

CHAPTER MEETINGS

SCV-PSES - 11/28 | **Why the CB Scheme and Hazard-Based Standards Are Incompatible** - each has its place, but there are conflicts ... [\[more\]](#)

SPECTRUM Webinar - 11/30 | **Medical Technology Gets a Shot in the Arm** - advances in technology (1-hour no-cost program) ... [\[more\]](#)

SCV-CES - 12/5 | **Streaming to the TV using IP** - H-P demonstration/talk on high-definition video streaming from PC, NAS, or wireless sources ... [\[more\]](#)

SCV-CS - 12/7 | **Trustworthy Information Technology - A Myth or an Enabler?** - placing substantial trust in technology ... [\[more\]](#)

SPECTRUM Webinar - 12/7 | **Mobile Devices and Their Impact on Network Security** - new mobile security tools and software (1-hour no-cost program) ... [\[more\]](#)

SCV-LEOS - 12/9 | **Chabot Space and Science Center Planetarium** - behind-the-scenes tour, luncheon, shows ... [\[more\]](#)

SCV-CNSV - 12/12 | **Transitioning From a One-Person Consultancy to a Consulting Group** - changing your business model ... [\[more\]](#)

SCV-CPMT - 12/13 | **Board Level Reliability of Wafer-Level Chip-Scale Packages with Copper Post Technology** - stress measurements, and improving the die-to-solder bump interface ... [\[more\]](#)

SCV-MTT - 12/14 | **Now is the Best Time Ever to Start a Technology-based Company, Particularly in Silicon Valley** - with a focus on microwave and millimeter waves ... [\[more\]](#)

SCV-Nano - 12/19 | **Nanotechnology Commercial Trends and Forecast for Success** - impacts in materials and manufacturing, life sciences, electronics, and instrumentation ... [\[more\]](#)

SCV-CPMT - 1/10 | **Optoelectronics Technology: New and Exciting Markets in Consumer and Entertainment** - LCD TVs, solar cells, sources and detectors, image sensors and more ... [\[more\]](#)

SCV-Mag - 1/16 | **Aspects of Recording on Patterned Media at Densities of 1Tb/in² and Beyond** - one bit equals one grain, with higher areal density potential ... [\[more\]](#)

SCV-CPMT - 1/25 | **The iNEMI Roadmap: Overview and Board Assembly Directions** - finalized International Electronics Manufacturing Initiative roadmap ... [\[more\]](#)

SCV-Rel - 1/31 | **Best of ISTFA** - highlights from the Int'l Symposium for Testing and Failure Analysis, in Austin ... [\[more\]](#)

Upcoming Conferences

Nov 27 - Dec 1: **Global Telecommunications Conference (GLOBECOM)** - Fairmont Hotel, S.F. [\[more\]](#)

Nov 30: **IT Roadmap Conference & Expo** ... - Moscone Center, S.F. - Complementary admission for IT executives, professionals [\[more\]](#)

Dec 3-6: **Winter Simulation Conference** - Portola Plaza Hotel, Monterey [\[more\]](#)

Jan 6-7: **Storage Visions 2007 Conference** - The Flamingo Hotel, Las Vegas - Early registration Deadline **December 29th** [\[more\]](#)

Feb 5-9: **RSA Conference** - Information Security And Expo - Moscone Center, S.F. - Registration discount through **January 8th** [\[more\]](#)

Professional Skills Courses

"Transitioning from Individual Contributor to Manager" Cypress Semiconductor, (S.J.) Dec 1 [\[more\]](#)

"Managing Time and Multiple Priorities" - at Exar Corporation (Fremont), December 12 [\[more\]](#)

"Presentation Skills" - at Exar Corporation (Fremont), January 17 [\[more\]](#)

Chapter Tour:

Chabot Space and Science Center Planetarium - behind-the-scenes tour, luncheon, shows ... [\[more\]](#)

Saturday December 9, 2006 - \$10 per ticket

10:00 AM: Behind the Scenes Tour of Planetarium

12:00 Noon: MegaDome Theatre Show "Living Sea"

1:00 PM: Luncheon social

2:30 PM: Planetarium Show "Legends of the Sky: Orion"

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IEEE GRID

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IEEE **GRID** is the monthly newsmagazine of the San Francisco Bay Area Council of the Institute of Electrical and Electronics Engineers, Inc. As a medium for news for technologists, managers and professors, the editorial objectives of IEEE **GRID** are to inform readers of newsworthy IEEE activities sponsored by local IEEE units (Chapters, Affinity Groups) taking place in and around the Bay Area; to publicize locally sponsored conferences and seminars; to publish paid advertising for conferences, workshops, symposia and classes coming to the Bay Area; and advertise services provided by local firms and entrepreneurs.

