

## Emerging Liquid Crystal Technologies V

*Conference Chair:* **Liang-Chy Chien**, Kent State Univ.

*Program Committee:* **Dirk J. Broer**, Philips Research Nederland B.V. (Netherlands); **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Harry J. Coles**, Univ. of Cambridge (United Kingdom); **Gregory P. Crawford**, Univ. of Notre Dame; **Andy Y. Fuh**, National Cheng Kung Univ. (Taiwan); **Otto Wolfgang Haase**, Technische Univ. Darmstadt (Germany); **Jun-ichi Hanna**, Tokyo Institute of Technology (Japan); **Heinz-Siegfried Kitzerow**, Univ. Paderborn (Germany); **Shunsuke Kobayashi**, Tokyo Univ. of Science (Japan); **Seung Hee Lee**, Chonbuk National Univ. (Korea, Republic of); **Akihiro Mochizuki**, Nano Loa, Inc.; **Ci-Ling Pan**, National Chiao Tung Univ. (Taiwan); **Richard Sutherland**, SAIC; **Shin-Tson Wu**, Univ. of Central Florida; **Hiroshi Yokoyama**, Kent State University

### Monday 25 January

#### SESSION 1: Emissive, Headmount and Projection Displays

*Session Chair:* **Byoungho Lee**, Seoul National Univ. (Korea, Republic of)

Room: TBD ..... Mon. 1:30 to 3:00 pm

1:30 pm: **Quantum dot light emitting devices with heavy metal-free materials** (*Invited Paper*), Seth A. Coe-Sullivan, Peter T. Kazlas, Jonathan S. Steckel, John E. Ritter, QD Vision Inc. (United States) [7618-19]

2:00 pm: **Design of a free-form single-element see-through head-worn display**, Ozan Cakmakci, Kevin Thompson, Optical Research Associates (United States); Jannick Rolland, Univ. of Rochester (United States) [7618-106]

2:20 pm: **Next-generation head-mounted display**, James P. McGuire, Jr., Optical Research Associates (United States) [7618-109]

2:40 pm: **High-power, high-bandwidth laser diode driver for next-generation laser projectors**, Andreas Streck, Wilhelm Stork, Univ. Karlsruhe (Germany); Armin Wagner, ELOVIS GmbH (Germany) [7618-108]

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

#### SESSION 2: 3D Displays

*Session Chair:* **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of)

Room: TBD ..... Mon. 3:30 to 6:00 pm

3:30 pm: **Overview of 3D/2D switchable liquid crystal display technologies** (*Invited Paper*), Byoungho Lee, Seoul National Univ. (Korea, Republic of); Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of) [7618-08]

4:00 pm: **Static 3D image space**, Badia Koupsi, Jim J. Sluss, Jr., Univ. of Oklahoma (United States) [7618-101]

4:20 pm: **Refreshable holographic 3D display using photorefractive polymer: progresses and prospectives**, Pierre-Alexandre Blanche, Ram Voorakaranam, Cory Christenson, College of Optical Sciences, The Univ. of Arizona (United States); Arkady Bablumian, TIPD LLC (United States); Jayan Thomas, College of Optical Sciences, The Univ. of Arizona (United States); Michiharu Yamamoto, Nitto Denko Technical Corp. (United States); Robert A. Norwood, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (United States) [7618-107]

4:40 pm: **Super multiview display and electronic holography as future 3D display**, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [7618-112]

5:00 pm: **Resolution analysis of Fourier-hologram generated by integral imaging and its enhancement**, Chen Ni, Jae-Hyeung Park, Kim Nam, Byong-Ho Yoon, Chungbuk National Univ. (Korea, Republic of) [7618-103]

5:20 pm: **A new method for laser speckle suppression**, Michael M. Tilleman, Elbit Systems of America (United States)

[7618-114]

5:40 pm: **An artifact metrics which utilizes laser speckle patterns of surface of object**, Manabu Yamakoshi, National Printing Bureau of Japan (Japan); Xiaoying Rong, California Polytechnic State Univ., San Luis Obispo (United States); Tsutomu Matsumoto, Yokohama National Univ. (Japan) [7618-128]

## Tuesday 26 January

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

### SESSION 3: Nonlinear Optics and Lasing

*Session Chair: Masanori Ozaki*, Osaka Univ. (Japan)

