

# Reliability Society

N E W S L E T T E R

<http://www.ieee.org/society/rs>



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Bob Gauger

## President's Message

### Reliability Society Goes International Again

In the last two years, the Reliability AdCom has been encouraging international participation by holding joint AdCom-workshop events in Zurich, Switzerland and Kyoto, Japan.. These events supplemented the AdCom meetings with workshops on current reliability topics. Local Reliability Society chapter representatives and other local IEEE representatives attended the AdCom meetings. The workshops were attended by interested members from universities and industry. This year, the Reliability Society goes to Madrid, Spain from 21 October to 23 October. The workshop in Madrid will consist of informative presentations about the Reliability Society and presentations on MEMS, concurrent engineering, ion beam technology, human reliability, and information technology. Our host will be the Spanish Council for Research. More about this event will be published in the next newsletter.



### IEEE XPLORE Is On-Line

Reliability engineers and other engineers seem to have an insatiable need for the latest technical information. That information frequently is difficult or at least time-consuming to obtain. IEEE now has greatly eased the burden of getting the latest technical information with its XPLORE service. This issue of the Newsletter contains an article on XPLORE that you should read. I have used XPLORE several times with great success. I recommend it highly.

### IEEE Strategic Planning In Process

As all of you know, organizations periodically must perform some self-examination of their relevance to the current technological environment. In August, IEEE initiated its self-examination with a strategic planning activity. The initial session was extremely successful in identifying enhancement opportunities and critical issues. It was extremely gratifying to me that one area of enhancement addressed service to the members through electronic publishing, new products, and more rapid consideration of new technologies. The second strategic planning session will be held in November.

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# Editor's Column

## RS Website

The new RS Website is now on line. It has a lot of neat features, improved navigation and faster loading. Our homepage will always have a question from the discussion forum plus a message flipper of items of interest to RS members. Check out the "Useful Information" link. It has some really good business planning links plus other useful links.

We froze the maintenance on the web site while we were doing this project, and there is some updating that needs to be

done. With the completion of this project, I am turning over the Webmaster duties to Alan Street, who has graciously agreed to be our new Webmaster. Give him some time to work off the backlog of updates, but by all means continue to provide him with your comments and suggestions.

Please take some time to tour the new site. The URL remains the same. I think you will like it. Also, our goal is to keep

continued on page 26



## Reliability Society Newsletter Inputs

All RS newsletter inputs should be sent to:

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The schedule for submittals is:	<b>Newsletter</b>	<b>Due Date</b>
	January	October 8
	April	January 8
	July	April 8
	October	July 8

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We had a full house for this meeting. Many realize that this type of work will keep us competitive as a nation in the world market place.

The Chapter has submitted a number of suggestions to the RAMS Management Committee. We suggested that the Symposium should continue to focus on availability combining reliability with maintainability on a regular basis. Several tutorials were suggested and one paper on a facility FMEA is being prepared.

Hin L. Yee has suggested that we start to work on brings AUTOTESTCON to Cleveland in 2004. We are putting together a Conference Committee to develop a proposal to help him with this idea.

Over all, here in the "Best Location In The Nation," we are having fun staying active and working to serve our members.

**Vincent Lalli, Chair**  
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## Philadelphia Chapter

At our meeting November 16, 1999 we had two sparkers.

### PART 1. Patents: What's All the Fuss? - Mr. Charles Eldering

Patents play an increasingly important role in the worlds of telecommunications, internet technology, and software. Companies like Microsoft that previously believed patents were not a key part of their business strategy are now accumulating intellectual property at a rapid pace. High-profile companies like Lucent and Cisco Systems have been involved in lengthy litigation in which patents are used to keep competitors out of a market or extract royalties of up to 6% of gross revenues. Recent changes in interpretation of patent law now allow methods of doing business to be patented. Patents will play an increasingly important role to a company's success and its ultimate revenue stream. While many engineers, and software engineers in particular, believe that patents are a deterrent to progress, patents are here to stay and, until complete reform of the patent system takes place, will become part of every engineer's professional life. This talk presented an overview of how patents have increased in importance, what types of things are being patented today, and how the independent consultant can utilize patents for his clients as well as for his own developments.

### PART 2. Current and Future Water Treatment Technologies - Mr. Frank Falcone

Continual focus on new and emerging water treatment technologies is real and growing. With the obvious impending need to improve aging and outdated water treatment facilities in major metropolitan regions throughout the USA, new technologies are being developed and implemented. As urban populations continue to grow and urban sprawl increases, water utilities are gearing up to meet future demand with cost-effective and reli-

able new innovations. These issues served as the basis for the presentation.

On January 18, 2000 we also had two speakers.

### PART 1. The Value of Including Industrial Design in Product Development - Mr. Peter W. Bressler

Roles in the product development process are changing. The past 50 years have witnessed a shift in professional responsibilities, development priorities, and business focus for success. Business in the 50's and 60's was driven by advertising; in the 70's and early 80's by technological change; and the late 80's and most of the 90's by marketing. At the end of the 90's, and in the beginning of the new millennium, business will be driven by design and ergonomics. These changes are caused mostly by advances in electronic technologies. What is Industrial Design? Where did it come from? What values does it bring to the product development process? Can it really make your product better? Can it really accomplish what Business Week magazine says it can? The answers to these questions were discussed.

### PART 2. How Good are the Present Data Fusion Methodologies? - Dr. John Sudano

Today, hundreds of systems employ data fusion methodologies in many fields. Multi-frequency, multi-polarization, and optical data from satellites are fused to estimate the timber volume and disease regions in forests. Autonomous underwater vehicles fuse multi-source sensor data to complete their prescribed missions daily. Steel mills fuse disperse data from sensors to obtain automated processes in the manufacturing of many steel products. Whereas many of these systems have registered successes, one area that has a great need, but very little success, is combat identification. The need to identify targets has never been greater than it is today. This presentation outlined a new generic architecture to address this complex issue.

On March 21, 2000 we heard.

## THE PITFALLS AND SUCSESSES OF A STARTUP BUSINESS, PARTS 1 AND 2 - Dr.

Gregory H. Olsen and Mr.  
Richard J. Capalbo

Many engineers toy with the idea of a startup every day; however, due to their technical background, they tend to focus on the technical issues while ignoring the business aspect. A panel discussion by two experts explored diverse business enterprises with their pitfalls and successes, based on their real-world experiences of what to focus on for a successful startup.

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## San Diego Chapter

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## Singapore Chapter (ED/Reliability/CPMT Joint Chapter)

Report on 1999 Activities - IEEE Singapore, REL/CPMT/ED Chapter

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## Switzerland Chapter

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## President's Message

continued from page 1

### RAMS

Be sure to attend the 2001 Annual Reliability and Maintainability Symposium (RAMS), January 22-25, 2001, at the Philadelphia Marriott, Philadelphia, PA USA. The theme is "Applications and Trends for Using Reliability and Maintainability Tools." RAMS is an outstanding opportunity

to obtain the latest reliability and maintainability information rapidly. It is also an excellent opportunity to meet reliability and maintainability experts from around the world and exchange ideas.

The RAMS tutorial program continues to expand and offers an excellent educational opportunity, the value of which far exceeds the registration cost. Finally, don't forget to visit the exhibitors to see the latest developments in reliability and maintainability tools.

### Reconfigured RS Web Site

The Reliability Society has reconfigured its Web site at We have changed its appearance and made it easier to use. Also, remember our Web site Discussion Forum when you need a question answered. It's a great way to get that extra help when you need it.

**Kenneth P. LaSala, Ph.D.**  
President,  
IEEE Reliability Society  
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## IEEE Reliability Society Seminars July 14, Burlington VT

The Reliability Society sponsored a seminar on Friday, July 14 hosted by IBM in Burlington Vermont in conjunction with the AdCom meeting. The day begins at 10:30 a.m. in the Presentation Center with an RS and IEEE overview. Following lunch, there were three parallel sessions.

The sessions were well attended and all found the technical content significant. Our thanks to the authors and presenters. The following is a listing of the presentations made.

### Silicon Technology Directions in the New Millennium

*Tak H. Ning*  
IBM Thomas J. Watson Research Center

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Although its performance and density are fast approaching saturation, scaled bulk CMOS will remain the platform for evolving silicon technology into several application-specific directions. Besides logic and memory, there will be emphases on low power, on EEPROM, RF and analog, and integration of these functions on the same chip or package. The opportunities and challenges will be discussed.

Tak H. Ning received his Ph. D. degree in physics from the University of Illinois at Urbana-Champaign in 1971. He joined IBM Thomas J. Watson Research Center at Yorktown Heights, New York in 1973. He has made significant contributions to silicon device physics, and to bipolar, CMOS, and DRAM technologies. He managed the

advanced silicon device technology research and development in IBM Research between 1981 and 1991. Since 1991, he has been an IBM Fellow, focusing on, among other things, silicon technology trends. He is a member of the U.S. National Academy of Engineering, and a fellow of the IEEE and the American Physical Society.

### Device and Product Design: Methodology and Reliability Strategy for Deep Sub-micron Technology

*William R. Tonti<sup>1</sup>,  
Wayne F. Ellis<sup>2</sup>*

*IBM Microelectronics, Essex Junction Vt.*

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## Devices – Bill Tonti

This tutorial will discuss device and process optimization techniques that may be employed in the design of present state of the art bulk silicon DRAM technology. MOSFET performance and reliability issues are contrasted.

Numerous issues influence a MOSFETs in-line process and field reliability. Assuring a stable IC design is a great challenge, and has many concerns with today's small feature size. Some of these are investigated using present DRAM technology.

Inclusion of process tolerances and lifetime shifts during the design of a DRAM transfer device greatly influences the MOSFETs performance and reliability operating point. Given an appropriate relationship for each occurrence a statistical design methodology insures product stability.