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From the editor . . .

Consumer electronics seems to be burgeoning! We see new developments reported in a number of our Chapter meetings (for example, the Consumer Electronics meeting on **Dec. 5th** and the CPMT meeting on **Jan. 10th**). Many of our design jobs are related to the consumer market – PCs and Macs, cellular phones, MP3 players, HDTV, LCD/Plasma/DLP TV screens, disk/digital storage, and other products.

Not only do we see this robust trend in our jobs and in the local engineering economy, but we also experience these new technological wonders in TV commercials, newspaper ads, and at our “favorite stores” – Frys, Circuit City, Best Buy, CompUSA and others.

In most years, I’m standing out there in the cold on Friday morning, the day following Thanksgiving – the day known as Black Friday (since its on this day that many stores get “in the black” financially for the year). Last week was the exception, since I have my recent PC with plenty of storage and applications, an MP3 player that I like, a newer cellular phone with cradle (so it can be “line 2” in my home), a VoIP line for my **GRID** activities, and nice wireless networking. (I might be looking for a new acoustic guitar – but that’s not exactly high-tech!)

So, as we come around to the holiday season, I’d like to wish each of you a very Merry Geekmas! After all, we should all be samplers of that great technology that we originate for consumers around the world!

Paul Wesling, GRID Editor
editor@e-grid.net

NOTE: This PDF version of the IEEE GRID – the **GRID.pdf** – is a monthly publication and is issued a few days before the first of the month. It is not updated after that. Please refer to the Online edition and Interactive Calendar for the latest information: www.e-GRID.net

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Clearly indicate position: #488 (Assistant Professor, Assistive Technology).

For further details about the Baskin School of Engineering at UCSC, see www.soe.ucsc.edu

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(Sun and Mon, Feb. 4 and 5) Partial listing:

- Secure Web Services
- Analyzing Wireless Security
- Exploitation: 0-60 in 3.5
- Learning to Speak Crypto
- Defending VoIP Networks
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- Web Application Security Workshop
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- Smart Cards in IT: Issuance, Management, and Usage
- Smart Cards in IT: Putting Smart Cards into Action
- Creative Web Protocol Attacks, Beyond Web Hacking
- Proven Performance Penetration Testing
- Side-Channel Attacks: Intro to Timing Attacks, SPA, and DPA
- Security Automation: Compliance Checking, Vulnerability Management, and Security Measurement
- How Do You Make Cryptography Work in the Real World?
- Cutting Edge Hacking Tools: A Hands-On Session for Incident Handlers Analyzing Wireless Security
- Infrastructure Attacktects & Defentecs: Hacking Cisco Networks

Keynote Speakers

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Craig Mundie, Chief Research and Strategy Officer, Microsoft Corporation

Larry Ellison, CEO, Oracle Corporation

John Thompson, Chairman and CEO, Symantec Corp.

Stratton Scavos, Chairman, President and CEO, VeriSign

Art Coviello, EVP, EMC & President, RSA, The Security Division of EMC

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- Enterprise Defense – Wireless – Identity & Access Management – Authentication – Consumer Protection
- Law & Liability – Professional Development – Service Oriented Architecture

Industry Expert track

– The FBI's Chief of Cyber Initiative & Resource Fusion Unit – The U.S. Department of Defense's Director of Defense Manpower Data Center – ... plus others

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- Ed Chan, Director of Security, Tivo Inc.

