascher, McMaster Univ. (Canada) ..... [GL106-04]

11:20 am: **Surface and material characterization by nonlinear optical ellipsometry**, G. J. Simpson, Purdue Univ. .... [GL106-02]

11:40 am: **Studies of triangular-structured two-dimensional photonic crystals for visible wavelength selection**, J. D. Clark, M. A. Marciniak, Air Force Institute of Technology; R. L. Nelson, Air Force Research Lab.; J. A. Lott, Air Force Institute of Technology ..... [GL106-16]

12:00 pm: **Commercialization of quantum well infrared imaging technology**, D. P. Forrai, D. Endres, J. W. Devitt, R. L. Rawe, L-3 Communications Cincinnati Electronics, Inc.; A. M. Sarangan, Univ. of Dayton; W. King, Essential Research, Inc. .... [GL106-07]



Thursday 15 June 2006

# High Peak Power and Average Power Lasers

Conference Chairs: Joseph W. Haus, Univ. of Dayton; Charles E. Stutz, Air Force Research Lab.

## Monday 12 June

**Joint Session with Conference GL109:  
Liquid Crystal Technology and Applications and  
GL101: Laser Sources and Enabling Materials:**

### Novel Lasing Media

Chair: Bahman Taheri, AlphaMicron, Inc.

Conv. Ctr. Rm. 305 ..... Mon. 8:20 to 10:00 am

8:20 am: **Lasing in polymer dispersed liquid crystals and liquid crystal infiltrated random media** (*Invited Paper*), D. S. Wiersma, S. Gottardo, S. Cavalieri, S. Mujumdar, Univ. degli Studi di Firenze (Italy) ..... [GL109-53]

8:50 am: **Light controllable structural changes and tuning of lasing in chiral liquid crystals** (*Invited Paper*), P. V. Shibaev, L. R. Sanford, P. Rivera, Fordham Univ.; V. A. Belyakov, L.D. Landau Institute for Theoretical Physics ..... [GL109-43]

9:20 am: **Photonic crystal lasers from holographic polymer dispersed liquid crystals (H-PDLCs)**, R. Jakubiak, Air Force Research Lab.; V. P. Tondiglia, L. V. Natarajan, R. L. Sutherland, Science Applications International Corp.; P. F. Lloyd, UES, Inc.; R. A. Vaia, T. J. Bunning, Air Force Research Lab. .... [GL109-05]

9:40 am: **Random lasing in multidomain cholesteric liquid crystals**, M. F. Moreira, M. Gu, O. D. Lavrentovich, B. Taheri, P. Palffy-Muhoray, Kent State Univ. .... [GL109-52]

## Tuesday 13 June

### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

### Plenary Session

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8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

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9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

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11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

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✓ **Design and analysis of a passively stabilized high-power narrow-bandwidth and widely tunable external cavity broad-area laser**, B. S. Bayram, R. Coons, Miami Univ.; B. L. Sands, Air Force Research Lab. .... [GL107-01]

✓ **Crystal growth of high-doped(>2.5at%) Nd:YAG and its properties**, B. Jiang, J. Xu, Shanghai Institute of Optics and Fine Mechanics (China) ..... [GL107-07]

## Thursday 15 June

### SESSION 1

Conv. Ctr. Room 304 ..... Thurs. 8:30 to 10:10 am

### High Peak Power

Chair: Peter E. Powers, Univ. of Dayton

8:30 am: **Scaling mid-infrared Cr<sup>2+</sup> laser operation to high powers** (*Invited Paper*), K. L. Schepler, Air Force Research Lab.; R. D. Peterson, U.S. Air Force; P. A. Berry, Air Force Research Lab. .... [GL107-09]

9:10 am: **High-peak lasers and fiber optics as alternative to spark ignition: increasing efficiencies, reducing NO<sub>x</sub>, and improving maintenance schedule**, B. Bihari, S. B. Gupta, R. R. Sekar, Argonne National Lab. .... [GL107-02]

9:30 am: **Laser-induced acoustic waves in thin solid foils and their utility for mass spectrometric analysis** (*Invited Paper*), A. V. Zinovev, W. F. Calaway, Jr., J. F. Moore, M. J. Pellin, I. V. Veryovkin, Argonne National Lab. .... [GL107-05]

Coffee Break ..... 10:10 to 10:30 am

### SESSION 2

Conv. Ctr. Room 304 ..... Thurs. 10:30 am to 12:30 pm

### Intense Laser Applications

Chair: Kenneth L. Schepler, Air Force Research Lab.

