First Look

Society for Information Display
SID INTERNATIONAL SYMPOSIUM, SEMINAR, AND EXHIBITION

DISPLAY WEEK 2012

June 3–8, 2012

Boston Convention & Exhibition Center, Boston, Massachusetts, USA

SID DISPLAY WEEK Boston 2012

Announcing Special Topics of Interest on

3D ○ Solid-State Lighting ○ Green Technology
○ Flexible Electronics & Printed Displays
○ Touch & Interactive Displays

Join us at Display Week 2012
to celebrate the 50th Anniversary
of the Society for Information Display
1962–2012

SID 50 ANNIVERSARY 1962-2012

Visit www.DisplayWeek.org

The Evolution of Displays

Electronic information displays touch nearly all aspects of modern life. Display Week's 2012 Keynote addresses will provide a vision of how the evolution of display technology will change the shape of displays of the future.

Keynote Speakers

Dr. Byung Chul Ahn, *Senior Vice-President and Head of the OLED Development Center, LG Display Co., Ltd.*

"Recent Breakthroughs for Larger-Sized OLED Displays and Their Application to OLED TV"

This year will mark the first year of the launch of larger-sized OLED TVs. This talk will highlight recent advances made in OLED technology and reveal the manufacturing breakthrough that led to the production of larger-sized OLED panels. Dr. Ahn will also describe the core technologies behind this breakthrough. Dr. Ahn led the development of the mass production of the first 5-in. OLED TV in 2009. In addition, he recently has been involved in the commercialization of LG's 55-in. Full-High-Definition (FHD) OLED TV.

Dr. Sung Tae Shin, *Senior Vice-President, LCD R&D Center, LCD Business, Samsung Electronics, Co., Ltd.*

"Display Transformation for Continuous Growth of the Display Industry"

Three waves of display evolution have been responsible for the continuous growth of the LCD market – notebook PCs in 2001, monitors in 2005, and LCD TVs in 2008. However, during the past few years, the display industry has become saturated due to stagnation in market growth, low panel price as a result of oversupply, and stagnant investment after Gen 8 production even though new applications, such as 3D, smart TVs, and tablets, have entered the marketplace. This talk will describe the next wave of display evolution – Display Transformation – that will stimulate healthy growth in the display industry. Here, Display Transformation means the multi-purpose use of displays, such as in smart windows, smart e-Boards, and digital art displays, that will deliver various online content and services for the "Smart Society." The talk will also describe what types of future technologies will be needed for this display transformation and the prospects of the display industry of the future. Finally, Samsung's vision and strategy of the next display world will be introduced.

Dr. Ramash Raskar, *Associate Professor of Media Arts and Sciences, and Co-Director, Center for Future Storytelling, MIT Media Lab*

Computational Displays: New Optimization for Interactive Lighting-Sensitive 3D Displays

Dr. Raskar will focus on the development of novel displays by the Camera Culture Group at the MIT Media Lab that (1) respond to ambient illumination (lighting-sensitive displays), (2) support intuitive multi-touch and gestural interaction (interactive displays), and eliminate the need for 3D glasses (automultiscopic 3D displays). At their core, these architectures exploit both the design of optical elements (*e.g.,* lenslet arrays and layered light-attenuating masks) and the development of the associated light-field encoding/decoding algorithms. Some of the novel displays to be described include the High-Rank 3D (HR3D) display, which contains a stacked pair of LCD panels rather than heuristically defined parallax barriers, the Bidirectional (BiDi) screen, an example of a new type of I/O device that possesses the ability to both capture images and display them, and a 6D optical system, which responds to changes in viewpoint as well as changes in back-lit transmitted illumination.

2012 SID Technical Program to Include Special Technology Tracks

The Society for Information Display's annual Symposium at Display Week offers a wide selection of presentations on display technology that simply cannot be found anywhere else. This year's program consists of 73 technical sessions with a total of 256 oral presentations and an additional 138 papers to be presented at the Thursday afternoon Poster Session. Please join us in Boston (Tuesday, June 5 – Friday, June 8) to share the latest research and development discoveries of the display industry and to join in the celebration of the 50th Anniversary of the Society for Information Display (1962–2012). This year's special areas of focus are 3D, Green Technologies, Solid-State Lighting, Flexible Electronics and Printed Displays, and Touch and Interactivity. Here is just a sampling of those topics and other innovations you can expect to find at this year's symposium.