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December 3-6, 2006



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- Designing Simulation Experiments
- How to Build Valid and Credible Simulation Models
- Agent-Based Modeling and Simulation
- Parallel and Distributed Simulation

Advanced

- Bayesian Ideas and Discrete Event Simulation
- Regression Metamodels and Experimental Designs for Simulation Practice
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Simulators for Human-Oriented Training

William R. Swartout, USC Inst for Creative Technologies

Discrete Event Models: Getting the Semantics Right

Edward A. Lee, University of California, Berkeley

Taming the Complexity Dragon

James O. Henriksen, Wolverine Software

Comprehensive and Realistic Modeling of

Biological Systems David Harel, Weizmann Inst of Science

Innovation in Software for Systems Biology: Is there Any? Herbert M. Sauro, Keck Graduate Institute

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2007 Conference Theme

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Keynote Speakers

Jerry Pierce, Senior VP-Technology, Universal Studios
Maureen Weber, GM, Personal Storage Business, H-P

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Storage Visions is held the two days prior to the Consumer Electronics Show – come to CES early for this special event

IEEE Professional Skills Courses

Transitioning from Individual Contributor to Manager

- Date/Time: Friday, Dec 1, 8:30 AM – 4:30 PM
- Location: Cypress Semiconductor, San Jose
- Fee: \$375 for IEEE Members; \$450 non-members

Managing Time and Multiple Priorities

- Date/Time: Thurs, Dec 12, 8:30 AM – 12:30 PM
- Location: Exar, Fremont
- Fee: \$275 for IEEE Members; \$325 non-members

SCV Chapters, Engineering Management & Components, Packaging and Manufacturing Technology Societies

Presentation Skills

- Date/Time: Wed, Jan 17, 9:00 AM – 5:00 PM
- Location: Exar, Fremont
- Fee: \$450 for IEEE Members; \$525 non-members

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www.EffectiveTraining.com


TUESDAY November 28

Why the CB Scheme and Hazard-Based Standards Are Incompatible

Speaker: Rick Buck, Senior Consultant, Safety Engineering Laboratory
Time: optional dinner with the speaker at 5:45 PM; presentation at 7:00 PM
Cost: optional speaker's dinner at El Torito Mexican Restaurant, 2950 Lakeside Drive, Santa Clara (2 blocks from meeting place)
Place: meeting: Applied Materials, Bowers Cafe, 3090 Bowers Ave, Santa Clara
RSVP: not required
Web: www.e-grid.net/docs/0611-scv-pses.pdf

Tonight's presentation explores why the widely used CB Scheme approach to product safety compliance and the new Hazard-Based standards approach are not compatible. The goals of the two approaches are in many ways complete opposites. For example, one relies on engineering judgment of a specific product; the other takes a prescribed approach to general product categories. Both schemes have their place, but come with conflicting technical, economical, and political goals. As the Hazard-Based standards approach comes into use, manufacturers will need to make a choice between the two methods. Come and find out why!

Rick Buck has worked in the field of product safety for over 20 years, including 3 years at UL and 2 years at TUV Rheinland. Obtaining compliance certification for hundreds of products in dozens of product categories has given Rick the essential background to address tonight's topic. He has held senior management positions and currently is a Senior Consultant at Safety Engineering Laboratory. Rick also was a founding member of the IEEE Product Safety Engineering Society (PSES) predecessor and was treasurer for several years.



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Streaming to the TV using IP

Speaker: TBD, from Adobe/Macrovision
Time: pizza, drinks and networking at 6:30 PM;
presentation at 7:00 PM
Cost: \$5 for IEEE members, \$10 for guests
Place: Hewlett Packard Oak Room, 19447
Pruneridge Avenue (Building 48), Cupertino
RSVP: not required
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Hewlett Packard will have a technology demonstration and talk about:

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THURSDAY December 7

Trustworthy Information Technology - A Myth or an Enabler?

Speaker: Dr. Roger Schell, co-founder and President, Asec Corporation
Time: 7:00 PM: social and refreshments;
7:30 PM Presentation
Cost: none
Place: ROOM 380C Main QUAD, Stanford University
RSVP: not required
Web: www.cs.sjsu.edu/~tylin/ieeesilicon

Roger R. Schell is co-founder and President of Asec Corporation, a new company focused on verifiably secure platforms for secure, reliable e-business. He is internationally recognized as a major contributor to the advancement of computer security concepts and the overall definition of network security. At Novell, he led their Class C2 network evaluation and managed development of product security. He was VP for Engineering at Gemini Computers where he developed their highly secure (Class A1) commercial product. He served as the founding Deputy Director of the National Computer Security Center, which he grew into a respected organization of more than 150 security professionals. For his work there he is widely regarded as the "father" of the Trusted Computer System Evaluation Criteria (the "Orange Book"), which has been the most widely used international security standard for computers and networks.