The device off current (Iso) and on current (Ion) trade-off are the primary design goals of a given technology. Simple scaling (i.e.,  $I_{on} \propto (Tox / L)V$ ,  $I_{so} \propto Ae^{-Vt/B}$ ) shows L and Tox can be used to improve drive current. If nothing else is done then Vt and subsequently Iso suffers. Well doping may be increased to compensate for the reduction in Tox and L. This adjustment could lead to a large increase in base Vt tolerance, source to substrate sensitivity, and substrate hot carrier problems if not implemented in a manner which minimizes these adverse effects. There exists an optimum doping profile which satisfies the above conditions.

Today's state of the art isolation technology is box shaped, and commonly implemented as a trench filled with SiO2. This isolation tends to have a parasitic parallel device gated at the isolation edges. In some cases Iso may be defined by the number of edges in a design rather than the total device width. Edge degradation therefore becomes a mechanism to be investigated in this type of isolation technology. Wafer Level Burn-In and Module Level Burn-In test methodologies are important early life screens used to both disposition product, and improve the overall yield by replacing circuit reliability failures with know good spare elements. Wafer burn-in is used to stress a chip for a short duration in time, usually accessing and applying accelerated test conditions to critical areas which cannot

be highly accelerated at the module level. Test coverage at Wafer burn-in is 100%, and the redundancy algorithms can be maximized prior to module burn-in. Module burn-in can take on many forms: static, dynamic, in-situ, or combinations of the above to achieve field reliability objectives.

## Product: - Wayne F. Ellis

This tutorial will discuss how today's reliability issues are addressed in the realm of high performance DRAM product design and development. Because of increased demands for product performance in a wider market, the issue of Functional Reliability will be introduced. Discussion of Functional Reliability will cover how this issue can relate to and also be independent of traditional reliability issues.

Because of the all points addressable matrix of minimum feature size structures, DRAMs have been a powerful vehicle by which to develop insights and techniques to provide for product manufacturability and reliability. Insights into defects, their distribution and activation energies have been applied to the design methodologies for today's advanced DRAM products. These methods seek to reduce product sensitivities to the most common defect species, such as use of redundant elements for the DRAM array and use of relaxed design ground rules for the support circuits where the concept of a redundant element is more problematic in its implementation. However, the concern for the support circuits is moderated by at least two complimentary effects. The first is that the density of defects falls off as  $x^{-3}$  as defect size increases above the minimum printable dimension of the lithographic tools in the fabricator. The second effect is the increasing amount of defect induced leakage current needed to disrupt operation of the more robust support circuits.

As DRAM performance is driven and new functional modes such as SDR and DDR are developed, the concept of functional reliability must also be addressed.

Functional reliability issues relate to such electrical issues as noises in the chip power/ gnd grid, precision timing circuits and delay stability in the presence of pro-

cess parametric variations. Another aspect is how device scaling and the required reduction of internal operating voltages is affected by the external operating/ interface voltages defined by international standards bodies such as JEDEC. This dictates that the internal operating voltages and resultant device design point must be developed with consideration of external voltage and the electrical impedance characteristics of product package and the on chip voltage regulation system and power grid.

## William R. Tonti

William R. Tonti received the B.S.E.E. with honor (1978) from Northeastern University. He then joined IBM in Essex Junction, Vermont, where he now works on Giga-bit DRAM technology development. He received an M.S.E.E. (1982) from the University of Vermont, an M.B.A. (1983) from St. Michael's College, and a Ph.D. in Electrical Engineering (1988) from the University of Vermont under the auspices of the IBM resident study program. His current interests include two and three dimensional 0.10 $\mu$ m process and device modeling, and the development of in house IBM and industry standard SPICE circuit simulators, and electrically programmable fuse technology. Recently Dr. Tonti has held positions at the International Reliability Physics Symposium, and the Integrated Reliability Workshop serving as the Technical Program Chairman, and General Chairman. He has authored numerous papers, and holds 22 U.S. patents. Dr. Tonti is a member of tau beta pi, eta kappa nu, and a senior member of IEEE, and an associate editor of the IEEE Transactions on Device and Material Reliability.

## Wayne F. Ellis

Wayne Ellis joined IBM in 1974 at the East Fishkill, NY facility, where he was involved with the development of NMOS logic products which featured up to 120 wireable gates per chip. In 1977 he transferred to the Essex Junction, VT plant where he has been involved in the development of DRAM products. He received an MSEE in 1991 and Ph.D. in Materials Science in 1993 from the University of Vermont under the auspices of the IBM Resident Study Fellowship. Dr. Ellis was

a Work Shop moderator for Product Reliability at the 1997 International Reliability Physics Symposium and delivered an invited paper on DRAMs at the 1998 IRW. He is currently involved in advanced 256Mb SDRAM product and eDRAM development.

## Building Reliability Into CMOS Designs

*Tim Rost, Texas Instruments inc.*

As increasing investments are made in VLSI technology and development, it becomes essential that designs have reliability issues addressed prior to volume manufacturing. Ideally, reliability issues would be addressed and corrected during the design process.

This tutorial provides a basic review of reliability wearout mechanisms, a discussion of how reliability mechanisms can be checked and corrected in the design phase, and how emerging process technologies such as Cu interconnects and low-K dielectrics will influence reliability design guidelines.

### Timothy Rost

Timothy Rost received his Ph.D. in electrical and computer engineering in 1991 from Rice University in Houston, TX. Since then, he has been with Texas Instruments in Dallas, TX and has served in various positions related to semiconductor device reliability. Currently, he manages the reliability group in Silicon Technology Development and is a senior member emeritus of the technical staff. Timothy has also been involved in the International Reliability Physics Symposium (IRPS) and the IEEE Reliability Society. He has been on various IRPS technical program committees and served most recently as the Finance Chair for the symposium. He has also been involved in various capacities in the IEEE Reliability Society, globally as a member of the ADCOM, and locally as Dallas Chapter Chair. He is the technical editor of 2 IEEE videotapes, one on MicroElectroMechanical Systems (MEMS) reliability, and another on gate dielectric wearout, as well as an author of a number of other technical papers in the area of reliability physics.

## Trends in Silicon Germanium BiCMOS Integration and Reliability

*J. Dunn, D. Harame, S. St. Onge, A. Joseph, N. Feilchenfeld, K. Watson, S. Subbanna<sup>1</sup>, G. Freeman<sup>1</sup>, S. Voldman, D. Ahlgren<sup>1</sup>, R. Johnson*

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Silicon Germanium (SiGe) BiCMOS is a silicon technology that combines a high-performance heterojunction bipolar transistor (HBT) with advanced CMOS and a suite of support devices capable of addressing a wide range of mixed-signal applications. When the SiGe technology was introduced an obvious concern was the aspect of reliability; more specifically, could a bipolar transistor with a strained layer in the base be made reliable? The answer has proven to be yes. SiGe products are now appearing from multiple suppliers in virtually all analog and high-frequency market segments. SiGe is used in wireless cellular CDMA and GSM standards at 900 MHz and 2.4 GHz, both in handsets and base stations. Wireless local area network (LAN) chipsets at 2.4 GHz have been announced where the use of SiGe reduced both the IC chip count and power consumption by

50%. SiGe is used in high-speed/high-capacity network applications including a 10 Gbps synchronous optical network (SONET) transmit-and-receive module. Other applications include discrete devices and products with lower levels of integration such as LNAs, VCOs, mixers, power amplifiers (PA), and GPS receivers. In addition to applications in the communications market, SiGe also provides product leverage in high-speed test and storage applications for PRML read channels.

In this paper we will review reliability data for SiGe HBTs and discuss the migration from 0.5 $\mu$ m to 0.25 $\mu$ m BiCMOS, reliability implications of device scaling at 0.18  $\mu$ m, and the safe operating conditions of a high-voltage SiGe HBT technology derivative. Electrostatic discharge (ESD) protection in SiGe technology, which has gained increased importance for RF applications, will be discussed. The ESD results for SiGe HBTs for use in diode configuration protection will also be given. Additionally, a brief summary is given describing the ESD protection of two passive elements, a metal-insulator-metal capacitor and a thick metal inductor.

### James Dunn

James Dunn received his B.S., M.E., and Ph.D. degrees in Materials Science and Engineering from the University of

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Utah in 1983, 1989 and 1989, respectively. He joined IBM in Essex Junction, Vermont in 1989 where he worked on BiCMOS technology development for Analog and Mixed Signal Applications. Since 1992 he has managed a group developing conventional silicon and SiGe based BiCMOS technologies.

## MicroElectroMechanical Systems (MEMS): What are They, and are They Reliable?

*Ann N. Campbell*  
Sandia National Laboratories  
ancampbe@sandia.gov

MicroElectroMechanical Systems (MEMS) comprise a relatively new and rapidly-developing technology area. Some expect that MEMS represent the "Next Silicon Revolution", and others are skeptical that they will live up to the "hype". This talk probably won't resolve that question, but will provide an overview of the basic MEMS technologies - surface micromachining, bulk micromachining, and LIGA - and will explore one of these (surface micromachining) in greater depth to describe the processing of these devices. Both current and potential applications of these microsystems will be described, including the promise that MEMS hold for optical communications. Finally, our investigation of the reliability of surface-micromachined MEMS will be discussed in some detail.

### **Ann N. Campbell**

Ann N. Campbell received the B. S. degree in materials engineering from Rensselaer Polytechnic Institute and the M. S. and Ph. D. degrees in Applied Physics from Harvard University. Ann joined the staff of Sandia National Laboratories in 1985 and spent 10 years (1989 - 1999) in the Microelectronics Failure Analysis Department. She has been active in developing advanced failure analysis applications for focused ion beam (FIB) systems and in studying the effects of FIB exposure on MOS transistor parameters. Ann has 12 publications and two patents in the area of microelectronics failure analysis, and is presently manager of the Microsystems Partnerships Department at Sandia. Ann has served on the International Reliability

Physics Symposium (IRPS) Management Committee Board of Directors. She is a Senior Member of IEEE and is a member of the IEEE Reliability Society Administration Committee.