3D

Possibly the biggest commercial story in displays in recent years is the arrival of 3D-ready TVs. Now that they have arrived, the story is far from over. Researchers continue to pursue the different approaches of active-shutter *vs.* passive glasses technology, and glasses-free viewing is a major challenge that many experts believe must be met in order to make 3D displays truly successful. This year's presentations also cover topics such as autostereoscopic 3D displays, 3D comfort and perception, volumetric and holographic displays, and stereoscopic and display applications. The Symposium includes the following sessions:

- Oxide TFTs
- Oxide-TFT Manufacturing
- e-Paper I & II
- Oxide AMOLED Displays
- Flexible TFTs
- Printed Displays and Electronics I, II, & III
- Flexible Processes

Green Technologies

Display technology continually advances to provide more resolution, larger size, and better performance – all at a lower cost. At the same time, environmental, social, and legislative forces are combining to ensure that manufacturers use the greenest-possible processes to create the most energy-efficient displays. What are the anticipated production and end-of-life issues for the display industry and how can they be addressed? The Symposium includes the following sessions:

- Driving Methods for Low-Power Displays
- Low-Power Displays and Materials
- Green Optics for Display Systems
- Display Manufacturing: Novel Devices & Green Technology

Solid-State Lighting

Solid-State lighting has begun to fulfill its promise with regard to saving energy and providing design flexibility. However, LEDs have made more commercial inroads in this area than OLEDs, which are currently available only in high-end architectural applications. OLED papers therefore form the bulk of this year's solid-state-lighting sessions, as the industry pushes to develop higher-efficiency, higher-performing OLED panels. Other solid-state-lighting papers will focus on trends in LED illumination. The Symposium includes the following sessions:

- Solid-State-Lighting Applications
- Solid-State Lighting I–IV
- Lighting Devices
- Fabrication Processes and Solid-State Lighting

Flexible Electronics and Printed Displays

Recent advances in the area of flexible electronics and printed displays have created the potential for lightweight, low-cost, and flexible devices based on technologies such as oxide TFT, organic light-emitting diode (OLED), and organic photovoltaics (OPV). This is the first year that SID has dedicated sessions to flexible electronics and printed displays; among the exciting work that will be described at the Symposium are the printing of organic TFTs and a new way to use high-temperature processes on low-temperature substrates. The Symposium includes the following sessions:

- Oxide TFTs
- Oxide-TFT Manufacturing
- e-Paper I & II
- Oxide AMOLED Displays
- Flexible TFTs
- Printed Displays and Electronics I, II, & III
- Flexible Processes

Touch and Interactivity

Since the launch of touch-enabled mobile devices several years ago, touch has become an increasingly crucial component for numerous display products. Yet, the industry has not found the ideal touch-technology solution. Touch is in an evolutionary phase now, and this year's papers reflect the diversity of approaches: projective-capacitive, optical, and many more. Which touch technologies hold the most promise and what is the next application or technology on the horizon? The Symposium includes the following sessions:

- Optical Touch Panels
- Enabling Technologies for Touch
- Projected-Capacitive Touch Panels

The topics described above are only a portion of the wealth of information you will discover at this year's Symposium. Visit www.displayweek.org to view the Preliminary Program. No one involved in the display industry can afford to miss this event. Please join us this June to engage, learn, and discover what you need to know about the innovations occurring right now in the display industry.

Market Focus Conferences

After a very successful debut in 2010, the Market Focus Conferences, now in their third year, will once again be held in conjunction with Display Week. They will cover the following two topics:

- The LED Lighting Evolution (Wednesday, June 6, 2012)
- The Future of Touch & Interactivity (Thursday, June 7, 2012)

Each Market Focus Conference will concentrate on the critical market development issues facing each of these technologies. Developed in collaboration with IMS Research, the conference will feature presentations and panel sessions with executives throughout the display supply chain. Conference fees include a continental breakfast, lunch, refreshments, access to the Exhibit Hall and Symposium Keynote Session on Tuesday morning, and electronic copies of the presentation material. Market Focus Conference registration does not require a current SID membership.

The LED Lighting Evolution – From Sapphire to Lumens: The LED Lighting Evolution conference will take place on Wednesday, June 6. The goal of this event is to allow global-industry leaders throughout the supply chain to explore the cutting-edge innovations that will shape the future of lighting and backlighting. This conference will feature keynotes and presentations from industry leaders, panel sessions, and ample time for networking.

