

SID Recognizes Outstanding Members of the Display Community

*This year's winners of the Society for Information Display's Honors and Awards include **Hiroyuki Ohshima**, who will receive the Karl Ferdinand Braun Prize for his contributions to LTPS technology and the mobile-display industry; **Shui-Chih Alan Lien**, who has earned the Jan Rajchman Prize for his contributions to LCD science and technology; **Martin S. Banks**, who will receive the Otto Schade Prize for his research into the causes of viewer discomfort and misperceptions in depth and motion; **Deng-Ke Yang**, who has earned the Slottow-Owaki Prize for his contributions to the education of students and professionals in the field of liquid-crystal displays; **Kenneth I. Werner**, who will receive the Lewis and Beatrice Winner Award for his services as editor, teacher, technologist, and SID proponent; and **Yi-Pai Huang**, who will receive the inaugural Peter Brody Prize for his contributions to the development of wide-view MVA-pixel technology and field-sequential-color driving methodology.*

by Jenny Donelan

The popular notion of a gifted scientist is often that of a driven individual toiling away in some laboratory through the dark hours of the night. And while such efforts may describe many of this year's winners at certain points during their lives, it's important to note that they rarely worked alone. The 2017 Honors and Awards recipients point to the synergies they experienced as members of a team, or as attendees at a conference such as Display Week, as a driving force for their research.

Hiroyuki Ohshima, winner of this year's Braun Prize, began his life's work in TFT LCDs as part of a team that was tasked by its employer to develop something new – a broad directive that would have been daunting if taken on alone. Jan Rajchman Prize winner Shui-Chih Alan Lien remembers discovering

Jenny Donelan is the editor in chief of Information Display Magazine. She can be reached at jdonelan@pcm411.com.

the contagious excitement generated by researchers presenting at Display Week – their zeal made him work harder. And when he and his co-workers finally solved a tough viewing angle problem, he was “happy and proud to be part of the team that developed this exciting and useful technology.” Martin S. Banks, winner of the Otto Schade Prize, was already a successful vision-science academic when he found a new direction after meeting SID researchers and learning how his expertise could inform display research. Slottow-Owaki winner Deng-Ke Yang is a gifted teacher (as well as researcher) who through his mentoring has sent many highly skilled display professionals into the global workplace. Kenneth I. Werner, who has been named recipient of this year's Lewis and Beatrice Winner Award, discovered that as much as he gave to the Society for Information Display through participating in its events and publications, he got back through enrichment to both his personal and

The 2017 winners will be honored at the SID Honors & Awards Banquet, which takes place at 8:00 pm, Monday evening, May 22, 2017, during Display Week at the Hotel Indigo in Los Angeles. Tickets cost \$100 and must be purchased in advance – they will not be available on site.

Visit www.displayweek.org for more information.

professional life. The winner of this year's Peter Brody Prize, Yi-Pai Huang, was also changed by visiting a SID symposium, where he was sparked by the excitement of the researchers there.

It is inspiring to see the humility with which these great scientists offer credit to the colleagues and mentors who helped them along the way. Please join us in congratulating this year's award winners. Their collaborative efforts have contributed to a stronger society, and thus to a stronger display industry.

2017 Karl Ferdinand Braun Prize

This award is presented for an outstanding technical achievement in, or contribution to, display technology.

Hiroyuki Ohshima, SID fellow and CTO of Japan Research Center for Huawei, receives this year's Braun Prize "for his outstanding contributions to the research and development of LTPS technology and his leadership in the mobile-display industry."

After graduating from the University of Tokyo, Ohshima's first job was working on semiconductors in the R&D department at Seiko Epson. In the early 1980s, the company relocated most of Ohshima's colleagues to a new semiconductor fab, leaving Ohshima and a few other researchers behind with instructions to leverage their semiconductor experience toward developing new technologies. Ohshima's team eventually decided to focus on thin-film transistor (TFT) LCDs because they thought the technology had potential for creating new flat-panel displays. That thought was novel: At the time, notes Ohshima, few people were aware of TFTs or their possible application to LCDs. "This was the start of my long journey with TFT-LCDs as my life work," he says.