10:30 am: **The amazing and useful output from a target struck by an ultra-intense laser** (*Invited Paper*), R. Freeman, The Ohio State Univ. .... [GL107-15]

11:10 am: **Ultrahigh-intensity Ti:sapphire/KrF\* hybrid laser system**, X. Song, C. K. Rhodes, Univ. of Illinois at Chicago ..... [GL107-06]

11:30 am: **Unique femtosecond micromachining methods in soda lime glass and silicon carbide**, L. DesAutels, Univ. of Dayton ..... [GL107-08]

11:50 am: **Electrical characterization of ferroelectric barium strontium titanate thin-films fabricated by pulsed-laser deposition using contact-mode AFM, surface potential imaging, and piezoresponse AFM**, A. L. Campbell, R. R. Biggers, Air Force Research Lab.; G. Subramanyam, B. D. Riehl, Univ. of Dayton ..... [GL107-04]

12:10 pm: **Flow visualization for high-power chemical lasers** (*Invited Paper*), G. P. Perram, G. A. Pitz, K. Essenhigh, Air Force Institute of Technology ..... [GL107-03]

Lunch Break ..... 12:30 to 1:30 pm

**SESSION 3**

Conv. Ctr. Room 304 ..... Thurs. 1:30 to 3:10 pm

**Beam Propagation**

*Chair:* **Joseph W. Haus**, Univ. of Dayton

1:30 pm: **Modulation instability for a cylindrically polarized beam**, Z. U. Mozumder, J. W. Haus, Q. Zhan, P. E. Powers, Univ. of Dayton ... [GL107-10]

1:50 pm: **An adaptive Fourier-Bessel split-step method and variational techniques applied on negative index materials (*Invited Paper*)**, P. P. Banerjee, G. T. Nehmetallah, Univ. of Dayton ..... [GL107-11]

2:10 pm: **Two-stage optical parametric generation for higher efficiency**, A. R. Pandey, J. W. Haus, Univ. of Dayton ..... [GL107-12]

2:30 pm: **Diffusion and photovoltaic-assisted grating formation in photorefractive counter-propagating two-beam coupling**, M. A. Saleh, Air Force Research Lab.; P. P. Banerjee, Univ. of Dayton; D. R. Evans, Air Force Research Lab. .... [GL107-13]

2:50 pm: **Optical correlator using anisotropic self-diffraction**, P. P. Banerjee, Univ. of Dayton ..... [GL107-14]

Tuesday-Thursday 13-15 June 2006

# Nano- and Microphotonics: Materials, Devices, Processing, and Applications

Conference Chairs: **Stanley Rogers**, Air Force Research Lab.; **Andrew M. Sarangan**, Univ. of Dayton; **Larry R. Dosser**, Mound Laser & Photonics Ctr., Inc.

Program Committee: **Daniel J. Denninghoff**, Air Force Research Lab.; **Timothy R. Klein**, Air Force Research Lab.; **Oleg D. Lavrentovich**, Kent State Univ.; **Aziz Mahfoud Familia**, Univ. of Dayton; **Peter Palffy-Muhoray**, Kent State Univ.; **Ivan I. Smalyukh**, Kent State Univ.; **Lavern A. Starman**, Air Force Institute of Technology; **Bahman Taheri**, AlphaMicron, Inc.

## Tuesday 13 June

### Plenary Session

Conv. Ctr. Theater ..... Tues. 8:00 am to 12:00 pm

### Plenary Session

Chair: **James G. Grote**, Air Force Research Lab.

8:00 am: **Photonics research at NASA Glenn**, W. Whitlow, Jr., NASA Glenn Research Ctr. .... [GL200-01]

8:30 am: **Magnetic properties of natural and modified DNA**, J. Jin, Korea Univ. (South Korea) ..... [GL200-02]

9:00 am: **Photonics research at the Air Force Research Lab.**, T. J. Bunning, Air Force Research Lab. .... [GL200-03]

9:30 am: **Innovative partnerships between government, academia, and the private sector: perspectives from Battelle**, R. Rosen, Battelle Memorial Institute ..... [GL200-04]

Coffee Break ..... 10:00 to 10:30 am

10:30 am: **Interference, coherence, and polarization**, E. Wolf, Univ. of Rochester and College of Optics and Photonics/Univ. of Central Florida ..... [GL200-07]

11:00 am: **Nanostructured liquid crystals for photonic applications**, H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) ..... [GL200-05]

11:30 am: **Nonlinear materials for infrared nonlinear optics**, G. C. Bhar, Vivekananda Univ. (India) ..... [GL200-06]