Dr. Schell originated several key modern security design and evaluation techniques and holds patents in cryptography and authentication. He participated in sponsored "tiger team" penetration tests of several commercial and security enhanced operating systems and networks for various government activities including the Defense Intelligence Agency, the U. S. Air Force, the Office of the Joint Chiefs of Staff, and the Central Intelligence Agency. He has more than 60 publications, and was Associate Professor of Computer Science at the Naval Postgraduate School. The NIST and NSA recognized him with the 1991 National Computer System Security Award, the nation's highest honor in the computer security field. Dr. Schell is a retired USAF Colonel. He received a Ph.D. in Computer Science from the MIT, an M.S.E.E. from Washington State, and a B.S.E.E. from Montana State.

Viable human societies in general and businesses in particular have always required trust. Our dramatically growing dependence on information systems inescapably allocate more and more of this trust from humans to technology. Unfortunately, both accumulated experience and a growing body of expert opinion increasingly call into serious question whether it is responsible to place substantial trust in this technology at all, especially in the face of professional attacks. The good news is that the state of the science of information security is astonishingly rich with solutions and tools to incrementally and selectively solve the hard problems. The bad news is that the state of the actual application of science, and the general knowledge and understanding of the existing science, is lamentably poor. The challenge for scholars and practitioners is to aggressively work to remedy this before our professional efforts to expand the reach of technology becomes a recipe for disaster.

WSC'06
WINTER SIMULATION
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introductory tutorials to
state-of-the-art research
and practice
Dec 3-6 Monterey
Portola Plaza Hotel
Program/Abstracts Posted

SATURDAY December 9

Chabot Space and Science Center Planetarium: Private Tour and Luncheon

Activities: behind-the-scenes tour, luncheon, shows
Time: 10:00 AM: Behind the Scenes Tour of Planetarium; 12:00 Noon: MegaDome Theatre Show "Living Sea"; 1:00 PM: Luncheon social; 2:30 PM: Planetarium Show "Legends of the Night Sky: Orion"; open until 10 PM
Cost: \$10 per ticket (no walk-ins allowed)
Place: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland
RSVP: Payment and names required by Tuesday Dec. 5th; PayPal on website preferred
Web: www.ieee.org/scv/leos

What a great opportunity to spend some "quality time" in the outstanding Chabot Space and Science Center, view two shows, enjoy a lunch - all for only \$10/person!

The Center is open to us from 10 AM - 10 PM for General Admission to the Chabot Space and Science Center (Astronomy Hall and telescopes will close at 4 pm).

IEEE SCV LEOS Tour Schedule (events start promptly):

- 10:00 am: Behind the Scenes Tour of Planetarium
12:00 pm: MegaDome Theatre Show "Living Sea"
1:00 pm: Luncheon social
2:30 pm: Planetarium Show "Legends of the Night Sky: Orion"

The Ask Jeeves Planetarium is a full-dome digital projection system. This next-generation projection technology is the most state-of-the-art on the planet. This new system is capable of projecting a brilliant seamless image over the entire 70-foot dome surface and can deliver jaw-dropping digital sound. The images surround the audience, extending beyond the peripheral vision, leading to an experience that is fully immersive and engaging.

If attending, you must RSVP by Tuesday Dec. 5 to IEEE SCV LEOS with the first and last name of everyone in your party, and their ticket category (adult, youth, senior - see above), so that your tickets can be purchased. We must purchase tickets in advance - NO EXCEPTIONS - NO WALK-INS ALLOWED for Behind the Scenes Tour and luncheon.

Bring the whole family!



Chabot's Zeiss Universarium star projector creates stunning views of the night sky and constellation effects.