## Engineering for Reliable Human Performance in Systems and Processes

*Kenneth P. LaSala, KPL Systems*

Human beings in manufacturing and operations account for a significant percentage of system or process errors or failures. Generally, the human element in manufacturing or operations does not receive adequate consideration when the system or process is being designed. This presentation will provide a brief overview of the factors that should be considered and the tools that are available to correct this situation. Specifically, the purpose of this presentation is to provide an awareness of the following aspects of reliable human performance:

- reliability, maintainability and availability parameters for human-machine systems,
- sources of human performance reliability data,
- tools for designing human-machine systems,
- reliability prediction for human-machine systems,
- verification of human-machine reliability.

The material is intended to acquaint the reader with the principal features of the concepts and tools, not to provide a computational proficiency.

### **Kenneth P. LaSala**

Kenneth LaSala is the director of KPL Systems and is the System Engineering Staff Manager, Systems Acquisition Office, for the National Oceanic and Atmospheric Administration (NOAA). Dr. LaSala has over 30 years of technical and management experience in reliability and systems engineering for the Air Force, the Navy, the Army, the Defense Mapping Agency, and NOAA. Also, he has served as the U.S. representative to NATO AC/250, Subgroup IX (Reliability

and Maintainability). Currently, he is the President of the IEEE Reliability Society and the chairman of the IEEE Reliability Society Human Interface Technology Committee. He currently participates in the DOD Human Factors Engineering Technical Advisory Group and the DOD Advisory Group on Electron Devices. He is a member of the IEC TC 56 U.S. Technical Advisory Group. His publications include papers, book chapters, and a video tutorial on R&M, systems requirements analysis, and human performance. His research interests include techniques for designing human-machine systems and progressive system engineering approaches. He received the B.S. degree in Physics from Rensselaer Polytechnic Institute, the M.S. in Physics from Brown University, and the Ph.D. in Reliability Engineering from the University of Maryland.

## Optimal Burn-in Policy

*Way Kuo, Texas A&M University*  
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In this talk, we will present an overview on techniques needed to understand and improve reliability of microelectronics products, in particular, at the infant mortality stage. Burn-in and its characteristics are presented at both the component and system levels. Also to be addressed are:

1. yield issues,
2. reliability modeling and optimization, and
3. statistical analysis of the infant mortality failure rates.

## Software Reliability Prediction

*John Healy, Telcordia Technologies*

Buyers of large software products need and want software reliability prediction. This tutorial discusses the need for software reliability prediction along with the types of models that are required in order to perform a prediction. I will discuss how the models are used and the type of data that can be used to fit the models. I will present several examples applying software reliability prediction. Finally, I will discuss the need for changing from a metrics mentality to a statistical mentality.



Software reliability modeling has been performed more and more over the last decade. Most often, analysts use the procedures that are described by Musa and others in their well-known books. There are several problems with implementing these procedures:

- These procedures typically provide predictions that are too late. No one wants to wait until a software product is out in the field for 1 year before developing a prediction.
- These procedures are not directly applicable to the type of data that are available. Most often the data that are available are grouped failure counts.
- These procedures do not incorporate any outside information on the prediction process. That is, the procedures do not allow for the inclusion of covariates.

For a software reliability prediction process to be usable, it requires that the procedure can be applied earlier in the lifecycle. The procedure must also work for the type of data that is typically collected. Finally, the procedure must allow for the use of outside information.

This paper will describe a software reliability prediction process that was developed at Telcordia that meets our needs. Our Software Reliability Prediction Procedure is usable and is adaptable. I will describe the model(s) underlying our procedure and illustrate the use of our procedure.

I will also discuss the metrics mentality that permeates the software reliability community. I will illustrate some easy-to-use metrics and show that they can lead to very poor results. I will close with a plea for statistical mentality instead of a metrics mentality.

### **John D. Healy**

Dr. John Healy is the Chief Scientist of Network Reliability at Telcordia Technologies. John's expertise is in the areas of reliability modeling, statistical analysis, quality control and data analysis. John led the data collection and analysis efforts for both Network Reliability Councils chartered by the FCC to improve telecommunications network reliability. John directed the development of

all the analyses methods used by the Network Reliability Steering Committee to monitor and control network reliability. He co-wrote the original proposals defining the outage index, which has been adopted by the telecommunications industry as the way to measure outage impact. John directed the development of risk analysis as the way to quantify network risks and compare and improve network architectures. John chairs the Facilities Solution Team aimed at reducing damages to underground fiber facilities. John represented the telecommunications industry and the pipeline industries on the Steering Team of the Department of Transportation's Common Ground Study. He served as an advisor to the President's Commission on Critical Infrastructure Protection on network reliability and security. John wrote the Reliability Prediction Procedure (RPP) which is used by hundreds of companies; the RPP is the commercial standard for hardware reliability prediction. John is currently a Vice-Chair of Reliability and Maintainability Symposium Committee (RAMS) and an Associate Editor of the IEEE Transactions on Reliability. John has a Ph.D. in mathematical statistics from Purdue University.

### **Lotus Notes/Domino International Testing**

*Katsushi Takeuchi,  
Lotus Development Corporation,  
Katsushi\_Takeuchi@lotus.co.jp,*

The International Product Development department in Lotus Development is in charge of testing all the supported languages of Notes/Domino. The testing is executed by 8 distributed teams worldwide. The presentation will mention about issues and difficulties of multiple language testing, as well as the solutions came out from our experiences.

### **Katsushi Takeuchi**

Katsushi Takeuchi is development manager of the Lotus Notes/Domino internationalization team. During his 14 years' experience in software development, he was mainly in charge of internationalizing/localizing software products to support various languages.

### **The IBM Burlington "Virtual Factory" for Y2K Testing**

*James F. McGarry,  
IBM MicroElectronics, Essex Junction VT  
jmcgarry@us.ibm.com*

Just about everyone looks in the mirror to check their appearance and adjust what doesn't meet their expectations. That's how IBM's Microelectronics Division tested its computing systems for Year 2000 readiness. The 'Virtual Factory' in Burlington was an isolated system that mirrored the site's computing infrastructure. The system was based on a process developed by IBM Global Services that was used by IBM and customers alike. The Burlington 'Virtual Factory' was the pilot for similar environments and testing at other IBM locations.

The Virtual Factory was designed to ensure that critical business processes would function properly in the new millennium. It provided the hardware and software facilities needed to simulate processing a raw wafer through the Burlington manufacturing line and, most importantly, the ability to set the date ahead to any date of concern for the year 2000. Manufacturing tools were connected to this advanced date system and tested for their individual readiness as well as for their integration with other applications and systems. For example, a wafer tester might use software on an attached system to transfer information to a database on a mainframe. When connected to the Virtual Factory system, the test tool was checked for its readiness along with that of the software on the local system, the network, and the database on the remote mainframe. The process was used to test the readiness of a sample of the 1,300 tools in Burlington along with their accompanying layers of software and interactions with other systems. Other critical systems tested included those controlling spare parts, production scheduling and data analysis. Development organizations tested their design systems as well. Burlington's Virtual Factory supported testing for other locations that use Burlington applications.

### **James F. McGarry**

Mr. McGarry joined IBM in 1968 in East Fishkill, NY as an Industrial Engineer, but quickly moved into a series of

Information Technology assignments in Applications Programming, Systems Software Support, and Managed Operations attending IBM's Systems Research Institute in 1976. He participated in the re-engineering of the IBM internal I/T structure which led to the founding of IBM Global Services before moving on to technical marketing and technology implementation positions.

He transferred to Burlington in 1993 and has held positions in ASIC Development, Final Test Data Analysis, and most recently as the Technical Assistant to the Site Y2K Program Manager where he was responsible for management of the "Virtual Factory" and End User Application Testing. He is currently a Project Manager in World Wide Bond, Assembly, and Test and an MBA student at the University of Vermont.

**Bill Tonti**  
wtonti@us.ibm.com

## RS AdCom Meets in Burlington VT

(Minutes will be published when approved)

The Reliability Society Advisory Committee (AdCom) held its quarterly meeting in Burlington, VT on July 15th. On the 14th a number of AdCom members toured the IBM Microelectronics facility in Burlington and presented a series of tutorials to the IBM personnel. The tutorials were interesting and well received. Several days of Reliability-based tutorials are planned for the next AdCom meeting in October. One of the highlights of the AdCom meeting was the dinner at the Trapp Family (yes, the Sound of Music Trapps) Restaurant on a mountaintop near Stowe. At that meeting, Chapter Awards (described above) were presented. In addition, 19 RS members received IEEE Millennium Medals in recognition for service to the RS and to IEEE.

## Reliability Society AdCom Meeting

**8 April 2000**  
**San Jose, CA**



## IEEE RELIABILITY SOCIETY ADCOM MEETING

**21 October 2000**

### AGENDA

- 9:00 AM Call to Order
- 9:00-9:25 Agree to Agenda, K. LaSala
- 9:25-9:40 Minutes Approval, Dennis Hoffman
- 9:40-10:00 President's Report, K. LaSala
  - Review of action items from last meeting
- 10:00-10:15 Break
- 10:15-10:45 Treasurers Report, R. Kowalski
  - Budget report
  - FY00 Budget
- 10:45-11:15 Meetings, J. Voas
  - Conference closeouts and budget approvals
  - Significant events
- 11:15-13:30 Lunch
- 13:30-14:00 Membership, P. Hetherington
  - Dallas PACE conference synopsis
  - Membership Report
- 14:00-14:30 Publications, R. Loomis
  - Transactions report
  - Newsletter report
  - Web site update
  - Video Program Status
- 14:30-15:00 Technical Operations, K. Inoue
  - Technical operations status and committee significant events
  - Standards
  - Council and liaison news

15:00-15:15 Break

15:15-15:45 Junior Past President's Report, L. Arellano

- Nominations Committee Report
- Awards and Medals report
- Updated field of interest progress
- By-laws and constitution revision progress
- Long-range planning progress

15:45-16:15 Senior Past President's Report

16:15-16:45 Old Business

- RS RAMS display progress, P. Tsung
- Branding Status, P. Tsung

16:45-17:00 New Business





## TechOps Technical Committees Reorganized – Part 3

It is my great pleasure to announce that three new TechOps Chairpersons have been appointed very lately. One of them is **John Healy**, Telcordia Technologies, who replaced the former Chairperson Hank Wolf of the Committee of **Information Technology & Communications**. He also works as our representative to the IEEE National Committee on Communication and Information Policy (CCIP). John is also a member of RS AdCom. The second is **Hiroshi Yajima**, Hitachi, Ltd., who takes care of the Committee on **Industrial Systems**, the Chair of which has been vacant. The third is **Dave Franklin**, who takes care of the Committee on **Aerospace & Defense Systems**, the Chair of which has been vacant. He is also an AdCom member and the Editor of RS Newsletter. I do hope they will contribute to our Society and its members through their volunteer activities.