Room: TBD ..... Tues. 10:30 am to 12:10 pm

10:30 am: **Resonantly-pumped optical Kerr nonlinearity in liquid crystalline materials**, (*Keynote Paper*) Yuen-Ron Shen, Univ. of California, Berkeley (United States) [7618-29]

11:10 am: **Photoreactive third-harmonic generation in liquid crystalline azopolymer thin films** (*Invited Paper*), Chia Chen Hsu, Jian Hung Lin, Hung Chih Kan, National Chung Cheng Univ. (Taiwan); Liang-Chy Chien, Kent State Univ. (United States) [7618-11]

11:40 am: **Band-tunable color cone lasing emission based on a dye-doped cholesteric liquid crystal film** (*Invited Paper*), Chia-Rong Lee, S. Lin, National Cheng Kung Univ. (Taiwan); H. Yeh, National Kaohsiung First Univ. of Science and Technology (Taiwan); T. Ji, J. Liu, P. Yang, National Cheng Kung Univ. (Taiwan); Ting-Shan Mo, Kun Shan Univ. of Technology (Taiwan); Shuan-Yu Huang, Chung Shan Medical Univ. (Taiwan); Chie-Tong Kuo, National Sun Yat-Sen Univ. (Taiwan); Kuang Yao Lo, National Chiayi Univ. (Taiwan); Andy Y. Fuh, National Cheng Kung Univ. (Taiwan) [7618-06]

**Lunch/Exhibition Break**..... 12:10 to 1:30 pm

### SESSION 4: Nanoparticles Self-Assembly, Dispersion and Manipulation

*Session Chair: Yuen-Ron Shen*, Univ. of California, Berkeley

Room: TBD ..... Tues. 1:30 to 3:00 pm

1:30 pm: **Quantum dot self assembly in liquid crystal media** (*Invited Paper*), Linda S. Hirst, University of California, Merced (United States) [7618-21]

2:00 pm: **Nanoparticle-dispersed liquid crystal prepared by a simple sputter deposition** (*Invited Paper*), Masanori Ozaki, Hidetsugu Yoshida, Kenji Kawamoto, Akihiko Fujii, T. Tsuda, Susumu Kuwabata, Osaka Univ. (Japan) [7618-31]

2:30 pm: **Control of colloidal interactions in liquid crystals by tailoring their shapes and using light-sensitive molecular monolayers** (*Invited Paper*), Ivan I. Smalyukh, Univ. of Colorado at Boulder (United States); Clayton P. Lapointe, Thomas G. Mason, Rahul Trivedi, Angel Martinez, Julian S. Evans, Paul ACKERMAN, University of Colorado at Boulder (United States) [7618-18]

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

### SESSION 5: Spatial Light Modulators

*Session Chair: Sin-Doo Lee*, Seoul National Univ. (Korea, Republic of)

Room: TBD ..... Tues. 3:20 to 4:20 pm

3:20 pm: **High performance spectroscopic ellipsometer using linearized liquid crystal phase modulators** (*Invited Paper*), Hiroshi Yokoyama, Liquid Crystal Institute, Kent State University (United States); Yuka Tabe, Waseda University (Japan) [7618-23]

3:50 pm: **30-ns liquid-crystal optical shutters** (*Invited Paper*), Michael G. Geis, Richard J. Molnar, George W. Turner, Theodore M. Lyszczarz, MIT Lincoln Lab. (United States); Richard M. Osgood, U.S. Army Soldier Systems Ctr. (United States) and Natick Lab. Army Research, Development, and Engineering Ctr. (United States); Brian R. Kimball, U.S. Army Soldier Systems Ctr. (United States) [7618-05]

## **SESSION 6: Bio-Active, Bio-Inspired Materials and Applications**

*Session Chair: Linda S. Hirst, Univ. of California, Merced*

Room: TBD ..... Tues. 4:20 to 6:10 pm

4:20 pm: **Cell biology and active liquid crystals** (*Invited Paper*), Daniel J. Needleman, Jan Bruges, Harvard University (United States) [7618-22]

4:50 pm: **Spatio-temporal growth of membrane patterns and lipid raft domains on a nanotopographic solid support** (*Invited Paper*), Sin-Doo Lee, Sang-Wook Lee, Seoul National Univ. (Korea, Republic of); Tae-Young Yoon, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7618-16]