The Future of Touch & Interactivity: The Future of Touch & Interactivity conference is the premiere event for display-industry professionals to learn about the latest in human–machine-interface technologies. The event will take place on Thursday, June 7, and cover how touch and interactive solutions are shaping the display industry. The Future of Touch & Interactivity will feature keynotes and presentations from industry leaders, panel sessions, and ample time for networking.

For further updates visit www.imsconferences.com/sidfti/html

SID Business Enterprise (Business Conference and Investors Conference)

Business Conference: The Business Conference will take place on Monday, June 4. The event will feature some of the leading minds from both Wall Street and the display industry and address the opportunities and challenges we are facing in this highly volatile economic environment. The Business Conference will feature keynotes and presentations from industry leaders, lively panel sessions, and ample time for networking.

For further updates visit www.imsconferences.com/sidbc.html.

Investors Conference: Co-sponsored by Cowen & Co., LLC, a securities and investment banking firm, this Conference, to be held on Tuesday, June 5, will feature company presentations from leading public and private display companies, intended to appeal primarily to securities analysts, portfolio managers, investors, M&A specialists, and display company executives.

For further updates visit www.cowen.com

2012 SID Seminar Series

Sunday Short Courses

The Society for Information Display presents four 4-hour short courses on diverse topics related to information display on Sunday, June 3. The tutorials are characterized by technical depth and small class size. The classes will cover the fundamentals of electronic information displays and will be held on the morning and afternoon of the Sunday preceding the Symposium. Full-color tutorial notes will be distributed to all participants and are included in the fee. Ample time will be provided for questions from the audience. The speakers are leaders in their respective fields and bring an international perspective to information display.

- **S-1:** Fundamentals of Solid-State Lighting and Manufacturing Technologies
- **S-2:** Fundamentals of Flexible-Display Technology
- **S-3:** Fundamentals of Touch Technologies and Applications
- **S-4:** Fundamentals of Active-Matrix Devices and Applications

Monday Technology/Applications Seminars

The SID Technology Seminars present lectures on diverse topics related to electronic information displays. These seminars are tutorial in nature, and an attempt is made to provide information at three levels. First and foremost, the technical foundations of the topic are treated in detail. Next, recent technical advances are discussed, and, finally, the current state of the art and the projection of future trends are analyzed. The Applications Seminars focus on the application and evaluation of information displays.

These seminars benefit both newcomers and experienced professionals. Engineers new to assignments in information display find them especially helpful in getting up to speed quickly. Experienced professionals attend to keep up with recent developments in fields closely related to their specialties. Managers attending the seminars obtain a broad perspective of the display field and a sense of its recent dynamics. Attendees will receive an excellent set of full-color notes, consisting of the instructor's presentation slides replete with references and illustrations. Ample time is provided for questions from the audience in each session. The speakers are leaders in their fields who bring an international perspective to information display.

Track 1: Liquid-Crystal Technology
- **M-1:** Photo-Alignment of LCDs and Polymer Films by Side-Chain Photopolymers
- **M-6:** Microsecond-Response-Time Blue-Phase LCDs

Track 2: Flexible Displays
- **M-2:** Flexible-Display Technologies
- **M-7:** Flexible Display Types and Applications

Track 3: Touch and Interactivity
- **M-3:** Capacitive Touch
- **M-8:** The Leading Edge of Touch

Track 4: 3D Technology
- **M-4:** Signal Processing for Stereoscopic 3D Displays
- **M-9:** Non-Glasses 3D Technology

Track 5: Nanotechnology and Mobile Displays
- **M-5:** Nanotechnology for Displays: A Potential Breakthrough for OLED Displays and LCDs
- **M-10:** Mobile Multimedia Displays

Track 6: OLED Technology
- **M-11:** OLED Lighting
- **M-16:** AMOLED-Based Displays for Future TV Markets

Track 7: e-Paper
- **M-12:** A Critical Review of the Present and Future Prospects for e-Paper
- **M-17:** Displays for eReaders: Selection Criteria and Technologies

Track 8: Pico-Projectors
- **M-13:** Introduction to Pico-Projectors
- **M-18:** Pico-Projector Applications

Track 9: Large-Area Displays
- **M-14:** The Future of Out-of-Home Displays
- **M-19:** Flexible Film Display Media for Signage

Track 10: Emerging Display Applications
- **M-15:** The Next Big Thing
- **M-20:** New Application Trends

For further details visit www.DisplayWeek.org.