As part of that journey, Ohshima helped develop low-temperature polycrystalline-silicon (LTPS) TFT technology. He also helped commercialize it for mobile displays, making possible the mobile device era in which we live today.

According to Tatsuo Uchida, SID fellow and professor emeritus at Tohoku University, "Mr. Ohshima was engaged in the research and development of LTPS TFT from a very early time, when it was still unexplored. He solved many problems relating to LTPS TFT for LCD drivers and peripheral circuits, and the resulting technology is now used for various high-definition active-matrix LCDs and



Hiroyuki Ohshima

OLEDs. Without his outstanding achievements, current high-resolution displays would not have been realized."

Ohshima notes that considerable challenges still exist for LTPS technology. "I call LTPS 'giant microelectronics,' he says, explaining that the technology integrates an enormous amount of micro devices onto "giant" glass substrates. "LTPS technology is so complicated by nature, and requires great technical maturity and careful alignment between product design and manufacturing processes." These considerations make it challenging to implement LTPS on a mass production basis. However, recent market trends require LTPS solutions for both LCD and OLED applications. This means that more companies interested in implementing LTPS are entering the market, and these companies represent new research and career opportunities for the next generation of display scientists.

When asked if he has advice for that next wave of display scientists, Ohshima says, "Looking back in history, we should remind ourselves that many new display technologies have been proposed with successful demonstrators, but eventually failed in industrialization and/or business." In order to avoid such failures, he recommends that displays be considered not by themselves but in relation to a variety of aspects, including supply chains both upstream and downstream, infrastructures, material supplies, manufacturing equipment, design tools, and global market trends.

2017 Jan Rajchman Prize

This award is presented for an outstanding scientific or technical achievement in, or contribution to, research on flat-panel displays.

Shui-Chih Alan Lien, SID fellow and CTO of China Star Optoelectronics (CSOT), receives the Jan Rajchman Prize "for his outstanding contributions to LCD science and technology, especially for the development of multi-domain VA LCDs, extended Jones matrix, and 110-in. curved televisions."

Shui-Chih Alan Lien's career has been marked by a wide range of achievements within the field of liquid-crystal displays. He was instrumental to the development of multi-domain vertical alignment (VA) LCDs, which helped create LC displays with wider viewing angles. He developed the extended Jones matrix, which calculates polarization changes through each layer of an LCD and the LCD's optics for the oblique incidence of light. And he led an R&D team at CSOT to develop the world's first 110-in., ultra-high-definition TFT-LCD panel with multiple touch and 3D functionality. (That product won a Display of the Year Silver Award from SID.) These are just three of the breakthroughs that Lien has helped bring about during a long career that has included positions at Optical Imaging Systems, IBM, AUO, and TCL, in addition to CSOT.

Lien says he was lucky because the LCD industry was just beginning while he was working on his Ph.D. degree in physics at the University of Minnesota. "I was fortunately able to find a job in the field of TFT-LCDs after finishing my degree. I liked the technology and have continued to work with it throughout my career."

In 1987, Lien joined the IBM T. J. Watson Research Center. By that time, "the LCD industry was blooming," he says, adding that narrow viewing angle issues were a major challenge for LCDs. "It was an exciting time to join the SID symposium each year," he says, "since a variety of multi-domain technologies were being proposed and demonstrated to solve the viewing angle problem. I really enjoyed discussing these topics with colleagues working in the same field – it stimulated many new ideas. Because of the exciting and hard work of engineers and scientists, the narrow viewing angle problem of TFT-LCD was solved." He describes that breakthrough as one of the most important in his career. "I am very happy and proud to be

2017 Honors and Awards



Shui-Chih Alan Lien

part of the team that developed this exciting and useful technology.”

Now the LCD industry is facing a challenge from AMOLEDs, says Lien, especially for small- and medium-sized panels. AMOLED has advantages in terms of response time, flexibility, and formability. “The LCD industry needs to overcome these three disadvantages in order to compete with AMOLED for the small and medium panel.” According to his associates, it is typical of Lien that he considers the next challenge in terms of the big picture. Says Hidefumi Yoshida, research director at Sharp, “Dr. Lien has great leadership in both development and commercial fields.”