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TUESDAY December 12

Transitioning From a One-Person Consultancy to a Consulting Group

Speaker: Mike Silverman, founder and managing partner, Ops A La Carte, LLC
Time: 7:00 PM Presentation
Cost: none
Place: KeyPoint Credit Union, 2805 Bowers Ave., Santa Clara
RSVP: not required
Web: www.CaliforniaConsultants.org/Events.cfm

Mike Silverman is the founder and managing partner of Ops A La Carte, LLC, a 6-year old technical operations consulting firm that Silicon Valley Business Journal just named as the 9th fastest growing private company in the Bay Area.

Mike has over 20 years of experience in technical operations, including reliability, quality, test engineering, manufacturing, compliance and safety. He has had over 300 consulting clients, including Cisco, Microsoft, Apple, Abbott Labs, Applied Materials and many small high-tech companies. He has consulted in a variety of industries, including telecommunications, networking, medical, semiconductor equipment, consumer electronics, power and defense electronics.

Mike has authored and published eight papers on reliability techniques which he has presented domestically as well as in China, Germany and Canada. He has also developed teaching courses on reliability and technical operations techniques, and currently teaches 23 courses in these areas.

Mike has a BS in Electrical and Computer Engineering from the University of Colorado at Boulder, and is a Certified Reliability Engineer (CRE) through the American Society for Quality (ASQ). Mike is a member of IEEE, ASQ, SME, ASME, PATCA, ASPMFG, EPIC and IEEE CNSV, and is currently Chair of the Santa Clara Valley Chapter of the IEEE Reliability Society.

About three years ago, CNSV member Mike Silverman changed his business model from a one-person consultancy to a consulting group. This change has led to many discoveries, some big benefits, as well as some eye-opening changes.

Mike's talk will address the following areas:

- How to expand geographically
- How to increase the number of services to provide
- How to find good quality consultants

Mike's new business model allows for billing at a higher rate, but there are numerous new costs with which to contend. If done properly, this model certainly allows for a higher profit, but not without risk. The experiences that Mike will share may help you decide whether a similar change would be beneficial for your own business model.

Mike's talk will be preceded by the annual CNSV election, as well as a mixer with free food and light drinks.

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WEDNESDAY December 13

Board-Level Reliability of Wafer-Level Chip-Scale Packages with Copper Post Technology

Speaker: John Jackson, Packaging Development Manager, Analog Devices Inc.
Time: 6:30 PM dinner (optional); 7:30 PM Presentation
Cost: Seated dinner served at 6:30 - \$25 if reserved before Dec. 10; \$30 at door
Place: Ramada Inn, 1217 Wildwood Ave (Fwy 101 frontage road near Lawrence Expy), Sunnyvale
RSVP: through PayPal on website, or by email to Janis Karklins, karklins@ieee.org
Web: www.cpmt.org/scv

Thermal cycling performance of a wafer-level chip-scale package (WLCSP) depends on many factors: board design, assembly process and the bump process. The typical failure mode observed for this package is fracture between die and solder bump interface. To strengthen the base of the solder ball during thermal cycling, an electroplated copper post was embedded on the RDL and is encapsulated in a low-stress molding compound. The post increases the standoff, which enhances reliability. Evaluations were conducted on daisy-chained units of a 41-I/O die, which is redistributed from the peripheral pad 6x7 array of 250um ball size at 450um pitch with a Cu post. An array of this size requires underfill; the effect of underfill and the type of material were included in this study.

Reliability performance was measured in accordance with IPC-9701. Thermal cycling from -40 to +125C was performed for a one hour cycle with 15 minutes ramp and 15 minutes dwell time. Time-to-failure, plotted as a Weibull distribution, is used to illustrate interesting and significant differences.

At time zero, the daisy chain resistance tracked with resistivity and trace width of copper and aluminum. Underfill did not change these values. Underfill selection had a significant effect on performance. Without underfill, copper redistribution metallurgy is preferred over aluminum. With underfill, the difference is not significant. Cu width may be a significant variable on the solder joint performance of WLCSP with the Cu post.

Additionally, stress measurements and their effect on WLCSP design will be discussed.