Unfortunately, we have lost a Chairperson due to his retirement. He is **Hank Wolf**, the former Chair of the Committee on Information Technology & Communications. He worked also as our Representative to CCIP for long time. His services in many phases to our Society are greatly appreciated.

The brief descriptions together with the scopes and activity plans for the year 2000 of the two Technical Committees on **Industrial Systems** and **Information Technology & Communications** are to follow. You will notice that the Chairpersons would invite you to take part in their activities. If you are interested in the activity of a specific Technical Committee, I would suggest not to hesitate to contact the Chairperson.

**Koichi Inoue**  
VP TechOps  
Inoue.k@ieee.org

### ■ Technical Committee on Industrial Systems

**Chair:** Hiroshi Yajima (Hitachi, Ltd., yajima@sdl.hitachi.co.jp)

**Members:** Volunteers from the following fields would be definitely welcomed; Process industry (chemical plant, nuclear plant etc), Large scale

machinery industry, CALS, Virtual manufacturing, Risk management for Industrial Systems, and Organizational management.

### **The scope, Objectives and Activity Plans:**

The main objective of our committee is to make clear merging reliability concept in industrial systems. Because concept of reliability in Industrial Systems seems to be changing in the era of internet.

In this committee, we would like to overview history of reliability in Industrial Systems, and to search new concept of reliability in the near future. Most of our attention will be focused on reliability evaluation of entire Industrial Systems at emergent situation and reliability issues of the system employing defect open standard exchange of monitoring and control data and intelligent industrial system, and system reliability concept in integrating heterogeneous systems such as CALS and VE (Virtual Enterprise), and privacy and software reliability issues in Industrial Systems.

### ■ Main survey fields of our committee are,

- (1) Reliability issues at industrial system employing defect open standard exchange of monitoring and control data in use of object oriented software technology and intranet on the Web.
- (2) Organization management method for plant accidents
- (3) Reliability issues at virtual manufacturing system
- (4) Japanese style management methodology vs risk management
- (5) Plant trouble automatic monitoring system specific for troubles in transition states and abnormal situation using small amount data

**The expected results from the activity:** Newsletter Articles (1-2 pages)

**Volunteers would be definitely welcomed. See the item “Members” above.**

### ■ Information Technology & Communications

**Chair:** John Healy (Telcordia Technologies, jhealy@telcordia.com)

**Members:** There are over 25 people on the subcommittee on reliability prediction

### **Scope, Objectives and Activities:**

In the past, the primary activity of this committee was representing the Reliability Society on the Committee on Communications & Information Policy (CCIP). The CCIP generates white papers advocating specific positions that IEEE should take about the technology or related issues. These white papers have primarily addressed proposed laws and regulations at the state and federal level associated with regulating the Internet, such as privacy, intellectual property, band width, access, the digital divide (between rich and poor), etc. John Healy will continue to represent the Reliability Society on this committee. One recent white paper is on content filtering of Internet traffic. The filtering allows users to have some control of the sites that can be accessed. A second is on Carnivore, the new FBI surveillance tool for packet networks. In both cases the goal is to provide scientific arguments and move the dialogue away from emotional statements.

John Healy is starting a subcommittee on reliability prediction for information/telecommunications. The direct goal is to update the reliability prediction procedure. An auxiliary goal is to develop a list of major issues in reliability prediction for telecommunications and information system equipment.

This committee will also interface with the Communications Quality and Reliability (CQR) Workshop. The CQR Workshop is an annual event aimed at defining reliability for communication networks. The last workshop was in April in Greece. It was aimed at supporting the development of communications networks to support major global events like the Olympics. The committee will pro-

vide information to the CQR on the Reliability Society

The committee will also interface with ANSI Committee T1A1.2 on network survivability. Issues and information from T1A1.2 will be distributed to the Reliability Society.

**Expected Results:** This committee will support generation of IEEE USA position papers related to Congressional actions through the Committee on Communications & Information Policy. Copies of reports from the CCIP will be distributed to the Reliability Society.

This committee will support the development of reliability prediction methodology. This includes providing the Reliability Society with a list of any issues that are generated by the team developing the methodology. A summary of the methodology will be provided to the Reliability Society.

The committee will interface with telecommunications reliability organizations and standards bodies. This includes the CQR Workshop on network survivability and T1A1.2. Speakers from the Reliability Society will be suggested to the CQR Workshop.

**Volunteers:** All volunteers are gratefully accepted.

## Technical Operations Semiannual Report

Surely one of the most important events for the Technical Operations (TechOps) is to publish in the Newsletter the TechOps Annual Technology Report on "The Status of Reliability Engineering Technology", which was unfortunately not published last year. But you will see the revival of the new TechOps Annual Technology Report once again in the Newsletter, scheduled to be published in

the January issue 2001. Thanks to many of the TechOps Technical Committee Chairpersons, we have had more than a dozen of inputs to the Report. Dr. Christian Hansen, Chair of the Reliability Methodology Committee, is now compiling and editing the Report. You can count on the Report.

In response to my request for the TechOps Committee Chairpersons to send me their semiannual activity reports, I have had the following four inputs. Note that the semiannual activity reports are not mandatory but optional to the Chairpersons this year. Year-end activity reports are, however, not optional but mandatory to every Chairpersons. You will see a collection of activity reports in the Newsletter, scheduled to be published in the April issue 2001

**Koichi Inoue**  
VP TechOps  
inoue.k@ieee.org

# Committee Reports

## Human Interface Technology

*Chair: Kenneth P. LaSala*  
(k.lasala@ieee.org)

This report covers the activities of the IEEE Reliability Society Human Interface Technology Committee for the period between 1 April 2000 and 30 June 2000. Committee membership during the period remained at the same level. One member, W.R. Nelson resigned due to a change in employment. His new position would not involve human interfaces. The committee welcomed Dr. Catherine M. Burns of the University of Waterloo (Canada) as a new member.

Committee activities were as follows:

1. Committee Newsletter - we introduced a newsletter for committee use. The newsletter summarized committee projects. This may be suitable for incorporation in the Reliability Society newsletter.
2. Human Performance Reliability standard - work continues on the stan-

dard at a slow pace. One concept under consideration is a matrix view which relates human factors engineering program activities and reliability program activities.

3. Annual Technology Report contribution - the committee assembled and submitted its contribution to the Reliability Society Annual Technology Report.

Activities for the next quarter are expected to be continued progress on the standard and another edition of the newsletter. We note that Ken LaSala's proposal for giving a tutorial at the 2001 Reliability and Maintainability Symposium (RAMS) has been accepted.

## Microelectronic Technologies

*Co-Chairs: Ann N. Campbell*  
(ancampbe@sandia.gov)  
& Timothy A. Rost (t-rost@ti.com)

The Microelectronic Technologies Committee met during the July AdComm

meeting in Burlington, VT on July 15, 2000. In attendance were Ann Campbell and Tim Rost (committee co-chairs), Marsha Abramo, Alan Street, Bill Tonti, and Bud Trapp.

Microelectronics and microsystems are rapidly evolving fields with a lot of excitement and activity. The committee discussed its objective of providing information to our members in the form of quarterly Newsletter articles, and developed the following list of topics for short articles for inclusion in the Newsletter. Articles that will appear over the next 12-18 months (1 per issue) include the integration of logic and dynamic random access memories (DRAMs), electrostatic discharge (ESD) protection for high frequency devices, reliability and packaging issues associated with new microelectronic materials (including copper interconnect and low-k dielectric materials), the failure analysis and reliability of radio frequency (RF) components, and the reli-

continued on page 16



**RELEX 2 PAGE SPREAD**  
**pick-up from July, page14**



**RELEX 2 PAGE SPREAD**  
**pick-up from July, page15**

## Committee Reports

Continued from page 13

ability of MicroElectroMechanical Systems (MEMS).

## Software Reliability

*Chair: Samuel J. Keene, Jr.  
(s.keene@ieee.org)*

The Software reliability committee has reviewed one paper submitted for publication to the IEEE Reliability Society Transactions. Sam Keene also served on the 2000 Program committee, and reviewed 4 submitted papers for that conference.

## Standards & Definitions

*Co-Chairs: Yvonne Lord  
(Yvonne\_Lord@mail.northgrum.com)  
& Thomas L. Brogan  
(Thomas\_L\_Brogan@res.raytheon.com)*

Below is the status of the two active working groups.

P1467 - This Working Group is currently upgrading their PAR for submittal to the Standards Board before the current PAR expires at the end of the year. The major upgrade is a change from a guide to a recommended practice. Dr. Paul Ellner, the Working Group Chair, reports that he expects to have the initial draft of the complete document ready for review by the entire working group before the end of the year.

P1413.1 - This project, sponsored by IEEE Standards Board SCC37, expects to have an initial draft ready for Working Group review in the mid-October timeframe. Minutes of meetings and teleconferences are posted on the web after they are approved: <http://grouper.ieee.org/groups/reliability/wg1413/index.html>. These minutes provide such information as meeting schedules, action item lists, document outlines and participation. This group has a goal of monthly interchange.

## Review of the IEA/HFES 2000 Congress

*by Catherine M. Burns, Ph.D., IEEE  
Reliability Society Human  
Interface Technology Committee*

Held in San Diego, California, this year's annual meeting of the Human Factors and Ergonomics Society was expanded to include the meeting of the International Ergonomics Association and to have a large start for the next millennium for the field of human factors and ergonomics. The one-week long conference encompassed more than 2000 paper and poster presentations, 16 workshops, and 33 international symposia on various topics. The variety of topics, and multiple parallel sessions meant that there was always some interesting topic on human physical or psychological performance being presented. That said, one of the challenges of a conference of this size is that the individual attendee cannot possibly attend everything of interest.