2017 Otto Schade Prize

The Otto Schade Prize is awarded for outstanding scientific or technical achievement in, or contribution to, the advancement of functional performance and/or image quality of information displays.

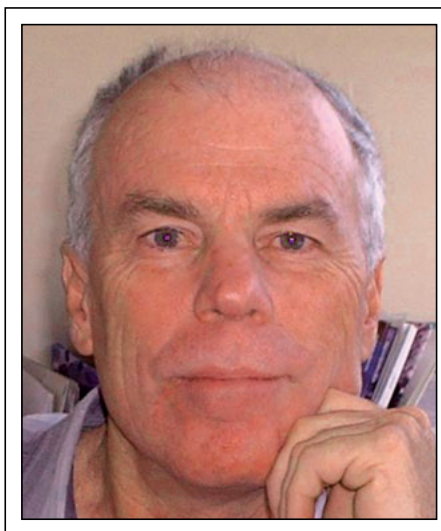
Martin S. Banks, professor of optometry and vision science at UC Berkeley, receives the Otto Schade Prize “for his research into the causes of viewer discomfort and misperceptions in depth and motion and the creation of volumetric technology to mitigate these effects.”

At first glance, Martin Banks’ educational path would not seem likely to lead to a career in vision science and optometry and to research in stereoscopic user discomfort and misperception that has changed the way dis-

plays are designed. As an undergraduate, Banks majored in psychology and minored in physics. After teaching in Germany for a year, he earned a master’s degree in experimental psychology, and then a Ph.D. in developmental psychology at the University of Minnesota.

“I always had an interest in the harder side of psychology and that got me interested in perception,” says Banks. His early work was in hearing research, but he switched to developmental psychology, at the time a rapidly growing field. Then he became interested in adult vision, and managed to get himself assigned to teach a binocular vision class. “I spent a summer learning as much as I could about the field so that I’d be able to teach competently when the class convened,” says Banks. Apparently, he was successful: “I really liked the topic and that got me into stereoscopy.”

The next career step – to displays – came about as a result of a couple of fortuitous events: First, Banks was invited to speak about vision science to a group of engineers at an SID meeting in Southern California. “I realized at the time how these folks were starving for more information about the visual system,” says Banks. Second, he met Kurt Akeley, one of the founders of Silicon Graphics, and together they began exploring the interfaces of computer science, vision science, and display engineering. That research generated a great deal of interest from the display community, and Banks has been doing some form of it ever since.



Martin S. Banks

“I’ve read several papers by Marty during the years and have been very impressed by his great analytic methods and knowledge about the visual system and applications related to displays,” says Adi Abileah, display consultant and 2012 Otto Schade Prize winner.

“Specifically and most recently, his models about vergence and accommodation conflicts, which cause discomfort and nausea in stereoscopic displays, are of great interest. His overall contribution to the understanding of the human vision system is an asset to the display industry.”

According to Banks, the challenges that vision science researchers are working on right now include color, high dynamic range, and especially the reproduction of focus cues (blur and accommodation) with high fidelity. Progress in vision science has been very steady, says Banks. “But display engineers have become increasingly interested in what vision scientists have to tell them. And many vision scientists have become increasingly interested in working with display engineers. The level of interaction between these two fields is so much greater now than it was a decade ago.”

2017 Slottow-Owaki Prize

The Slottow-Owaki Prize is awarded for outstanding contributions to the education and training of students and professionals in the field of information displays.

Deng-Ke Yang, SID fellow and professor at Kent State University, receives the Slottow-Owaki Prize “for his contributions to the education and training of students and professionals in the field of liquid-crystal displays.”

Deng-Ke Yang’s major technical achievements are in the areas of bistable cholesteric reflective displays and polymer stabilized cholesteric texture light shutters. These scientific contributions are documented in two books, five book chapters, more than 120 publications, and 21 issued and pending patents.

But it is his work as an educator and mentor that has earned him the 2017 Slottow-Owaki Prize. “I have known Professor Yang for over 20 years and I am proud to say I am one of his many students at the Liquid Crystal Institute (LCI) at Kent State University,” says Ray Ma, director of flexible OLED R&D at Universal Display Corporation. “Professor Yang takes pride in his work as a teacher and regards teaching as one of the highest honors,” Ma continues. “Even today, I still keep my notes



Deng-Ke Yang

from his class in my office and will reference them once a while.”