Special Event

Boston's Museum of Science — Sponsored by Corning Incorporated

CORNING

Come join us on this special event to Boston's Museum of Science and celebrate the 50th Anniversary of SID courtesy of Corning Incorporated on Wednesday evening, June 6. Attendees will dine amid high-tech devices, mingle among Mesozoic creatures, and experience a journey to the stars. The Museum offers film presentations in digital 3D using their state-of-the-art 3D digital projection system that incorporates polarized light instead of the traditional red/blue lens filters. Truly one of the region's most unique settings, the Museum offers novel surroundings and out-of-the-ordinary experiences that promise to intrigue and entertain.

Buses will leave the Boston Convention and Exhibition Center between 6:30 and 6:45 pm on Wednesday evening to take attendees to the museum for the 7:00 start time. Buses will return after the event ends at 10:00 and drop off guests at each of the SID-blocked hotels (Westin and Seaport).

Tickets are $50 per person and can be purchased at the SID Registration Desk during Display Week.

Display Week 2012 Overview

Boston Convention & Exhibition Center, Boston, MA USA

June 3–8, 2012

TIMETABLE	Sunday	Monday		Tuesday			Wednesday			Thursday			Friday
	Course	Seminars	Bus Conf	Symp	Exh	Inv	Symp	Exh	Focus	Symp	Exh	Focus	Symp
7:45 AM - 8:30 AM			Business Conference	SID Bus Mtg									
8:30 AM - 9:00 AM		Seminars M1 -M5		Welcome & Keynote Addresses									
9:00 AM - 9:30 AM	Short Courses S1 & S2						Oral Sessions 21-26	Exhibits / Exhibitors Forum Sessions / I-Zone	Market Focus Conference: The Lighting Evolution	Oral Sessions 39-44	Exhibits/ Exhibitors Forum Sessions	Market Focus Conference: Future of Touch and Interactivity	Oral Sessions 63-68
9:30 AM - 10:00 AM													
10:00 AM - 10:30 AM													
10:30 AM - 11:00 AM		Seminars M6 -M10		Oral Sessions 3-8	Exhibits / Exhibitors Forum Sessions / I-Zone	Investors Conference	Oral Sessions 27-32			Oral Sessions 45-50			Oral Sessions 69-73
11:00 AM - 11:30 AM													
11:30 AM - 12:00 PM													
12:00 PM - 12:30 PM			Bus. Conf. Lunch				Luncheon: DYA & Best-in-Show Awards						Auth. Int.
12:30 PM - 1:00 PM													
1:00 PM - 1:30 PM										Oral Sessions 51-56			
1:30 PM - 2:00 PM		Seminars M11- M15	Business Conference				Designated Exhibit Time						
2:00 PM - 2:30 PM				Oral Sessions 9-14									
2:30 PM - 3:00 PM													
3:00 PM - 3:30 PM	Short Courses S3 & S4									Oral Sessions 57-62			
3:30 PM - 4:00 PM		Seminars M16 - M20		Oral Sessions 15-20			Oral Sessions 33-38						
4:00 PM - 4:30 PM													
4:30 PM - 5:00 PM										Auth. Int.			
5:00 PM - 5:30 PM			Bus. Conf. Recept.	Auth. Int.		Inv. Conf. Recept.	Auth. Int.			Poster Session			
5:30 PM - 6:00 PM													
6:00 PM - 6:30 PM							Special Event						
6:30 PM - 7:00 PM													
7:00 PM - 7:30 PM													
7:30 PM - 8:00 PM													
8:00 PM - 8:30 PM		Awards Banquet											
8:30 PM - 9:00 PM													
9:00 PM - 9:30 PM													
9:30 PM - 10:00 PM													