This conference was well attended by the international community, presenting a too-rare opportunity to listen to and meet with international colleagues in the areas of human performance and reliability. An attendee looking for specific sessions on human reliability may have been disappointed as there were only two sessions dedicated to this area in the conference. However, there were many relevant papers on human performance and approaches for improving human reliability presented in the cognitive engineering, the power systems, and the aviation systems sessions. The cognitive engineering group sessions hosted several impromptu discussions of the merits of new approaches such as cognitive work analysis and ecological interface design, over more established approaches such as mental model work and situation awareness. Some attendees argued growing discomfort with the suitability of the more established approaches for complex, safety-critical systems. Attendees interested in the historical events leading to the growth of human reliability had the opportunity to attend a special presentation by Edward Frederick, the power

plant operator on shift at the time of Three Mile Island accident. Mr. Frederick convincingly reconstructed the accident and discussed the interaction of the available technologies and human performance during the event for a memorable and worthwhile session. Overall, the conference was well-organized and well-attended, making it a worthwhile week for attendees and participants.

## Hello from the RAPTOR Team!

ARINC is pleased to announce that we now support RAPTOR! In addition to providing RAPTOR software free of charge (Free updates and patches also), we offer a range of services to complement RAPTOR. We are currently scheduling regional seminars and can on-site course with a portion tailored to on-site user requirements. Specialized courses on more advanced features can be developed for customized applications (all attendees for special advanced course should have completed "RAPTOR Fundamentals")

Consulting, Model building and analysis, model design coaching, Data collection and analysis (database design, distribution curve fitting, macro building, Custom model modifications (re-labeling dialog boxes, language changes to dialog boxes, customized input/output macros), Verification and Validation studies are available from ARINC.

## Planned improvements include,

**Capacity:** The ability to measure the effects of lost capacity with respect to the RAM attributes of a system. Capacity analysis is generic and can represent message flow, traffic flow, manufacturing processes, etc. Combine capacity, RAM, and cost analysis to precipitate the true characteristics of a system from a system engineering perspective.

**Non-identical priority-return standby:** Model components that are inactive (cold) or semi-active (hot) that can act as alternates to a primary. Alternates and primaries need not be identical. Set a priority value so that a particular primary is always the preferred equipment to be



used. Set switching values to mimic non-perfect switchover.

**Elemental Dependency:** Block or nodes can be sent into an idle status (inoperative) whenever a particular block or node is in a failed status.

**Resource Scheduling:** Personnel or equipment needed to conduct a repair can be scheduled or shift-based.

**Event Based Phasing:** An RBD can change its characteristics during segments of a simulation. The simulation would jump from one phase (or state) to another whenever conditions occurred that defines a phase.

**Multiple Resources:** Blocks would be allowed to acquire more than one type of resource (personnel, support equipment, etc.) to begin a repair cycle.

**Software Reliability:** The ability to grow or degrade the mean life of a block (e.g., software code) to mimic the improvement or degradation of blocks over time.

**Hierarchical RBDs:** The ability to build multiple levels of system indenture within a single reliability block diagram.

**Repair Priority:** The ability to assign the order in which blocks acquire spares and resources and thus start their repair cycles.

**Shelf Reliability:** The ability to mimic spares that have failed during storage.

**Random Variate Logistic Delay Times:** Pre and post logistic delay times associated with a repair cycle that can be represented by a fixed value, the normal, triangular, or uniform distributions.

**Dependent Failures:** The ability of one failure to precipitate the failure of another element in a probabilistic manner.

**Recovery and Fleet Simulations:** The ability to start elements in a failed state with some portion of their repair cycles completed. The ability to have some portion of a block's life expired before the start of a simulation.

If you are interested in any of the planned improvements and would like more information about these improvements, please contact the RAPTOR team for specifics. Make the power of RAPTOR work for you by allowing the RAPTOR team to help you maximize your efforts.

## New Web Applications

IEEE Members,

Good News. Recently a new electronic member service has been released. This service (along with the others mentioned in the email below) allows a member to add services. This means that a member can now add a pub or a society membership electronically at any time. This has been a much-needed electronic service and will get rid of the member need for the web page that directs a member to call the customer service center. Still more to do for adding services to non-members - but a good first step.

A major IEEE milestone has been reached in realizing our goal of "Doing Business Electronically."

Three major web applications went into service with true e-business functionality:

- 1) New Member application, with Instant Service, and all back office systems totally automated,
- 2) 2001 Renewal application, with Instant Service and all back office systems totally automated,
- 3) Add of Service application with Instant Service and all back office systems totally automated.

By instant service it is meant that all services that a member is entitled to, and are authenticated via an IEEE web account, are instantly available to the member after they complete the web transaction. These services include access to purchased electronic publications via IEEE Xplore, electronic access to IEEE Spectrum On-line, member prices on purchases from IEEE On-line Catalog and Store, member prices for purchases at Fatbrain, and the ability to choose an e-mail alias.

Back office systems totally automated means just that. The transactions are handled automatically and totally untouched by IEEE staff hands.

The Add of Services application allows a member at any time to join an IEEE Society and to purchase publications over the web.

These new and improved applications are the result of a major transformation of our Information Systems and Web Applications. My thanks to this and past Boards for their support and to the many staff and volunteers that have made these accomplishments possible.

Please go to <<http://www.ieee.org>>, click on "Renew" and renew your membership. All that you will need is an IEEE Web Account. After you renew, at any time, you can go back to our home page, click on "Add Service" and join another IEEE Society or purchase another publication.

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## IEEE Xplore Now Ready For Use

Following several months of extensive testing of IEEE business rules and communications to the membership, IEEE Xplore is now ready for member access. Visit IEEE Xplore <<http://www.ieee.org/ieeexplore>> to search and view abstract/citation records starting from

1988 as well as full-text of your personal subscriptions. Both services were formally provided by Bibliographies Online and OPeRA, respectively. IEEE Xplore currently offers more than 630,000 documents at your desktop. New content is added weekly. In the near future, new enhancements will further expand IEEE Xplore's offerings. Document references will be available in the abstract/citation records. Those references will include links to IEEE referenced content within IEEE Xplore as well as to referenced content of other publishers. Linked references highly improves the navigation of IEEE Xplore. Additional enhancements are planned in 2000 and 2001. IEEE members must have an IEEE Web Account to access IEEE Xplore. Members can easily establish an account at <<http://www.ieee.org/web/accounts/>>. Access permissions are determined by a member's society membership. In general, basic rights include:

- Browse tables of contents of journals, magazines, conferences and standards starting from 1988
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## Meeting Notices

### 2000 Integrated Reliability Workshop

The 2000 Integrated Reliability Workshop (IRW), sponsored by the IEEE Reliability Society and the IEEE Electron Devices Society, will be held at the Stanford Sierra Camp on the shore of Fallen Leaf Lake near South Lake Tahoe, CA from October 23<sup>rd</sup> to 26<sup>th</sup>, 2000. This workshop provides a unique forum for open and frank discussions of all areas of reliability research and technology for present and future semiconductor applications.

This year's workshop will feature a **keynote address** by Daniel J. DiMaria and James H. Stathis of the IBM T.J. Watson Research Center, entitled, "Defect Generation and Reliability of Ultra-thin SiO<sub>2</sub> at Low Voltage".

The technical portion of the 2000 workshop is being organized by Andreas Martin of Infineon Technologies AG and will focus on six main areas:

- Wafer Level Reliability Tests and Test Approaches
- Identification of Reliability Effects
- New or Existing Reliability Characterization and Prediction Models
- Reliability Test Structures
- Customer Product Reliability Requirements / Manufacturer Reliability Tasks
- Designing-in-Reliability (Circuits, Processes, Products)

Hot topics include Cu interconnects; reliability of deep sub-micron; high speed, high frequency devices; new dielectric systems; and reliability modeling and simulation.

The IRW is quite a bit different from a typical technical conference. From the moment you arrive, after winding slowly back to the south shore of Fallen Leaf Lake, you realize that you are taking part in something special. Attendees stay in cabins without TVs or phones, dress is casual (suits, ties and high heels are shunned), affiliations are downplayed, and meals are taken at the lodge dining room, family-style. Attendees of the workshop are expected to participate actively. You feel yourself drawn into technical discussions from the start. Every aspect of this conference, from the isolated location to the format of the technical program, is designed to get attendees to interact.

Located just a short scenic drive (less than two hours) from Reno, the Stanford Sierra Camp is situated at 6000 ft in the High Sierra on Fallen Leaf Lake. Attendees stay in cabins nestled amid the pines and cedars along the shoreline. All cabins have decks and breathtaking views of the lake and surrounding peaks (don't worry, the cabins also have warm beds and hot showers; phone booths are available in the lodge). This peaceful setting, free from the distractions and annoyances of modern

life, presents a terrific opportunity to get to know your colleagues, including internationally renown experts. This is an opportunity not usually available at bigger, more hectic reliability conferences. Instead of watching TV, participants spend their evenings at poster sessions, discussion groups, and special interest groups (SIGs), all with refreshments provided to stimulate discussions.

One unique aspect of this workshop is the opportunity for every attendee to present a poster of their own research, no matter what state it is in. Just arrange for space when you register or bring last-minute results in your briefcase or backpack. Your ideas will be accommodated. This a great way to share that new project you are working on and to get world-class feedback. The poster presentations are even eligible for a two page write up in the conference proceedings. The **open poster sessions** are but one example of the opportunities for interaction that sets the IRW apart from other conferences.

Another distinction of the IRW is the moderated **Discussion Groups** that are held in the evenings. Organized this year by William Vigrass of Texas Instruments, the Discussion Groups topics are: 1) Single Event Upsets (SEU), 2) WLR Monitoring, 3) Product Qualification / Burn In, 4) Gate Oxide Integrity, 5) Electromigration, and 6) Designing for Reliability. Lively conversation and debate among participants is promised and written summaries will be included in the workshop proceedings.