Over the years, Yang has advised more than a dozen graduate students, many of whom are now working in companies such as 3M, Apple, Corning, Kodak, Tianma, and UDC. “They are all playing important roles in the display industry because of the solid training they received from LCI under the guidance of Professor Yang,” says Ma.

Yang also teaches classes at various universities around the world. He has authored two books with Shin-Tson Wu, *Reflective Liquid Crystal Displays* and *Fundamentals of Liquid Crystal Devices*. Both are extremely popular references for students and professionals in the field of liquid-crystal displays the world over.

Yang became interested in the study of liquid crystals when he entered graduate school 33 years ago. “I realized that liquid crystals are interesting in terms of fundamental science and are also important for practical applications. Furthermore it does not cost much to do liquid-crystal research!” Yang continues to research cholesteric liquid-crystal devices. The biggest challenge for this technology, he says, is to develop video-rate, high-image-quality transfective displays that can be used everywhere, from dim indoor lighting to bright sunny outdoor conditions.

2017 Lewis and Beatrice Winner Award

The Lewis and Beatrice Winner Award for Distinguished Service is awarded to a Society member for exceptional and sustained service to SID.

Kenneth I. Werner, journalist, analyst, consultant, and principal of Nutmeg Consultants, receives the Lewis and Beatrice Winner Award “for his dedicated services as editor,



Kenneth I. Werner

author, teacher, technologist, and, most importantly, one of the strongest proponents of SID.”

Ken Werner’s connections to SID date back to a time when he was managing editor of *IEEE Spectrum* and happened to edit an article on display technology by Larry Tannas, founder of Tannas Electronic Displays and a past president of SID. Two years later, when the Society needed an editor for this magazine, Tannas remembered Werner’s work and

2017 SID Special Recognition Awards

Presented to members of the technical, scientific, and business community (not necessarily SID members) for distinguished and valued contributions to the information-display field.



Masaki Hasegawa “for his invention of decomposition-type photoalignment used in IPS and FFS LCDs to achieve a high contrast ratio and low power consumption.”

Dr. Hasegawa is a manager of Merck Performance Materials Ltd. He earned his Ph.D. degree in engineering from Tokyo Institute of Technology.



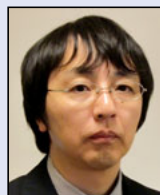
Raymond Kwong “for his pioneering research on and commercialization of high-efficiency and high-stability phosphorescent OLED materials and devices.”

Dr. Kwong is currently the director of Universal Display Corporation HK Ltd. He received his Ph.D. in chemistry from the Univ. of Southern California.



Jang Hyuk (Jeremy) Kwon “for his pioneering research on OLED displays, especially on the top-emission device architecture in AMOLED displays.”

Dr. Kwon is a professor at Kyung Hee University. He has a Ph.D. in chemistry from the Korea Advanced Institute of Science and Technology (KAIST).



Kenichiro Masaoka “for his leading contributions to the research and development of a wide-color-gamut UHD-TV display system and gamut-area metrology.”

Dr. Masaoka is a principal research engineer with the Advanced Television Systems Research Division, NHK Science and Technology Research Laboratories. He received his Ph.D. in engineering from the Tokyo Institute of Technology.

2017 Honors and Awards

hired him for *Information Display*. Werner stayed at the magazine from 1987 to 2005, bringing the magazine to what was universally recognized as a new standard of excellence. “During Ken’s time with *Information Display*, the magazine became truly professional,” says Tannas.

After his stint with *Information Display*, Werner continued to work in the display industry, as he does to this day. Years earlier, after leaving *IEEE Spectrum*, he had founded Nutmeg Consultants, which specializes in

display industry manufacturing, technology, and applications, including mobile devices and television. He continues to run Nutmeg Consultants, and is also a senior analyst for display research firm MEKO, Ltd.; a founding co-editor of MEKO’s *Display Daily*; and a regular contributor to HDTVexpert.com

Werner has also stayed involved with SID, serving as program chair or co-chair for several of the Los Angeles chapter’s one-day conferences – a long-running and very successful series.