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SCV Microwave Theory and Techniques

THURSDAY December 14

Now is the Best Time Ever to Start a Technology-based Company, Particularly in Silicon Valley

Speaker: Doug Lockie, President and CTO,
Gigabeam Corporation
Time: 6:00 PM: social and refreshments; 6:30 PM
Presentation
Cost: none
Place: National Semiconductor, Bldg #9,
Classroom #4, 2900 Semiconductor Dr.,
Santa Clara
RSVP: not required
Web: www.mtt-scv.org

The talk will review relevant portions of the economic and technology history of the US, the role of venture capital in the process, some comments on how to start a new tech based company, and some of the reasons now is the best time ever. The speaker will also offer some thoughts on potential new start opportunities in the microwave and millimeter wave technology space. This talk is an expansion of a similar presentation at the IMS 2006 in San Francisco.

Doug Lockie is the President and CTO of Gigabeam Corporation, a Millimeter Wave Radio supplier. He has worked as an Applications Engineer for Watkins Johnson, co-founded Pacific Monolithics (with Alan Podell), founded Endgate (which became Endwave upon the merger with the Millimeter Wave Division of TRW) and Co-founded Gigabeam. During his time with the US Air Force, he pioneered some of the first uses of GaAs in airborne radar. He has authored or co-authored 12 patents related to microwave and millimeter wave communications systems and components. Mr Lockie received a BSEE from Montana State University in 1969.



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TUESDAY December 19

Nanotechnology Commercial Trends and Forecast for Success

Speaker: Mark Bunger, Research Director, Lux Research
Time: Registration & light lunch 11:30 AM; Presentation at Noon
Cost: Members and Students \$5; Non-Members \$10
Place: National Semiconductor, Bldg 31, 955 Kifer Road, Santa Clara
RSVP: by email to dhavaljb@aol.com
Web: ewh.ieee.org/r6/san_francisco/nntc

Nanotech is evolving from discovery to commercialization, and leading corporations and startups in fields like materials and manufacturing, life sciences, electronics, and instrumentation are feeling the impact. This is driving big changes in science-centric business areas like research and product development. Nanotech's commercial success is now even hitting more mundane functions like partnering and hiring, as the number of people working on nanotech in large corporations will increase sixfold in the next three years. The talk will describe these trends with facts from today and forecasts for tomorrow.

Mark Bunger joined Lux Research with 14 years of business strategy experience, both as a management consultant and technology analyst. Most recently, he was a Principal Analyst at Forrester Research, where he studied and advised clients in manufacturing industries. The first years of Mark's career were spent at Accenture in the U.S., U.K., and Scandinavia, where he was a consultant focusing on a variety of industries and technologies. Mark's work can be found on CNN, CNBC, The Wall Street Journal, and the Financial Times. Mark's education includes International Marketing at Mårdalen Polytechnic in Sweden, and Market Research at the University of Texas. In addition, Mark studied biochemistry through the University of California at Berkeley's extension program, and currently assists part-time in a neural stem cell lab in the UCSF Department of Neurology.

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WEDNESDAY January 10

Optoelectronics Technology: New and Exciting Markets in Consumer and Entertainment

Speaker: Michael Lebby, President and CEO,
Optoelectronics Industry Development
Association (OIDA)

Time: 6:30 PM dinner (optional);
7:30 PM Presentation

Cost: Seated dinner served at 6:30 - \$25 if
reserved before Jan 7; \$30 after & at door

Place: Ramada Inn, 1217 Wildwood Ave (Fwy 101
frontage road near Lawrence Expy),
Sunnyvale

RSVP: through PayPal on website, or by email to
Janis Karklins, karklins@ieee.org

Web: www.cpmt.org/scv

Michael Lebby, OIDA's former executive director, was elected as the new president and CEO of OIDA in 2006. His career has spanned all aspects of the optoelectronics business ranging from research and development, manufacturing, and finance, to sales, marketing, and investing. He holds more than 170 U.S. patents issued in optoelectronics.