### SESSION 1

Conv. Ctr. Room 306 ..... Tues. 1:00 to 3:00 pm

### MEMS I: Devices and Processes

Chair: **Lavern A. Starman**, Air Force Institute of Technology

1:00 pm: **Photonic MEMS in enabling technologies (Invited Paper)**, S. Rogers, Air Force Research Lab. .... [GL108-16]

1:30 pm: **Optothermally actuated microwings for an autonomous flying microrobot (Invited Paper)**, D. J. Denninghoff, L. A. Starman, Air Force Institute of Technology; P. E. Kladitis, Edwards Air Force Base .... [GL108-10]

1:50 pm: **Characterization of stress in GaN-on-sapphire MEMS structures using micro-Raman spectroscopy (Invited Paper)**, F. E. Parada, M. A. Marciniak, L. A. Starman, Air Force Institute of Technology; J. R. Foley, Air Force Research Lab. .... [GL108-13]

2:10 pm: **Development of nano-Raman spectroscopy with high contrast**, R. D. Hartschuh, N. Lee, D. Mehtani, A. Kisliuk, M. D. Foster, A. P. Sokolov, Univ. of Akron; J. F. Maguire, Air Force Research Lab. .... [GL108-117]

2:30 pm: **Designing and testing a nulling radially symmetric microellipsometer (Invited Paper)**, Q. Zhan, A. Tschimwangan, Univ. of Dayton ..... [GL108-23]

Coffee Break ..... 3:00 to 3:20 pm

## SESSION 2

Conv. Ctr. Room 306 ..... Tues. 3:20 to 5:30 pm

### MEMS II: Applications and Materials

Chair: **Stanley Rogers**, Air Force Research Lab.

3:20 pm: **Agile plasma-gas based broadband infrared beamsteering (Invited Paper)**, S. Rogers, T. R. Klein, Air Force Research Lab. . [GL108-15]

3:40 pm: **Infrared optics for broadband beam steering applications (Invited Paper)**, J. S. Sanghera, L. E. Busse, V. Q. Nguyen, I. D. Aggarwal, Naval Research Lab.; S. Rogers, D. E. Zelmon, Air Force Research Lab. .... [GL108-31]

4:00 pm: **Performance and optimization of optothermal microwings for an autonomous flying microrobot**, D. J. Denninghoff, L. A. Starman, Air Force Institute of Technology; P. E. Kladitis, 31 Test and Evaluation Squadron ..... [GL108-11]

4:20 pm: **Fabrication and characterization of a 3D periodic nanostructure**, B. D. Booso, Univ. of Dayton and Science Applications International Corp.; A. M. Sarangan, Univ. of Dayton ..... [GL108-27]

4:40 pm: **Flat-top focusing with a long depth of focus using cylindrical vector beams**, Q. Zhan, W. Chen, Univ. of Dayton ..... [GL108-22]

5:00 pm: **Single waveguide variable optical attenuator array (Invited Paper)**, D. W. Nippa, S. M. Risser, M. Dixon, R. J. Higgins, D. E. Schoellner, L. Vassy, R. W. Ridgway, Optimer Photonics, Inc. .... [GL108-32]

### ✓ Posters-Tuesday

Poster authors will begin displaying posters after 12:00 pm Tuesday. A poster session, with authors present at their posters, will be held Tuesday evening from 5:30 to 6:30 pm. Poster presenters, see page 24 for setup instructions.

✓ **Optimization of erbium-doped fiber amplifiers design**, M. A. El-Aasser, Ain Shams Univ. (Egypt); T. Yousef, A. Shaban, G. Said, Fayoum Univ. (Egypt) ..... [GL108-01]

✓ **Electronic temperature effects on the optical response of simple metal clusters (metal nanoparticles)**, H. Faramarzi, Amir Kabir Univ. of Technology (Iran) ..... [GL108-04]

✓ **An innovative process using soft mold and gas-bag pressuring mechanism for replicating micro/nano-features onto convex curves surfaces**, S. Yang, National Taiwan Univ. (Taiwan) ..... [GL108-05]

✓ **Optical properties of tips for apertureless near-field microscopy**, N. Lee, R. D. Hartschuh, D. Mehtani, A. Kisliuk, M. D. Foster, A. P. Sokolov, I. Tsukerman, Univ. of Akron ..... [GL108-17]

✓ **Laser-scanning angular deflective microscopy**, M. Chiu, National Formosa Univ. (Taiwan) ..... [GL108-21]

✓ **Optical characterization of iridescent wings of Mopho Didius butterfly using a high accuracy nonstandard FDTD algorithm**, S. Banerjee, ..... [GL108-33]