For those with the stamina, the Discussion Groups are followed by the **Special Interest Group meetings** or SIGs (as attendees refer to them). The SIGs are composed of small groups of researchers and engineers who often continue their conversations and collaborations even after they leave the workshop. Every attendee has the opportunity to become part of an existing SIG or suggest a new topic and start one of their own. One particularly successful example is the Thin Oxide Integrity SIG which has met for several years and collaborated to produce award winning presentations at other reliability meetings. Be warned, remnants of the SIG discussions sometimes rage on into the wee hours of the morning.

Yet another advantage of attending the IRW is the **Tutorial Short Course**, presented by world class experts and included at no additional cost. The tutorials review basic topics as well as the latest developments and are designed to be beneficial both to newcomers and experienced members of the reliability community. Organized this year by Doug Menke of Motorola, the Tutorial Short Course will be broken into three topics: 1) "Integrated Circuit Fabrication Technology and Yield Control," by Ernest Levine, Tom Houghton, and Parth Dave of IBM MicroElectronics, 2) "Ultra-thin Oxide Reliability for ULSI Applications," by Ernest Wu of IBM MicroElectronics, and 3) "Managing Technology Qualification in a Foundry/Fabless Partnership," by Raif Hijab of Cirrus Logic.

Last, but certainly not least, attendees have Wednesday afternoon off to enjoy activities such as hiking (with the annual trek to the top of Mt. Tallac as a favorite goal), volleyball, canoeing, biking, walking, or just conversing by the lake, all in the fresh clean mountain air. This free afternoon is a great way not only to network, but to build long-lasting friendships.

Additional information about the workshop is available on the IRW website at [www.irps.org/irw](http://www.irps.org/irw), or by contacting SAR Associates at 301 N. Madison Street; Rome, NY 13440, Phone: 315-339-3968; fax: 315-336-9134. Note: If you want to take part in this event, please register early as space at the Stanford Sierra Camp is limited to roughly 120 attendees and the workshop has sold out in the past.

On behalf of the 2000 Integrated Reliability Workshop Committee, we look forward to meeting you in Lake Tahoe!

**Dr. John F. Conley, Jr.**  
**Communications Chair, IRW 2000**  
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## International Reliability Physics Symposium Preliminary Notice

The 39th International Reliability Physics Symposium (IRPS) will be held at the Wyndham Palace in the Walt Dis-

ney World Resort on April 30 - May 3, 2001. This year's symposium will include the excellent technical program, tutorials, workshops, equipment demonstrations, and social events that have become familiar trademarks of the IRPS. A new panel discussion is being planned following last year's successful panel on the future of oxide reliability. Additionally, a new emphasis on product reliability should be of interest to the attendees. Special social events taking advantage of the Walt Disney World setting are also being arranged. For more information go to the IRPS website at [www.IRPS.org](http://www.IRPS.org). If you're considering submitting an abstract, the September 15th deadline is rapidly approaching. Submission details are available on the website at [www.irps.org/tpc](http://www.irps.org/tpc). For information on participating in the IRPS Equipment Demonstration Program, please contact Scien-Tech Associates, Inc., at 828-898-6375, or email, [dbarbsta@aol.com](mailto:dbarbsta@aol.com).

**Edward I. Cole Jr.**  
**2001 IRPS Publicity Chair**  
<http://www.IRPS.org>

# IEEE Reliability Society Technical Tutorial Day

October 23, 2000  
 Madrid Spain

### Held at:

**Spanish Council for Research**  
 C / Serramo, 113  
 28006 Madrid

### Schedule of presentations

10 a.m. – 10:20 a.m. **Dr. Kenneth LaSala**  
*Overview of the IEEE Reliability Society*  
 10:20 a.m. – 10:40 a.m. **Dr. Koichi Inoue**  
*Overview of the Technical Operations Subcommittees of the IEEE RS*  
 10:40 a.m. – 11:00 a.m. **Ms. Loretta Arellano**

*The Benefits of membership and Chapters in the IEEE RS*

### Technical Program

11:00am – Noon **Mr. Dennis Hoffman**  
 Concurrent Engineering / Integrated Product Development  
 Noon – 12:30 pm Break  
 12:30 p.m. – 1:30 p.m. **Dr. Kenneth LaSala**  
**Electronic Implementation of Concurrent and Reliability Engineering**  
 1:30 p.m. – 3:30 p.m. **Lunch**  
 3:30 p.m. – 4:30 p.m. **Ms. Marsha Abramo**

**Focused Ion Beam Technology and Applications to Microelectronics**

4:30 p.m. – 5:30 p.m. **Dr. Kenneth LaSala**  
**Engineering for Reliable Human Performance in Systems and Processes**

5:30 p.m. – 6:30 p.m. **Mr. Dick Doyle, P.E.**

**MEMS Reliability Analysis**

**Speaker Abstracts and Biographies**

**Concurrent Engineering / Integrated Product Development**

Concurrent Engineering, or integrated product development, is purported to be an approach that can yield a large competitive advantage to early adopters of the methodology. CE is applicable to any industry that develops its own products and wants to remain competitive in today's marketplace. This overview is intended to supply an introduction to CE concepts and principles, and to set the stage for CE implementation.

**Dennis Hoffman** is a Reliability Society officer, a long-term IEEE member, and has a broad Reliability experience base in development and production of electronic systems. He has held various Reliability management positions supporting product divisions. Mr. Hoffman attained the peer recognition title of Distinguished Member of the Technical Staff. Mr. Hoffman has BS and MS degrees in Electrical Engineering.

### **Electronic Implementation of Concurrent and Reliability Engineering**

This lecture provides an introduction to the basics of computer networks and discusses their role in the modern concurrent engineering environment. The lecture discusses types of networks, network structure, intranets, extranets, virtual private networks, and approaches to developing networks and network architectures. If time permits, there is a supplement on electronic tools for reliability engineering. The lecture is intended for those students and engineers who need to understand the modern information technology environment.

**Kenneth LaSala** is the director of KPL Systems and is the System Engineering Staff Manager, Systems Acquisition Office, for the National Oceanic and Atmospheric Administration (NOAA). Dr. LaSala has over 30 years of technical and management experience in reliability and systems engineering for the Air Force, the Navy, the Army, the Defense Mapping Agency, and NOAA. Also, he has served as the U.S. representative to NATO AC/250, Subgroup IX (Reliability and Maintainability). Currently, he is the President of the IEEE Reliability Society and the chairman of the IEEE Reliability Society Human Interface

Technology Committee. He currently participates in the DOD Human Factors Engineering Technical Advisory Group and the DOD Advisory Group on Electron Devices. He is a member of the IEC TC 56 U.S. Technical Advisory Group. His publications include papers, book chapters, and a video tutorial on R&M, systems requirements analysis, and human performance. His research interests include techniques for designing human-machine systems and progressive system engineering approaches. He received the B.S. degree in Physics from Rensselaer Polytechnic Institute, the M.S. in Physics from Brown University, and the Ph.D. in Reliability Engineering from the University of Maryland.

### **Focused Ion Beam Technology and Applications to Microelectronics**

During the past decade, focused ion beam (FIB) systems have become indispensable tools in the arsenal of analytical techniques available to failure analysts and IC designers. FIB systems are similar to scanning electron microscopes (SEM) in that a charged particle beam is generated, raster-scanned, and used for high resolution imaging. In addition, the use of massive Ga ions permits the FIB system to be used for both material removal (milling) and deposition, enabling applications such as precision cross sectioning and chip repair. This lecture will review the fundamentals of FIB system operation, describe a wide range of applications, and discuss FIB approaches for chip repair and failure analysis from the backside of the chip.

**Marsha Abramo** is an advisory scientist with the IBM Microelectronics Division in Essex Junction, Vermont. She joined the company in 1980 and has primarily worked in process development and advanced technology transfer related to plasma and ion-beam physics. Her particular interests in recent years have been in the development of advanced techniques for focused ion-beam gas-assisted etching and ion-induced dielectric deposition for failure-analysis applications. Ms. Abramo received the BS degree in chemistry from Trinity College in Burlington, Vermont.

### **Engineering for Reliable Human Performance in Systems and Processes**

Human beings in manufacturing and operations account for a significant percentage of system or process errors or failures. Generally, the human element in manufacturing or operations does not receive adequate consideration when the system or process is being designed. This presentation will provide a brief overview of the factors that should be considered and the tools that are available to correct this situation. Specifically, the purpose of this presentation is to provide an awareness of the following aspects of reliable human performance:

- reliability, maintainability and availability parameters for human-machine systems,
- sources of human performance reliability data,
- tools for designing human-machine systems,
- reliability prediction for human-machine systems,
- verification of human-machine reliability.

The material is intended to acquaint the reader with the principal features of the concepts and tools, not to provide a computational proficiency.

See Bio above for **Kenneth LaSala**

### **MEMS Reliability Analysis**

The intent of the Micro-Mechanical Engineering tutorial is to provide:

- An overview of all aspects of micro-mechanical reliability engineering.
- A basic understanding of the micro-mechanical reliability discipline for people who have a knowledge of reliability and wish to learn more about this discipline .
- A comparison of various mechanical reliability predictions and sources of data along with helpful methodology in using them.

An understanding of important relationships with other reliability/design disciplines.

Presented are Reliability predictions and failures of ultra small parts based on aging and wear out. Present and future techniques for predicting failure rates are

included, along with the design equations and how they are used. Sample calculations are provided for parts subjected to HALT, including micro bearings and gears.

