

SEMI AROUND THE WORLD

AMD, Intel, Cypress and Synopsys Execs Will Give Keynote Speeches at SEMICON West 2007

SEMICON® West will return to the Moscone Center in San Francisco, California the week of July 16–20. Presentations at this year's exposition will focus on a range of topics that are revolutionizing the advanced manufacturing world including new opportunities for high-k materials, the solar energy market and innovative new advances in design-for-manufacturing.

Keynote speakers will include Douglas Grose, SVP of technology development, manufacturing and supply chain, AMD; Paolo Gargini, Intel fellow, Technology and Manufacturing and group director, Technology Strategy, Intel; T.J. Rodgers, chairman, SunPower Corporation and chairman and CEO, Cypress Semiconductor; Rhone Resch, president, Solar Energy Industries Association (SEIA); and Aart de Geus, chairman and CEO, Synopsys.

"The most exciting developments in the industry are taking place at SEMICON West 2007, and virtually every global equipment and material supplier will be participating," said Victoria Hadfield, president of SEMI North America. "Visitors can expect to see over 200 new product introductions, the latest ITRS updates and discussions, and learn about the most innovative new technological developments which could move the industry past 45 nm and CMOS."

The TechXPOTs ("Tech Spots"), which are essentially shows-within-the-show, feature a combination of exhibits, live technical content, and presentations by the winners of the Technology Innovation Showcase (TIS), as well as special interactive displays. This year's TechXPOTs include Emerging Technologies and Markets, Test Assembly and Packaging and Challenges in Device Scaling. •

SEMICON®
West 2007

JULY 16–20, 2007

EXHIBITS—JULY 17–19, 2007
SAN FRANCISCO, CALIFORNIA

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A New Milestone for Flat Panel Displays

THE FLAT PANEL DISPLAY (FPD) MARKET IS EXPECTED

to reach the \$100 billion mark this year. It is a significant milestone and one that the industry can be proud of. At the same time, cumulative investment in TFT-LCD manufacturing has also reached \$100 billion—most of that within the past decade.

SEMI members are important players in providing the enabling technology used to manufacture TFT LCDs, which account for more than 80 percent of the total FPD market. Currently 243 SEMI members—or about 12 percent of our total membership—consider FPD as a key target market.

Spending on TFT-LCD equipment peaked at \$12 billion last year, according to market research firm DisplaySearch. This will level off over the next three years as FPD fabs digest the significant capital expansion of the past three years. However, the TFT-LCD materials market continues to grow at double-digit rates and is expected to reach \$48 billion this year.

One of the key drivers of the spectacular growth of the FPD market has been large-screen TVs. In fact, LCD TVs have a 38 percent share of the global FPD applications market in terms of revenues, followed by desktop monitors with a 22 percent share, mobile phones with almost 15 percent and notebook computers with just over 11 percent, according to DisplaySearch. LCD TV is not only the largest FPD product application—it is the fastest growing. Unit shipments grew at a CAGR of 118 percent in the two-year period ending Q3 2006, according to DisplaySearch. Growth through to 2008 is forecasted at 40 percent CAGR.

To help suppliers in the FPD supply chain prosper and grow, SEMI provides a global platform to help improve competitiveness. We do this via a range

of activities that include dedicated expositions such as FPD China and FPD Expo Taiwan, business forums such as the Global FPD Partners Conference (GFPC), and market research activities and standards development. These activities offer our members global exposure to the key markets and the opportunity to interact with individuals driving opportunities in the sector.

One challenge facing the FPD industry is the lack of technical standards. Two key areas of focus are substrate sizes and environment, health and safety (EHS). We will soon launch a global survey to assess FPD standards needs and identify top priorities. The survey will incorporate input from panel makers, equipment and materials suppliers, academia, consortia and other organizations to develop a global standards roadmap.

In the semiconductor industry the implementation of SEMI standards has collectively saved billions of dollars through the elimination of redundant and conflicting efforts. We hope to support the growth and development of the FPD industry by facilitating similar cost-saving standards in co-operation with suppliers and customers.

SEMI will continue to support and expand our services to the FPD industry with the goal of strengthening communication and co-operation between equipment suppliers, materials suppliers, the panel makers, and parts manufacturers.

— Stanley Myers •



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SEMICONDUCTOR HISTORY

SEMI Joins Forces with Computer History Museum To Record and Preserve Semiconductor History

FUTURE VISITORS TO THE COMPUTER HISTORY Museum (CHM) in California may wonder why two dirty old wagon wheels are among the displays of Crays, Univacs, Altairs and other relics of the computing age.

The artifacts—donated by SEMI—were retrieved from the Walker's Wagon Wheel Restaurant in Mountain View, California, before it was demolished in 2000. Dag Spicer, senior curator for the CHM, said the museum was pleased to have the wagon wheels because they represent “an enormous constellation of social and economic stories.”

attributed to the IP sharing that took place in drinking establishments like the Wagon Wheel.