He has also supported various display activities in Brazil, culminating with the formation of the Latin American Chapter. “Ken has been a key contributor to Latin Display over the years,” wrote Alaide, Victor, and Carlos Mammana (Latin America Chapter chair, director, and member, respectively) in a statement recommending Werner for the award. “Over many years, Ken not only disseminated knowledge about displays but championed the SID organization, explaining its goals and helping to foster the creation of the Latin American Chapter for SID. He continues to motivate the industry to increased participation in SID activities.”

Werner’s background is not that of a typical wordsmith. He has a degree in physics and started out as an engineer at RCA. “I found that I enjoyed the first six months of each project when I was trying to figure out which way was up, and then found the next 18 months of wrapping up the details to be horribly tedious,” says Werner. “So I looked for an area where I could use my technical expertise as a generalist, rather than a hyper-specialist.” This led him to publishing, and eventually, to SID.

Werner says, “I received great satisfaction from covering SID’s major conferences for *Information Display*, which gave me the opportunity to make many friends in the display industry and to view display technology and manufacturing around the world close up.” He also enjoyed running the promotion and press relations program for Display Week, though he is quick to point out that the person who did most of the work of keeping the press happy was his friend and colleague Dian Mecca.

When asked about the significance of the award to his career, Werner replies: “I didn’t do these things in order to win an award, even one as prestigious as the Lewis and Beatrice Winner Award. I did them because people asked me. And by simply saying ‘yes,’ I wound up greatly enriching my professional and personal life. This award is icing on the cake.”

2017 Peter Brody Prize

The Peter Brody Prize (new this year) is awarded to honor outstanding contributions of young researchers (under age 40) who have made major-impact technical contributions to the developments of active matrix addressed displays in one or more of the following areas:

2017 SID Fellow Awards

The grade of Fellow is conferred annually upon SID members of outstanding qualifications and experience as scientists or engineers whose significant contributions to the field of information display have been widely recognized.



Toshiaki Arai “for his distinguished contributions to high-reliability high-performance oxide-TFT technology for AMOLED displays.”

Dr. Arai is a chief technologist at JOLED Inc. He received his Ph.D. degree from the Nara Institute of Science and Technology.



Sin-Doo Lee “for his outstanding contributions to fast-switching and wide-view LCD technologies, ranging from vertically aligned nematic to defect-free ferroelectric modes.”

Dr. Lee is a professor in the School of Electrical Engineering of Seoul National University. He received his Ph.D. degree in liquid-crystal physics from Brandeis University.



Hyun Jae Kim “for his original contributions to LTPS TFTs using excimer-laser annealing and for implementing the annealing process into the commercial production of LTPS TFT-LCDs and AMOLED displays.”

Dr. Kim is a professor in the School of Electrical and Electronic Engineering at Yonsei University in Seoul, Korea. He received his Ph.D. degree in materials science and engineering from Columbia University.



Sang-Hee Ko Park “for her development of the first AMOLED display with oxide TFTs.”

Dr. Park is a professor at the Korean Advanced Institute of Science and Technology. She earned a Ph.D. in chemistry from the University of Pittsburgh.



Qun (Frank) Yan “for his outstanding contributions to plasma displays, especially for inventing and developing the calcium magnesium oxide protective layer for the mass production of high-luminous-efficacy PDPs.”

Dr. Yan is a distinguished professor at Fuzhou University and chief technology advisor for Changhong Electric Group Co., Ltd. He received his Ph.D. in physics from Vanderbilt University.

- *Thin film transistor devices*
- *Active matrix addressing techniques*
- *Active matrix device manufacturing*
- *Active matrix display media*
- *Active matrix display enabling components*

Yi-Pai Huang, professor and associate dean of R&D at National Chiao-Tung University, earns the inaugural Peter Brody Prize “for his innovative contributions to the development of wide-view MVA-pixel technology and the invention of the field-sequential-color driving method to achieve imperceptible color breakup.”