**Dick Doyle** has more than 30 years of experience in the theoretical analysis and design of electrical and mechanical systems. Mr. Doyle's recent experience includes consulting for the past 20 years in the Electro-Mechanical systems related to Ocean Mining, Ship Building, Nuclear Power and the Digital Television Industries. He performed computer simulations and analysis of a ship gun turret explosion, performing reliability predictions of the mechanical hydraulic rammer device that might have failed. Previous consulting work included teaching Mechanical Stress Analysis (Mechanical Reliability) to graduate engineers working for the US Navy (Civil Service). This course was taught as a 3 day seminar and has been presented at many different locations including Washington DC, Louisville, KY, Craine, IN and Port Hueneme, CA. He developed the text and has taught the course over 25 times in the past 10 years.

Mr. Doyle is a Registered Electrical and Civil Engineer in California. He has a B.S. in Mechanical Engineering from Oregon State University and a M.S. in Engineering from the University of California, Irvine

## *Discount on Project Management Courses Offered*

PISCATAWAY, NJ. 7 July 2000.

Management Concepts, a global leader in project management training, is offering classes to IEEE members at a special 10% discount. Management Concepts is an innovator that consistently provides timely, targeted information and knowledge-based products to people requiring business-related skills.

Take the next step in career development by learning project management. The discipline of project management is critical for success and is becoming a required area of expertise for career advancement.

These 2 to 5 day courses are awarded Continuing Education Units making it ideal for fulfilling professional obligations. Courses are held at a variety of locations and times during the year.

Among the 35 Project Management courses offered are:

- Project Management Principles, covering the fundamentals necessary for each phase of the project life cycle.
- Leadership and communication skills for project managers, covering the forms of leadership best suited to your personality and how to use techniques to manage and re-

solve conflict, change and personnel issues.

- Managing multiple projects and geographically dispersed projects, focusing on the challenges of co-locations, virtual teams, conflicting priorities and limited resources.
- Negotiation for project management executives, examining the negotiation process, how to determine what is negotiable, recognize needs and vulnerabilities, and improve negotiating techniques.

The Management Concepts courses join the growing list of educational opportunities to be found at the IEEE professional development institute (PDI) when it opens in September 2000. The IEEE PDI will maximize life long learning and professional development opportunities for IEEE members globally.

To register or for full course selection and schedules visit [www.managementconcepts.com](http://www.managementconcepts.com) or call 1.800.232.9096. The IEEE member discount can be applied to any course offered by Management Concepts. For further information contact Alan Trembly, [a.trembly@ieee.org](mailto:a.trembly@ieee.org).

**Lynn Murison**  
**Outreach Administrator,**  
**IEEE Educational Activities**  
**ph: 1.732.562.6526**  
**[www.ieee.org/organizations/eab/](http://www.ieee.org/organizations/eab/)**

## Preliminary Notice

### 2001 ACRS Joint Meeting

March 19-21 2001  
Hilton Oceanfront Resort  
Hilton Head Island, SC,  
U.S.A

<http://www.cr.org>

### Fourth International Conference on

### Modeling and Simulation of Microsystems MSM 2001

### 2001 International Conference on Computational Nanoscience (Biology, Chemistry,

### Materials) ICCN 2001

#### MSM 2001

<http://www.cr.org/MSM2001>

The largest gathering in the field worldwide, MSM is the premier technical forum for presenting the latest research and development in modeling and simulation methods, tools and applications in the MEMS, microelectronic, semiconductor, sensor, materials and biotechnology fields.

Conference Chairs, Narayan Aluru, University of Illinois at Urbana Champaign  
Andreas Wild, Motorola

## Topics

- Mathematical Modeling and Scaling Laws
- Numerical Methods
- Finite and Boundary Element Methods
- Process, Device and Circuit Simulation
- Model Calibration and Validation
- Equipment Modeling
- Computational Materials
- Combinatorial Chemistry
- Atomistics and Molecular Simulation
- Co-simulation and Optimization
- System and Multi-level Modeling
- Artificial Intelligence and Expert Systems
- Virtual Reality and Computer Vision
- Data Bases, Data Exchange and Translators

## Application Areas

- Semiconductors and Microelectronics
- Advanced Packaging and Interconnects
- Micro Electro Mechanical Systems (MEMS)
- Smart Sensors and Structures
- Advanced Lithography and Photonics
- Biotechnology
- DNA Chip Technology and Genomics
- Microfluidic Systems
- Environmental Monitoring
- Metrology
- Manufacturing and Scheduling
- CAD/CAE/CAM

## Keynote Lectures

- Towards Predictive TCAD and Fab Integration; Wolfgang Fichtner, Swiss Federal Institute of Technology
- Bringing Together MEMS, Optics, Fluidics, RF & ICs in a Design Flow; for MST, John Gilbert, Microcosm Technologies, Inc.
- Nano-Structure Simulation: From Thin Oxides to Biological Ion Channels; Karl Hess, University of Illinois at Urbana-Champaign
- Multiscale Modeling of Microfluidics; George Karniadakis, Brown University

- Bootstrapping OMEM Device Models to the System Level; Steven Levitan, University of Pittsburgh

## Special Sessions

- Verilog-A Hardware Description Language; Ira Miller, Motorola
- Quantum Effects, Quantum Devices and Spintronics; Dragica Vasilesca, Arizona State University

## Workshops, Tutorials & Panels

- Simulation Techniques for Micromachined Devices; Jacob White, Massachusetts Institute of Technology
- Interdisciplinary Design and Simulation Methods for Micro-and Biomedical Fluidic Applications; Steffen Hardt, Institute of Microtechnology, Mainz, Germany
- MEMS Simulation Tools: Tutorial and Demonstration; ANSYS, Inc
- Panel: CAD Tools for MEMS; Moderator: Mary-Ann Maher, MemScap

## ICCN 2001

<http://www.cr.org/ICCN2001>

Advanced computational techniques in the nano and micro regimes are paramount in the advancement of nanoscience. ICCN provides a forum for the interdisciplinary blending of computational efforts in biology, chemistry, physics and materials, founded on inherently similar ab initio approaches, applied towards traditionally distinct disciplines.

## Venue

The 2001 ACRS Joint Meeting will be held at the luxurious, Hilton Oceanfront Resort. This beach front venue is tucked away on breathtaking Hilton Head Island, off the southeastern tip of South Carolina, U.S.A.

In addition to the conference technical program, an exciting list of social activities are being planned to allow attendees ample opportunity to enjoy this exquisite island location, which enjoys a subtropical climate year-round.

Visit the conference web sites <http://www.cr.org/ICCN2001> and <http://www.cr.org/MSM2001> for more information, including registration, and housing.

ICCN 2001 Conference Chairs William Goddard, Caltech, Computational Chemistry; Roberto Car, Princeton Uni-

versity, Computational Materials; Amos Bairoch, Swiss Institute of Bioinformatics, Computational Biology

ICCN 2001 Conference Co-Chairs Srinivas Iyer, Los Alamos National Laboratory; Dirksen Bussiere, Chiron Corp.; Wolfgang Windl, Motorola

## Topics and Application Areas

### Computational Biology

- Molecular Modeling
- Protein Engineering
- Structural Biology
- Bioinformatics/Computational Genomics
- Mathematical Biology
- Computational Drug/Molecular Design
- Engineering
- Functional/Structural Genomics
- Self-Replicating/Organizing Systems

### Computational Chemistry

- Combinatorial Chemistry
- Polymers and Colloids
- Solid State and Surface Chemistry
- Catalysis, Separations and Reactions
- Kinetics and Collision Dynamics
- Crystallization and Additives
- Formulations and QSAR
- Molecular Electronic Structure
- Quantum Molecular Dynamics - Theory & Applications
- General Computational Chemistry - Theory & Methods

### Computational Materials

- Interfaces and Contacts
- Surfaces, Surface Processes and Thin Films
- Optical and Vibrational Properties
- Mechanical Behavior
- Alloys and Nanostructures
- Tribology
- Radiation Effects in Solids & Cluster Impact Phenomena
- Semiconductors & Electronic Materials
- Glasses & Ceramics
- Materials at High Pressure and High Temperature
- Large-Scale Simulations
- Multiscale Modeling of Materials
- General Theory & Methods

## Keynote Lectures

- Computational Nanotechnology; William Goddard, Caltech

- Computational Materials; Roberto Car, Princeton University
- Computational Biology; Amos Bairoch, Swiss Institute of Bioinformatics
- Nano-Structure Simulation: From Thin Oxides to Biological Ion Channels; Karl Hess, University of Illinois at Urbana-Champaign

### Special Sessions

- Structure Based Drug Design: Theory, Computation and Practice; Fred Cohen, University of California at San Francisco; Dirksen Bussiere, Chiron Corporation
- Protein Structure and Structural Genomics; Kurt Krause, University of Houston
- Atomic and Molecular Scale Modeling of Materials; Niels

Gronbech-Jensen, University of California Davis & Berkeley Lab

- Nanoscale Modeling of Front-End Processing in Silicon; Wolfgang Windl, Motorola
- Quantum Mechanics & Computational Modeling of Soft Matter; Lawrence Pratt, Los Alamos National Laboratory, Stephen Paddison, Motorola

A current frontier of computational modeling involves soft matter and chemical questions that require quantum mechanical methods. This segment of ICCN emphasizes ab initio computer simulations of solutions and soft matter, O(N) algorithms for electronic structure computation, and QM/MM models for condensed matter biology, chemistry, and materials science.

### Invited Speakers

- David Chandler, University of California, Berkeley
- Paolo Carloni, Trieste, Italy
- Michael Klein, University of Pennsylvania
- Mark E. Tuckerman, New York University
- Eric Schwegler, Lawrence Livermore National Laboratory
- Matt Challacombe, Los Alamos National Laboratory

<http://www.cr.org>

Applied Computational Research Society

Please address all questions and requests to [info@cr.org](mailto:info@cr.org)

## ICASSP 2001

### Industry Technology Tracks

### Salt Lake City, UTAH May 7-11, 2001

ICASSP will hold again several sessions as part of its Industry Technology Tracks (ITT). The goal of the ITT is to highlight the contributions of industry to DSP technology, from specific hardware and software solutions to results from internal research and development. ICASSP is the largest forum for the ex-

change of new results in signal processing, and attracts leaders in the field from around the world. We encourage you to participate by submitting a paper to the ITT portion of ICASSP. We are particularly seeking contributions in the following areas:

- DSP Chips & Architectures
- DSP Tools & Rapid Prototyping
- Communication Technologies
- Multimedia & DTV Technologies
- Adaptive Interference Cancellation
- Automotive Applications
- Defense & Security Applications
- Emerging DSP Applications (biomedical, power systems, etc.)