Display Week 2012 Symposium at a Glance

2012 SID Display Week Symposium at a Glance – Boston Convention and Exhibition Center

	Times	Ballroom East	Ballroom West	Room 205AB	Room 205C	Room 210A	Room 210B	Times	
Tuesday, June 5	8:00 – 10:20	SID Business Meeting and Keynote Session (Concourse Hall)						8:00 – 10:20	Tuesday, June 5
	10:50 – 12:10	3 Oxide TFTs	4 Blue-Phase Liquid Crystal 1	5 Stereoscopic Display Applications (Joint with Applications)	6 Innovations in FPD Analysis	7 Plasma-Display Technology	8 e-Paper I	10:50 – 12:10	
	2:00 – 3:20	9 Oxide AMOLED Displays	10 Blue-Phase Liquid Crystal 2	11 Polarization-Based 3D Displays (Joint with Systems and Liquid Crystal)	12 Advances in 3D Display Characterization (Joint with 3D)	13 CaMgO Protective Layer for Low-Power Plasma Displays	14 e-Paper II	2:00 – 3:20	
	3:40 – 5:00	15 AMOLED Displays	16 Blue-Phase Liquid Crystal 3	17 Autostereoscopic 3D Displays I (Joint with Systems)	18 Advanced and 3D Display Applications (Joint with 3D)	19 Solid-State Lighting Applications (Joint with Applications)	20 Flexible TFTs	3:40 – 5:00	
	5:00 – 6:00	Author Interviews (Exhibit Hall)						5:00 – 6:00	
Wednesday, June 6	9:00 – 10:20	21 OLED Displays I	22 Liquid-Crystal Alignment I	23 Autostereoscopic 3D Displays II (Joint with Applications)	24 Novel and Emerging Display Applications	25 Optical Touch Panels (Joint with Active-Matrix Devices)	26 Flexible Display Manufacturing (Joint with Manufacturing)	9:00 – 10:20	Wednesday, June 6
	10:40 – 12:00	27 OLED Displays II	28 Liquid-Crystal Alignment II	29 LC Lens for 3D (Joint with Liquid Crystal)	30 Video Processing for 2D/3D (Joint with 3D)	31 Enabling Technologies for Touch	32 Printed Displays and Electronics I (Joint with Flexible)	10:40 – 12:00	
	2:00 – 3:30	Designated Exhibit Time (Exhibit Hall)						2:00 – 3:30	
	3:30 – 4:50	33 OLED Devices I	34 Ferroelectric and Antiferroelectric LC Effects	35 3D Lightfield Imaging and Displays (Joint with Systems)	36 Image-Quality Enhancement	37 Projected-Capacitive Touch Panels	38 Printed Displays and Electronics II (Joint with Flexible)	3:30 – 4:50	
	5:00 – 6:00	Author Interviews (Exhibit Hall)						5:00 – 6:00	
Thursday, June 7	9:00 – 10:20	39 OLED Devices II	40 Cholesteric LCDs	41 Solid-State Lighting I	42 Intra-Panel Interface	43 Driving Methods for Low-Power Displays	44 Display Manufacturing: Flexible Processes (Joint with Flexible)	9:00 – 10:20	Thursday, June 7
	10:40 – 12:00	45 Solid-State Lighting II (Joint with Lighting)	46 Novel Non-Emissive Displays	47 3D and Multiview Projection (Joint with Projection)	48 Display Driving Techniques	49 Low-Power Displays and Materials	50 Display Manufacturing: Lamination & Testing	10:40 – 12:00	
	1:30 – 2:50	51 Solid-State Lighting III (Joint with Lighting)	52 Electrophoretic Displays	53 Lens Design for 3D Displays (Joint with Systems)	54 Color	55 Green Optics for Display Systems (Joint with Green)	56 Display Manufacturing: Oxide TFTs (Joint with Active-Matrix Devices)	1:30 – 2:50	
	3:10 – 4:30	57 Solid-State Lighting IV (Joint with Lighting)	58 High-Resolution TVs	59 Volumetric, Lightfield, and Holographic Displays (Joint with Systems)	60 Image Quality and Viewing Experience	61 Cool Lasers for Projection	62 Display Manufacturing: Novel Devices and Green Technology (Joint with Green)	3:10 – 4:30	
	4:30 – 5:30	Author Interviews (Exhibit Hall)						4:30 – 5:30	
	5:00 – 8:00	Poster Session (Exhibit Hall)						5:00 – 8:00	
Friday, June 8	9:00 – 10:20	63 FED and Emissive Devices	64 High-Performance Mobile Displays	65 3D Comfort (Joint with Applied Vision)	66 Novel Backlights (Joint with Lighting)	67 Optical Components for Projection	68 Display Manufacturing: Fabrication Processes and Solid State Lighting (Joint with Lighting)	9:00 – 10:20	Friday, June 8
	10:40 – 12:00	69 Lighting Devices	70 Novel Display Devices	71 3D Perception (Joint with Applied Vision)		72 Projection Display Systems (Joint with Systems)	73 Display Manufacturing: Substrates	10:40 – 12:00	
	12:00 – 1:00	Author Interviews (Exhibit Hall)						12:00 – 1:00	

TECHNOLOGY TRACKS KEY

3-D	Active-Matrix Devices	Applications	Applied Vision	Electronics	Emissive
Flexible	Green	Lighting	Liquid Crystal	Manufacturing	Measurement
OLEDs	Printed Displays and Electronics		Projection	Systems	Touch