An appreciation for art and imagery led Yi-Pai Huang to a career in displays. “My father is a photographer, so I enjoyed seeing beautiful pictures when I was a kid,” says Huang. While at graduate school at National Chiao-Tung University, he had the chance to visit Professor Han-Ping Shieh (a display pioneer in his own right and winner of a Slottow-Owaki Prize). There in Shieh’s lab, he saw many new TFT-LCD technologies powering displays with beautiful imagery. “Therefore, I decided to join Shieh’s group to do research for improving the optics and picture quality of displays and TFT-LCDs,” says Huang.

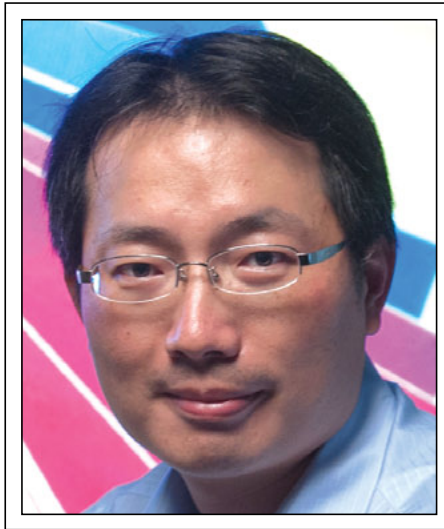
He went on to develop advanced-MVA TFT-LCD for reduced color washout, invent a stencil-FSC driving method to achieve imperceptible color break-up, and implement an LC-lens array for various 3D applications. He has published 60 journal papers, 133 conference papers, and 3 book chapters. He holds 98 issued patents.

“Huang is an outstanding scientist who has made tremendous accomplishments at a young age,” says Fan Luo, retired CTO for AUO, who worked with Huang at AUO.

“Professor Huang has also been very active in

SID activities, serving as chair of the Taipei Chapter and program chair for the technical symposium.”

Huang notes that growing up, he was drawn to sports as well as science. He might have



Yi-Pai Huang

become an athlete or a physical education teacher, he says, had his mom not steered him toward science when he was 18 and applying to undergraduate programs.

He credits SID with providing a great deal of inspiration early on. “I joined my first SID symposium in 2001 and saw many researchers engrossed in display technology and excitedly reporting their most innovative achievements in the symposium,” he says. “That really encouraged me to focus more on display research.” In 2009, Huang became the officer of SID’s Taipei chapter and the program committee member of SID. He says he has learned a great deal from senior scientists in this society, in terms of both leadership and technology. “I really have to give my sincere appreciation to SID,” he says, “and especially to my senior mentors, Professor Han-Ping Shieh, Professor Shin-Tson Wu, Dr. Fan Luo, and Dr. John Chen.”

When asked what advice he might give to young researchers starting out, Huang offered this:

“Young people have ‘fresh’ brains, so they shouldn’t be bounded by old technology. The displays of the future could be some arbitrary type – we could have images floating in the air, or even imaging directly into the brain. I would like to encourage young people to use their imaginations to develop a future type of display in their minds, and then try to realize it solidly, because your achievement will never be greater than your dream.” ■

The 2017 Honors and Awards Committee members are:

- Shin-Tson Wu, *Chair*
- Paul Drzaic
- Min-Koo Han
- Ingrid Heynderickx
- Chris King
- Fan Luo
- Haruhiko Okumura
- Jun Souk
- Ching Tang
- Andrew Watson
- Larry Weber



I-Zone

Display Week 2017

Innovation Zone (I-Zone)

May 23-25, 2017

Sponsored by E Ink

The prototypes on display in the Innovation Zone at Display Week 2017 will be among the most exciting things you see at this year’s show. These exhibits were chosen by the Society for Information Display’s I-Zone Committee for their novelty, quality, and potential to enhance and even transform the display industry. Programmable shoes, interactive holograms, the latest head-up displays, and much more will not only fire your imagination, but provide an advance look at many of the commercial products you’ll be using a few years from now.

SID created the I-Zone as a forum for live demonstrations of emerging information-display technologies. This special exhibit offers researchers space to demonstrate their prototypes or other hardware demos during Display Week, and encourages participation by small companies, startups, universities, government labs, and independent research labs.

Don’t miss the 2017 I-Zone, taking place on the show floor at Display Week, May 23-25.

**I-Zone 2016 Best
Prototype Award Winner:
nVerpix**