**Wednesday 14 June**

**SESSION 3**

Conv. Ctr. Room 306 ..... Wed. 8:30 to 10:20 am

**Nanophotonic Design and Fabrication I**

*Chair: Andrew M. Sarangan, Univ. of Dayton*

- 8:30 am: **Computer-aided design for nanophotonic devices and ICs (Invited Paper)**, W. Huang, McMaster Univ. (Canada) ..... [GL108-30]
- 9:00 am: **New simulation methods for nanoscale photonic structures and negative-refraction materials**, I. Tsukerman, F. Čajko, A. P. Sokolov, Univ. of Akron ..... [GL108-18]
- 9:20 am: **Silicon micro-optic devices for enhancing the fill factor of infrared image sensors**, L. Sun, A. M. Sarangan, Univ. of Dayton; J. W. Devitt, M. Garter, P. Henry, L-3 Communications Cincinnati Electronics, Inc. .... [GL108-06]
- 9:40 am: **Simulation of the resonant cavity enhanced (RCE) corrugated quantum well infrared photodetectors (C-QWIPs) using finite difference time domain (FDTD)**, J. P. Kim, A. M. Sarangan, Univ. of Dayton ..... [GL108-24]
- 10:00 am: **Planning the nanophotonics cleanroom**, T. E. Hansz, FPR, Inc. .... [GL108-02]
- Coffee Break ..... 10:20 to 10:40 am

**SESSION 4**

Conv. Ctr. Room 306 ..... Wed. 10:40 am to 12:00 pm

**Nanophotonic Design and Fabrication II**

*Chair: Larry R. Dosser, Mound Laser & Photonics Ctr., Inc.*

- 10:40 am: **Fabrication and characterization of a thermally tunable Bragg filter on a suspended SOI waveguide**, C. R. Raum, R. C. Gauthier, R. N. Tait, Carleton Univ. (Canada) ..... [GL108-29]
- 11:00 am: **Threshold gain studies in surface emission distributed feedback lasers in polymer gain**, A. Mahfoud Familia, A. M. Sarangan, Univ. of Dayton; T. R. Nelson, Jr., Air Force Research Lab. .... [GL108-26]
- 11:20 am: **Coherently controlled photonic band gap and its applications in optoelectronic devices**, S. M. Sadeghi, McMaster Univ. (Canada); W. Li, Univ. of Wisconsin/Platteville ..... [GL108-03]
- 11:40 am: **Metallo-dielectric photonic band gap structures fabricated using RF magnetron sputtering technology**, C. E. Sunny, A. M. Sarangan, Univ. of Dayton ..... [GL108-25]

**Thursday 15 June**

**Joint Session with conference GL109:  
Liquid Crystal Technology and Applications:**

**Liquid Crystal Polymer Composites, Suspensions, and Emulsions**

*Chair: Timothy J. Bunning, Air Force Research Lab.*

Conv. Ctr. Rm. 305 ..... Thurs. 8:20 to 10:00 am

- 8:20 am: **Laser manipulation of droplets and particles in liquid crystals (Invited Paper)**, H. F. Gleeson, M. R. Dickinson, The Univ. of Manchester (United Kingdom); T. A. Wood, Univ. of Bristol (United Kingdom) . [GL109-29]
- 8:50 am: **Nematic drops: defects, electro-optics, and ordered structures (Invited Paper)**, A. Fernandez de las Nieves, Univ. de Almería (Spain) and Harvard Univ.; D. Link, RainDance Technologies, Inc. and Harvard Univ.; D. A. Weitz, Harvard Univ. .... [GL109-33]
- 9:20 am: **Reverse-mode holographic polymer dispersed liquid crystals incorporating monofunctional liquid crystal acrylate monomers**, A. M. Urbas, E. R. Beckel, V. P. Tondiglia, L. V. Natarajan, T. J. Bunning, Air Force Research Lab. .... [GL109-08]
- 9:40 am: **Electrooptic properties of holographic polymer-stabilized cholesteric liquid crystals**, E. R. Beckel, Air Force Research Lab.; L. V. Natarajan, V. P. Tondiglia, R. L. Sutherland, Science Applications International Corp.; M. C. Ingram, T. J. Bunning, Air Force Research Lab. .... [GL109-07]
- Coffee Break ..... 10:00 to 10:20 am