5:20 pm: **Printable sensor based on cholesteric liquid crystal for temperature and amine detection.**, Katherine B. Pacheco, Technische Univ. Eindhoven (Netherlands); Dirk J. Broer, Philips Research Nederland B.V. (Netherlands); Cees W. M. Bastiaansen, Technische Univ. Eindhoven (Netherlands) [7618-15]

5:40 pm: **Electroactive super-elongation of carbon nanotube aggregates in liquid crystal medium and its application for displays** (*Invited Paper*), S. H. Lee, Chonbuk National Univ. (Korea, Republic of) [7618-33]

## **Wednesday 27 January**

### **SESSION 7: New Materials and Substrates**

*Session Chairs: Rudolf Zentel, Johannes Gutenberg Univ. Mainz (Germany); Junji Watanabe, Tokyo Institute of Technology (Japan)*

Room: TBD ..... Wed. 8:00 to 10:30 am

8:00 am: **Novel cinnamic-acid-derived hydrogen-bonded mesogens with relatively wide blue phases** (*Invited Paper*), Wan-Li He, Huai Yang, University of Science and Technology Beijing (China) [7618-26]

8:30 am: **Liquid crystal and photoluminescent properties of gold(I)-alkanethiolates complexes and their transformation into gold nanomaterials** (*Invited Paper*), Jong-Chan Lee, Seoul National Univ. (Korea, Republic of) [7618-09]

9:00 am: **Plastic substrate technologies for flexible displays** (*Invited Paper*), Toru Hanada, Teijin Ltd. (Japan) [7618-104]

9:30 am: **Regular undulation morphology observed in fracture and film surfaces of chiral S $\sigma$ \* polymer** (*Invited Paper*), Junji Watanabe, Chunying Zhang, Susumu Edo, Ryouhei Ishige, Masatoshi Tokita, Tokyo Institute of Technology (Japan) [7618-20]

10:00 am: **A continuous flow synthesis of micrometer sized actuators from liquid crystalline elastomers** (*Invited Paper*), Christian Ohm, Johannes Gutenberg Univ. Mainz (Germany); Christophe Serra, Lab. d'Ingénierie des Polymères pour les Hautes Technologies, CNRS (France); Rudolf Zentel, Johannes Gutenberg Univ. Mainz (Germany) [7618-30]

**Coffee Break** ..... 10:30 to 11:00 am

### **SESSION 8: Polymer-Stabilized LCDs**

*Session Chair: Hiroshi Yokoyama, Kent State Univ.*

Room: TBD ..... Wed. 11:00 am to 12:20 pm

11:00 am: **Fast electro-optical Kerr effect of nano-structured liquid crystals** (*Invited Paper*), Hirotsugu Kikuchi, Kyushu Univ. (Japan); Yasuhiro Haseba, Chisso Petrochemical Co. Ltd. (Japan); Suk-Won Choi, Kyung Hee University (Korea, Republic of); Shin-ichi Yamamoto, Chisso Petrochemical Co. Ltd. (Japan); Takashi Iwata, NOF Corporations (Japan); Hiroki Higuchi, Kyushu Univ. (Japan) [7618-24]

11:30 am: **Polymer-networked liquid crystal cell for omni-directional viewing angle switching** (*Invited Paper*), Tae-Hoon Yoon, Jong-In Baek, Ki-Han Kim, Jae-Chang Kim, Pusan National Univ. (Korea, Republic of) [7618-102]

12:00 pm: **Liquid crystal directed-polymer nanostructure for vertically aligned nematic devices**, Volodymyr Borshch, Liang-Chy Chien, Kent State Univ. (United States) [7618-02]

**Lunch/Exhibition Break** ..... 12:20 to 1:50 pm

**SESSION 9: Dye-Doped Devices**

*Session Chair: Ivan I. Smalyukh, Univ. of Colorado at Boulder*

Room: TBD ..... Wed. 1:50 to 3:10 pm

1:50 pm: **Guest-host liquid crystal devices** (*Invited Paper*), Bahman Taheri, AlphaMicron, Inc. (United States) [7618-25]

2:20 pm: **Bistable device using anchoring transition of nematic liquid crystals on perfluoropolymer surface** (*Invited Paper*), Surajit Dhara, Univ. of Hyderabad (India); Jin Ki Kim, Fumito Araoka, Soon Moon Jeong, Reiri Kogo, Ken Ishikawa, Hideo Takezoe, Tokyo Institute of Technology (Japan) [7618-17]