In 1985, Lebby's research took him to AT&T Bell Laboratories, followed in 1989 by a move to Motorola's Phoenix Corporate Research Laboratory in Phoenix, Arizona. Early in 1997, he became an R&D Business Technology Development Manager where he managed all aspects of advanced technologies in corporate R&D. In 1998, Lebby joined AMP as a member of the Global Optoelectronics Division's management team. At AMP he was responsible for growing the fiber optic datacom and telecom business through external interactions that included mergers, acquisitions strategic alliances, and technical strategic planning. In 1999, Lebby joined Intel as a corporate investor and was responsible for sourcing, negotiating, and closing private placement equity deals in the optical networking, component, and semiconductor arenas.

In 2001, Lebby founded a new fiber optics company, Ignis Optics, where he served as the CEO, President, and Board Member in addition to acting VP of Sales, Marketing and Business Director during the growth phases. Ignis Optics was acquired by Bookham Technology in October 2003 and Lebby became responsible for corporate and technical strategy at Bookham Technology.

Dr. Lebby joined OIDA as Executive Director in early 2005. He was elected an IEEE Fellow for contributions to optoelectronics technology.

The total optoelectronics components and enabled products grew 20% in 2005 to \$364 billion, from \$304 billion in 2004. Components grew 17% in 2005 to \$104 billion, from \$89 billion in 2004. When flat panel displays are excluded as components, components grew 10% in 2005 to \$30 billion, from \$27 billion in the previous year.

The driving engine for these numbers has again been the successful penetration of display-based products and technologies into both the consumer and computer markets, as it was in 2004. The products with the strongest growth were liquid crystal display (LCD) TVs (79%) and camera phones/personal digital assistants (PDA) (41%). Within the components segment, much of the growth has been driven by solar cells (24%), display modules (20%), and sources and detectors (10%).

Optoelectronics is quickly penetrating a number of products across many markets, with a trend toward convergence. Optoelectronics technologies are utilized in products that span communications, computing, and consumer/entertainment. A significant enabler driving convergence is the LCD flat panel display, which is today found not only in notebook personal computers (PC), but also in televisions, mobile cellular phones, PDAs, and desktop monitors. A number of specific types of applications that are particularly dependent upon optoelectronics have strong potential for market growth in 2006. These include the Internet and computing, cellular telephony, wireline telecommunications, and emerging applications such as games, healthcare, and sensors.

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TUESDAY January 16

Aspects of Recording on Patterned Media at Densities of 1Tb/in² and Beyond

Speaker: Hans Jürgen Richter, Recording Physics Group, Seagate Technology
Time: Cookies & Conversation at 7:30 PM; Presentation at 8:00 PM
Cost: none
Place: KOMAG, 1710 Automation Parkway, San Jose
RSVP: not required
Web: www.ewh.ieee.org/r6/scv/mag

Hans Jürgen Richter received his degree in Electrical Engineering and his PhD (1989) from the Rheinisch-Westfälisch-Technische Hochschule Aachen in Germany. From 1989-1995 he worked at BASF AG in Germany at the central research labs on magnetic, magneto-optical and optical data storage. Since 1995 he worked for Seagate Technology, where he has been leading the Recording Physics group. Dr. Richter is currently a Technologist at Seagate Technology. At Seagate, he has been working on both theoretical and experimental aspects of magnetic recording. He has been involved with longitudinal recording, anti-ferromagnetically coupled media, perpendicular recording and most recently with studies on bit patterned media.

Dr. Richter has been active on the Editorial Board of the Transactions on Magnetics of the IEEE since 1996 and led the Technical Committee of the IEEE Magnetic Society from 1999-2004. He has published about 80 papers in peer-reviewed journals and 5 articles in textbooks and Encyclopedias. He currently holds 19 patents with another 14 pending and 1 trade secret. In 2005, he was consulting professor at Stanford University, CA.

Over the years, the recording density in magnetic recording technology has been continuously increased. To date, the highest recording density that has been publicly announced is Seagate's demonstration of 421 Gbit/in² using perpendicular recording. One of the limitations to conventional perpendicular recording is the onset of superparamagnetism. The bits are defined by statistical means – that is, one has to define the bits with as many grains as possible. This requires a reduction of the grain size, which is eventually limited by the onset of superparamagnetic effects. It is generally agreed that this limits perpendicular recording to densities of 500 and 1000 Gb/in².