The donation of the wagon wheels by SEMI is the latest in a series of co-operative efforts by the two organizations to preserve and record the legacy of the semiconductor industry. SEMI also donated to the CHM an IC packaging materials collection put together over the past four decades by Dan Rose, who was a pioneer in packaging during the early days of Fairchild Semiconductor.

SEMI efforts to preserve and record the history of the industry focus on oral histories with pioneers in the equipment and materials industry. Selected interviews are published monthly in the “SEMI Global Update” online newsletter. To date, more than 40 oral histories have been recorded. They include the founders of companies such as Applied Materials (Michael McNeilly), GaSronics (Monte Toole), Lam Research (David Lam), MRC (Sheldon Weinig), Novellus Systems (Brad Mattson) and Teradyne (Nick DeWolf, Alex d'Arbeloff), among many others. Included are Japanese equipment industry pioneers such as Shoichiro Yoshida (Nikon), Kenichi Sekiya (Disco) and Shigeo Takayama (Hakuto).

In most cases the oral history interviews are videotaped. Selected highlights from past interviews appeared in a 28-minute DVD documentary, “Great Moments in Semiconductor History,” produced in 2005 and available for purchase from the SEMI online store. The documentary features interviews with key device pioneers, including Jack Kilby and Robert Noyce, co-inventors of the IC, and Gordon Moore, who worked with Jean Hoerni on the planar process, which preceded the invention of the IC. In the area of equipment and materials, the documentary features interviews with Robert Lorenzini, founder of Siltec; McNeilly of Applied Materials; and Burton Wheeler, a lithography pioneer who began his career at David W. Mann Company.

Just as the wagon wheels inspire stories about the early days of Silicon Valley, the SEMI oral histories shed light on how the semiconductor equipment and materials industry came to be.

Jerry Hutcheson, founder of VLSI Research and formerly with RCA and Signetics, remembers when there was no such industry. “When the [semiconductor] industry started off, there was no equipment industry,” he said. “Most of the equipment we used we either bought from someone else and then modified, or



Dave House (left) of the Computer History Museum and Stan Myers, president and CEO of SEMI, toast the handover of the wagon wheels.

Dave House, a member of the CHM board of trustees and former Intel executive, said the Wagon Wheel was an important part of the early formation of Silicon Valley. “It was a place where engineers [from different companies] would get together and share their experiences. Sometimes a little bit of information flowed along with the drinks and miraculously the next day, a yield problem was solved or a design problem was solved. I'm sure that today's IP lawyers would be absolutely aghast at what happened in those early days.”

Christophe Lecuyer, historian and author of “Making Silicon Valley,” believes the rapid progress in developing MOS technology in Silicon Valley during the 1960s can be partly



we built from scratch ourselves. As I recall, it was around 1968 or '69 that the equipment industry really began to develop.”

Oral histories also tell what might have been. For example, Applied Materials, now the largest equipment company in the world, was at various times involved in acquisition deals that—had they gone ahead—would have changed the face of the industry.

In the early 1980s, GCA, then a major equipment supplier based in Boston, Massachusetts, began merger talks with Applied. The new entity would have seen GCA founder Milt Greenberg become chairman and Applied CEO Jim Morgan as president.

Jim Gallagher, a senior vice president at GCA, was the go-between during the talks. “I was like a Jewish matchmaker, you could say, in that I would be carrying messages back and forth. Jim [Morgan] and I never talked on the floor. Usually I’d meet him in the parking lot or someplace else and pass the word on,” Gallagher recalls. The talks broke down largely because Greenberg wanted too much control of the merged entity, according to Gallagher, who died in 2006. “One of my greatest disappointments is that it [the merger] never happened,” he said.

Applied was at the center of another deal in the late 80s involving Novellus Systems, which

was then a startup under Brad Mattson. Bob Graham, who worked for Applied at the time, recalled the events in a 1995 interview with the Institute for the History of Technology.

“They [Novellus] had a very high productivity system to do chemical vapor deposition that would knock the socks of anything we had in development at Applied as far as wafer quality,” Graham said. He negotiated the purchase of Novellus and took it to Applied’s CEO Morgan for approval, but the plan was nixed at the last minute. Morgan told his side of the story in a SEMI oral history conducted in 2004. “We had a discussion about buying Novellus as an interim product. I kind of felt we couldn’t ride two horses. I really bet on the [Precision] 5000 because I saw the technology of the multi-chamber, single wafer tool as a wave of the future. So I turned down the acquisition,” said Morgan. As a result, Bob Graham left Applied and was recruited by Brad Mattson as CEO of Novellus. The company grew to become one of the Top 10 equipment companies in the world. •

FLAT PANEL DISPLAY

LCD TV Sector Shines in Global \$100 Billion FPD Market

LCDS HAVE BECOME “AN OVERNIGHT SUCCESS after 30 years,” according to Bruce Berkoff, chairman of the LCD TV Association. “This has been a 30-year process of getting there, with \$100 billion invested [in the TFT-LCD supply chain] and a million man-years of work,” he said.