2:50 pm: **Reflective display based on biphotonic effect-induced phase transition in dye-doped cholesteric liquid crystals**, Andy Y.-G. Fuh, San-Yi Huang, Yi-Shin Chen, Hung-Chang Jau, Ming-Shian Li, Jui-Hsiang Liu, National Cheng Kung Univ. (Taiwan) [7618-01]

**Coffee Break** ..... 3:10 to 3:40 pm

**SESSION 10: Holography and Holographically-Formed PDLCs**

*Session Chair: Andy Y. Fuh, National Cheng Kung Univ. (Taiwan)*

Room: TBD ..... Wed. 3:40 to 5:40 pm

3:40 pm: **Electrically switchable diffractive devices based on LC and polymer composites** (*Invited Paper*), Joachim Stumpe, Oksana V. Sakhno, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [7618-28]

4:10 pm: **The dynamics of human sperm droplets on a liquid crystal and polymer composite film**, Farn Lu, Ton Yen General Hospital (Taiwan); Yi-Hsin Lin, National Chiao Tung Univ. (Taiwan); Wan-Chen Tsai, Ton Yen General Hospital (Taiwan); Jiong-Juan Li, Ting-Yu Chu, National Chiao Tung Univ. (Taiwan); Hsu-Kuan Hsu, Wang-Yang Li, Chi-Mei Optoelectronics Corp. (Taiwan) [7618-07]

4:30 pm: **Evaluations of liquid crystal panel as a random phase modulator for optical encryption systems based on the double random phase encoding**, Yasuhiro Harada, Shingo Fukuyama, Kitami Institute of Technology (Japan) [7618-12]

4:50 pm: **Electrical tuning of two-dimensional honeycomb photonic lattices using holographic polymer dispersed liquid crystals**, Ryuichiroh Ohira, Mayu Miki, Yasuo Tomita, The Univ. of Electro-Communications (Japan) [7618-13]

5:10 pm: **Ultrafast switching liquid crystals for next-generation transmissive and reflective displays** (*Invited Paper*), H. J. Coles, Univ. of Cambridge (United Kingdom) [7618-32]

**Posters-Wednesday**

Room: TBD ..... Wed. 6:00 to 7:30 pm

**Smart windows with functions of reflective display and indoor temperature control**, I-Hui Lee, Yu-Ching Chao, Chih-Cheng Hsu, Liang-Chao Chang, Taipei Municipal Lishan High School (Taiwan); Tien-Lung Chiu, Yuan Ze University (Taiwan); Jiunn-Yih Lee, National Taiwan Univ. of Science and Technology (Taiwan); Fu-Jen Kao, National Yang-Ming Univ. (Taiwan); Chih-Kung Lee, Jiun-Haw Lee, National Taiwan Univ. (Taiwan) [7618-04]

**Novel type of tunable infrared liquid crystalline filters**, Tahir D. Ibragimov, Institute of Physics (Azerbaijan); Gazanfar M. Bayramov, Baku State Univ. (Azerbaijan) [7618-10]

**Calculation of computer generated hologram for 3D display using light-ray sampling plane**, Koki Wakunami, Masahiro Yamaguchi, Tokyo Institute of Technology (Japan) [7618-14]

**Textured  $Zn_2SiO_4:Mn^{2+}$  phosphor film on quartz glass**, Jae Bum Lee, Je Hong Park, Kwang Won Park, Pukyong National Univ. (Korea, Republic of); Kwang Il Seo, Young Kw K. Kwon, MUJIN (Korea, Republic of); Jong Su Kim, Pong Kyun Shon, Sang Nam Lee, Pukyong National Univ. (Korea, Republic of) [7618-105]

**A black metal-dielectric thin film for high-contrast displays**, Sang-Hwan Cho, Min-Kyo Seo, Ju-Hyung Kang, Jin-Kyu Yang, Sung-Yong Kang, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7618-110]

**Multi-domain liquid crystal alignment based on periodical polyimide micro-bars fabricated by inkjet printing.**  
Jeoung-Yeon Hwang, Liang-Chy Chien, Kent State Univ. (United States) [7618-113]