**Joint Session with conference GL109:  
Liquid Crystal Technology and Applications:**

**Nanostructured and Doped Photonic Materials**

*Chair: Helen F. Gleeson, The Univ. of Manchester (United Kingdom)*

Conv. Ctr. Rm. 305 ..... Thurs. 10:20 am to 12:20 pm

- 10:20 am: **Nonlinear transmission and switchable reversed diffraction in dye-doped liquid crystals (Invited Paper)**, D. R. Evans, G. Cook, M. A. Saleh, J. L. Carns, Air Force Research Lab.; S. Serak, N. V. Tabiryana, BEAM Engineering for Advanced Measurements Co. .... [GL109-55]
- 10:50 am: **Numerical calculations of the magnetic susceptibility of cut gold nanorings**, J. R. Neal, P. Palffy-Muhoray, B. Taheri, Kent State Univ. .... [GL109-51]
- 11:10 am: **Ferroelectric nanoparticles in liquid crystals**, F. Li, J. L. West, Kent State Univ.; A. V. Glushchenko, Univ. of Colorado at Colorado Springs; C. I. Cheon, Hoseo Univ. (South Korea); Y. A. Reznikov, Institute of Physics (Ukraine) ..... [GL109-23]
- 11:30 am: **Holographic polymer-dispersed liquid crystals doped with montmorillonite clay (Invited Paper)**, T. Tsai, Y. Chang, Chung Yuan Christian Univ. (Taiwan) ..... [GL109-41]
- 12:00 pm: **Polymer-dispersed liquid crystals containing nanocrystals of oxides doped with rare earths**, S. J. Klosowicz, Wojskowa Akademia Techniczna (Poland) ..... [GL109-19]
- Lunch Break ..... 12:20 to 1:30 pm

**SESSION 5**

Conv. Ctr. Room 306 ..... Thurs. 1:30 to 3:10 pm

**Nanotechnology Applications I**

*Chair: Timothy R. Klein, Air Force Research Lab.*

- 1:30 pm: **Development of a quantum dot 0.6eV thermophotovoltaic (TPV) converter (Invited Paper)**, D. Forbes, S. Sinharoy, Essential Research, Inc.; R. P. Raffaele, Rochester Institute of Technology; V. Weizer, N. Homann, T. Valko, N. Bartos, D. Scheiman, Essential Research, Inc.; S. G. Bailey, NASA Glenn Research Ctr. .... [GL108-07]
- 2:00 pm: **Development and applications of infrared focal plane arrays composed of an array of semiconductor nanowires (Invited Paper)**, D. T. Crouse, A. A. Ikram, City College/CUNY; S. Mahapatra, Phoebus Optoelectronics LLC ..... [GL108-28]
- 2:30 pm: **Investigation of piezoelectric field effect on emission spectra of GaN QDs on AlN**, N. Yang, D. Korakakis, West Virginia Univ. .... [GL108-09]
- 2:50 pm: **Measurement of electron mobility in Alq3 over temperature through a novel small-signal technique**, H. Mu, D. J. Klotzkin, A. Desilva, H. A. Wagner, Univ. of Cincinnati ..... [GL108-14]
- Coffee Break ..... 3:10 to 3:40 pm

**SESSION 6**

Conv. Ctr. Room 306 ..... Thurs. 3:40 to 5:20 pm

**Nanotechnology Applications II**

*Chair: Aziz Mahfoud Familia, Univ. of Dayton*

- 3:40 pm: **Development of a >2.0 micron light-emitting diode using lattice mismatched materials (Invited Paper)**, D. Forbes, S. Sinharoy, Essential Research, Inc.; R. P. Raffaele, Rochester Institute of Technology; V. Weizer, N. Homann, T. Valko, N. Bartos, D. Scheiman, Essential Research, Inc. .... [GL108-08]
- 4:10 pm: **Pulsed-laser deposition of LaS nanowires (Invited Paper)**, S. B. Fairchild, Air Force Research Lab.; M. M. Cahay, Univ. of Cincinnati; V. Semet, V. T. Binh, Univ. Claude Bernard Lyon 1 (France); S. Bandyopadhyay, Virginia Commonwealth Univ.; L. Grazulis, Univ. of Dayton Research Institute; J. L. Boeckl, Air Force Research Lab. .... [GL108-19]
- 4:40 pm: **Lateral crystallization of thin metallic films on SiO2 using excimer projection irradiation**, R. Zhong, J. P. Leonard, Univ. of Pittsburgh ..... [GL108-12]
- 5:00 pm: **Luminescence efficiency improvement of GaAsN quantum structure with surface plasmons**, T. Liu, D. Korakakis, J. Gu, S. Chandril, T. H. Myers, West Virginia Univ. .... [GL108-20]