One of the leading candidates to increase areal density even further is recording on patterned media. Here one bit equals one grain and therefore, in light of the superparamagnetic effects, the areal density can be increased significantly. In the talk, a comprehensive analysis of the areal density potential of patterned media recording will be presented. The noise sources of patterned media, such as dot size fluctuations and dot spacing fluctuations are discussed and compared with recording on conventional media.

The talk addresses general changes in a recording system that have to be made to achieve a successful recording system using patterned media. An aspect of particular importance is the requirement of synchronized writing. A statistical analysis shows that the recording performance is dominated by written-in errors rather than traditional signal-to-noise considerations. Written-in errors are caused by statistical fluctuations of the magnetic properties and the locations of the individual dots. The analysis shows that recording systems with a very low bit aspect ratio perform very poorly. The highest areal densities are obtained with a combination of a pole head, a soft magnetic underlayer and a storage medium of the composite type. Areal density scenarios of up to 5Tb/in² are analyzed.

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THURSDAY January 25

The iNEMI Roadmap: Overview and Board Assembly Directions

Speakers: Dr. Dongkai Shangguan, Flextronics, and Jim McElroy, CEO, iNEMI
Time: Buffet lunch served at 11:45; Presentation at 12:15 PM
Cost: \$15 if reserved before Jan 22; \$20 after & at door
Place: Ramada Inn, 1217 Wildwood Ave (Fwy 101 frontage road near Lawrence Expy), Sunnyvale
RSVP: through PayPal on website, or by email to John Jackson, john.jackson@analog.com
Web: www.cpmt.org/scv

iNEMI is the International Electronics Manufacturing Initiative. Its Roadmap was recently finalized, and it will be published this spring. The SCV Chapter will get a preview from two of the key committee people who worked on it.

Dr. Dongkai Shangguan received his BS degree in Mechanical Engineering from Tsinghua University, China, his Ph.D. degree in Materials from the University of Oxford, U.K., and an MBA degree from San Jose State University. He conducted post-doctoral teaching and research at the University of Cambridge and then at The University of Alabama. He lectured at the Wayne State University as Adjunct Faculty and is currently a guest professor at Shanghai University, China.

Dongkai worked for 10 years at Ford Motor Co./Visteon Corporation in various technical and management functions including advanced electronics manufacturing and supplier quality, before he joined Flextronics International in 2001 where he is currently Vice President for Assembly Technology and Platform Realization with the Corporate Technology Group, responsible for advanced packaging and assembly technology, environmental technology, design/manufacturing collaboration and DFX solutions, industrialization and product realization, etc. He has published 2 books and over 200 papers and articles (including many journal publications and several book chapters), and has given numerous technical presentations and keynotes. He has 20 U.S. and international patents issued and a number of U.S. and international patents pending.

Dongkai is a senior member of IEEE and SME, and a member of the IEEE CPMT Society Board of Governors. He chaired the iNEMI 2007 Roadmap for Board Assembly. He is currently a regular columnist for the "Global SMT & Packaging" magazine, and serves on the editorial/advisory board of several technical journals. He has received a number of recognitions for his contributions to the industry, including the "President's Award" from IPC, "Total Excellence in Electronics Manufacturing Award" from the Society of Manufacturing Engineers (SME), and the "Soldertec Lead-Free Soldering Award".

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Speakers: various attendees of ISTFA
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7:00 PM Presentation
Cost: none
Place: HP Oak Room, Bldg 48, Pruneridge Ave.
at Wolfe Road, Cupertino
RSVP: not required
Web: ewh.ieee.org/r6/scv/rl

The International Symposium for Testing and Failure Analysis (ISTFA) provides a forum for the latest developments in wafer, chip, package, and board-level test and failure analysis. The 29th ISTFA was held November 12-16, 2006, in Austin. Information on ISTFA is available on the web at <http://www.asminternational.org/istfa/>. The January Santa Clara Valley IEEE Reliability Society meeting will feature a panel discussion of selected papers from ISTFA. The panel is being organized by Art Rawers. We are looking for additional panel members, especially ISTFA attendees. If you are interested in helping select papers, being on the panel, leading a discussion, or contributing in another way, please e-mail us at reliability@ieee.org.



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