LCD technology accounts for more than 80 percent of the total FPD market, equal to \$83.6 billion in LCD sales. Plasma technology follows with about 8 percent of the market while OLED displays hold just over 1 percent, according to market research company DisplaySearch. By comparison, CRTs are forecasted to be a \$5.8 billion market in 2007, down from \$19 billion five years ago.

Berkoff was one of the panelists featured at the Global FPD Partners Conference (GFPC) 2007 held in Nagasaki, Japan, from April 11–14. The annual event, organized by SEMI, brings global FPD industry leaders together to explore mutual issues and exchange ideas that support business and technology development. The theme of this year’s GFPC was “Building Partnerships and Expanding Possibilities in the Global FPD Industry.” Keynote presentations and panel sessions focused on topics such as consumer electronics, EHS, mobile displays, future displays, and the latest manufacturing technologies for large-screen LCDs.

Berkoff pointed out that display technology has unlimited applications. “It enables so many things that hopefully you don’t think about the display [itself]. You can hang it big on a wall, or hidden under a cabinet, or in the back seat of a car,” he said.

Berkoff, who also acts as a consultant to FPD companies, said startups in the display industry often forget that science always loses to engineering, engineering always loses to economics, and economics always loses to politics. “So many people forget that the best technology doesn’t always win,” he said. An example is OLED, which has been a “zero-billion dollar” market for several years.

Nobody disputes that OLED is a superior technology to LCD in most applications, but until the industry can build a supply chain and infrastructure for mass production at low cost it will be a niche market compared with TFT-LCD, according to Berkoff.

An example of “engineering losing to economics” can be found in the PDP industry. Although plasma display factories can be built at one-tenth the cost of LCD fabs, they are not as cost-effective because LCD plants are able to tap into the high-volume computer LCD market to achieve a return on investment. •



Stephanie Dina Dempsey (left), executive director, Austin Community College Foundation, and Rebecca Taylor, partner, Taylor-Deining Partners, and ACC Foundation board member, accepting this year's SEMI Austin Golf Classic donation.

SEMI PROGRAMS

SEMI Austin Golf Classic Benefits Frank Squires Scholarship Program

THE SEMI FRANK SQUIRES SCHOLARSHIP Program at Austin Community College, Austin, Texas, one of the longest-running and most successful SEMI North America regional activities, received a donation for \$27,858 on April 18, 2007. The donation represented proceeds from the 11th Annual SEMI Austin Golf Classic. More than 140 SEMI members and customers participated in the Classic, which was held at the Avery Ranch Golf Club.

The scholarship program honors Frank Squires, SEMATECH chief administrative officer and senior vice president, who passed away in 1998. Squires joined SEMATECH in 1991 and was an outspoken advocate of corporate support for, and involvement in, education.

He pioneered innovative programs with ACC, some of which were later adopted at schools across the country. More than \$190,000 has been donated to the program since its inception.

"SEMI members have supported ACC and this scholarship program through good times and bad," said Terry Berke, director of the SEMI North America Central Region. "It's been one very visible way to support a community that's been so supportive of the semiconductor industry over the years." Corporate sponsors for the event were Tokyo Electron America (ACE Sponsor), Jordan Valley Semiconductors, SEZ America, Entegris, Applied Mechanical, Deloitte, ASML, Kinetics, Advanced Logic Technologies and Solvay Chemicals. •

CALENDAR OF EVENTS

JULY 2007

July 4-6
FPD Expo Taiwan 2007
Taipei World Trade Center
Taipei, Taiwan
www.semi.org/fpdexpotaiwan

July 16-20
SEMICON® West 2007
Moscone Center
San Francisco, California
www.semiconwest.org

AUGUST 2007

August 16
Silicon Valley Lunch Forum
Santa Clara Marriott
Santa Clara, California
www.semi.org/svlf

SEPTEMBER 2007

September 4-5
SEAJ/SEMI Industry Strategy & Technology Forum
Pacifco Yokohama
Yokohama, Japan
www.semi.org

September 12-14
SEMICON Taiwan 2007
Taipei World Trade Center
Taipei, Taiwan
www.semi.org/semicontaiwan •

SEMI MEMBERS ONLY — www.semi.org/nano

SEMI AROUND THE WORLD

Nano Start-Up Company Database

SEMI has developed a database of approximately 400 global start-up companies using nanotechnology in electronics and energy related markets. The database, which is **available free of charge to SEMI members**, includes company name, address, executive contacts, product category, product type, technology and application.

Almost half of the companies on the list make some sort of nano material, while one-third are developing applications and one-quarter are targeting supply. Most of the companies on the list are focused on the semiconductor market, followed by optoelectronics, displays and sensors respectively. More than 65 percent of the companies are targeting the nanoelectronics sector. Energy, including fuel cells, solar cells and batteries, accounts for the remaining 35 percent of target applications.

The database can be accessed at www.semi.org/nano, then Select Member Profiles. •