Other DSP Technologies  
The industry program will be moderated by the Industry DSP Committee. The Industry Track Program Co-Chairs are:

- Jose Fridman, Analog Devices ([jose.fridman@analog.com](mailto:jose.fridman@analog.com))
- Michael Deisher, Intel Corporation ([michael.deisher@intel.com](mailto:michael.deisher@intel.com))

For more details on the ICASSP-01 program, tutorials, exhibits, and registration, visit:

<http://www.icassp2001.org>  
**Lee Swindlehurst**  
**Technical Program Chair**  
**ICASSP 2001**

## Call for Papers

### Preliminary Call for Papers

### ICACSD'2001 International Conference on Application of Concurrency to System Design

25-29 June, 2001,  
Newcastle upon Tyne, U.K.

Supported by In cooperation with IEEE Computer Society Framework 5 Working Group on IEEE Circuits and Systems Society Asynchronous Circuit Design (ACID-WG) IEEE Circuits and Systems United Institute of Electrical Engineers Kingdom and Republic of Ireland, British Computer Society Circuits and Systems Chapter Formal Methods Europe

**Contact e-mail: [acsd2001@ncl.ac.uk](mailto:acsd2001@ncl.ac.uk)**  
**URL: <http://www.cs.ncl.ac.uk/conferences/2001/acsd>**

The International Conference on Application of Concurrency to System De-

sign (ICACSD) is being organized for the second time (see also CSD'98 - <http://www.u-aizu.ac.jp/csd98/>) to serve as a forum for disseminating advanced research results on theory and practice of design of concurrent systems. While there are a few success stories in this field, there is a real need to provide practitioners with adequately sound and expressive tools, and researchers with real motivations and examples. The aim of this conference is to contribute towards this goal by bringing together experts in a wide variety of fields related to complex concurrent system de-

# New IEEE Book Available Power Transmission Under Deregulation

## High Reliability Content

This new Selected Readings volume addresses the problems of electrical power transmission under deregulation. It will prove valuable to those working in the field as well as for those in power policy positions.

Whither Transmission Reliability? Selected Readings Available PISCATAWAY, NJ, 20 June 2000. Will the bulk electric power system be as reliable in the future as it has been in the past? The Evolution of Electric Power Transmission Under Deregulation, edited by John A. Casazza and George C. Loehr, is a compendium of over fifty of the most current and classic articles on transmission under deregulation which seeks to enlighten the reader on this subject. According to John Casazza, "Those restructuring the electric power industry have ignored the effects on the reliability of our electric transmission systems. Risks of blackouts and power shortages continue to grow. New technical and institutional solutions are needed. If these are not coordinated, reliability will continue to decline while costs continue to increase."

These selected readings provide up-to-date information and an overview valuable not only to those working in the field, but also to those in power policy positions, offering under one convenient cover a choice selection of papers and articles on transmission reliability. Areas covered include:

- An overview of electric power systems
- Transmission System Planning & Design
- Transmission System Operation
- Transmission Transfer Capability
- Restructuring, Reliability & Transmission Capability
- Transmission System Components & Research
- Communications, Information Security & Other Factors

Experts John A. Casazza, P.E. and George C. Loehr have carefully selected the most significant and valuable articles for this volume. Mr. Casazza, an award winning IEEE Life Fellow, has worked in industry and served the community and nation as a member of various Councils and Panels for 54 years. He has testified extensively as an expert witness before Federal and state regulatory bodies. Mr. Loehr 's career in transmission planning in the Northeast spans more than 35 years. He is a recognized national expert on electric power system reliability.

To order The Evolution of Electric Power Transmission Under Deregulation, List price \$69.95, IEEE Member price \$49.95, use product number SR112. Order from the IEEE Customer Service Department, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA; e-mail: [customer-service@ieee.org](mailto:customer-service@ieee.org); phone: 1.800.678.4333; Web: ONLINE STORE at <http://shop.ieee.org/store/>. For other educational products access: <http://www.ieee.org/organizations/eab/cathome.htm>

**Lynn Murison,  
IEEE Educational Activities  
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Phone: 1.732.562.6526**

sign and analysis. The conference will be organized jointly with the 22nd International Conference on Application and Theory of Petri Nets (ICATPN); <http://www.cs.ncl.ac.uk/conferences/2001/pn/>, which attracts leading researchers, both academic and industrial, working with Petri nets. The scientific programs of the two conferences and, in particular, the associated workshops and advanced tutorials, will be co-ordinated in order to ensure that there is a significant level of interaction and exchange of ideas between their respective participants.

The scientific program will also include invited lectures covering the areas of current interest, tool presentation and demonstration

## TOPICS OF INTEREST:

Formal and semi-formal models: Petri nets, Process Algebras, Temporal Logics, Data Flow nets, Statecharts, Synchronous Languages, HDLs, etc.

- Formal methods for CAD and verification of concurrent systems: model checking, asynchronous design, high-level synthesis, hardware/software co-design, etc.
- Real-time and hybrid systems
- Discrete-event systems, communication protocols and interfaces
- Concurrency issues in designing Systems-on-Chip
- Performance modelling and analysis for concurrent systems
- Case studies of concurrent systems design and verification
- Presentation of software tools supporting the above topics

## IMPORTANT DATES:

Submission of Papers: December 1, 2000

Notification: March 1, 2001

Final Version Due: April 1, 2001

Tutorials: June 25-26, 2001

Conference: June 27-29, 2001

**PAPER SUBMISSION:** Submitted papers should be no more than 15 pages in 11-point font with a 60-word abstract, and should include a cover page with authors' physical and e-mail addresses, phone and FAX numbers. Prospective authors should submit electronic versions (postscript or pdf, created for A4 size) of their papers to Alex Yakovlev ([Alex.Yakovlev@ncl.ac.uk](mailto:Alex.Yakovlev@ncl.ac.uk)).



Accepted papers are intended to appear in proceedings published by the IEEE Computer Society Press.

**TOOL DEMO SUBMISSION:** Submissions for tool demonstration should be (no more than 5 pages) sent to Albert

Koelmans (Albert.Koelmans@ncl.ac.uk) by April 1, 2001.

## New at RAMs

We are something new we are trying this year, a UNIVERSITY AND COLLEGE INFORMATION TABLE.

RAMS now offers accredited Universities and Colleges the opportunity to provide information about programs, which address the needs of RAMS atten-

dees. The Exhibits Area will include a table for pamphlets or information packets, which can be picked up by interested RAMS attendees. Information will be about degree programs, short courses or certificate programs offered by the institutions.

For those of you who are affiliated with Universities or Colleges, here's your chance. Also, feel free to let Colleges or Universities you are in contact with know about this opportunity.

**Charlie Plotkin**  
cplotkin@ford.com

## Preliminary Notice

### 8th Reconfigurable Architectures Workshop (RAW 2001)

San Francisco,  
April 23, 2001

<http://www.cse.unsw.edu.au/~raw/>

to be held in conjunction with

### International Parallel & Distributed Processing Symposium (IPDPS 2001)

<http://www.ipdps.org/>

The 8th Reconfigurable Architectures Workshop (RAW 2001) will be held at the San Francisco Airport Hyatt, April 23, 2001. RAW 2001 is associated with the 15th Annual International Parallel & Distributed Processing Symposium (IPDPS 2001, formerly IPDS & SPDP). RAW 2001 is one of the major meetings for researchers to present ideas, results, and on-going research on both theoretical and industrial/practical advances in Reconfigurable Computing.

### Main focus of the Workshop:

Run Time Reconfiguration - Foundations, Algorithms, Tools. Reconfiguration of circuitry at runtime, also called run-time reconfiguration, is a new dimension in computing that blurs traditional barriers between hardware and software components. As a consequence, neither the processor architectures nor the hardware/software design methodologies and tools that are available today can fully exploit the possibilities created by this new computing paradigm. Algorithm designers and system designers alike are challenged to exploit the potential of innovative reconfigurable devices for the implementation and use of complex systems. This goal requires design tools based on a robust formal description of the underlying concepts of configurable computing in order to get independence from the frequently changing specific properties of commercially available devices. An appropriate combination of knowledge about dynamic reconfiguration technologies, the various different models of reconfigurable computing, programming methods, efficient algorithms, and the supporting tools, is required.

RAW 2001 is planned to provide a forum for creative and productive interaction between these disciplines, with a particular aim of encouraging the de-

velopment of innovative algorithms targeted at novel reconfigurable systems.

The topics of interest include, but will not be limited to:

- Reconfigurable Computing
  - Models
  - Architectures
  - Mobile circuitry
  - Evolvable hardware
  - Configurable resource management
- Programmable Logic Devices and Systems
  - Reconfigurable Systems
  - Algorithms and complexity
  - Fault tolerance issues
  - Adaptable systems
- Development Tools and Methods
  - High-level design methods
  - Compilation techniques algorithms
  - Support for virtual machines systems
  - Methodologies and tools
- Applications
  - Mapping of parallel algorithms
  - Arithmetic/geometric/graph
  - Wireless and distributed
  - Industrial applications & experiences

In 2001, IEEE CS Press will publish the IPDPS symposium and workshop abstracts as a printed volume. The complete symposium and workshop proceedings will also be published as a CD-ROM disk.



unexpected situation in which an application caused system hardware shutdowns; it was quickly recognized and corrected effecting only the virtual product in the 'Virtual Factory' in May, 1999 rather than millions of dollars worth of real product in

January 2000. We also discovered that a particular hardware/software upgrade was not needed which resulted in a substantial cost avoidance.

When the real New Year's Day 2000 arrived, no one noticed from a data pro-

cessing or tool viewpoint — everything worked properly; we had found and exorcised any bugs well in advance thanks to the 'Virtual Factory'.

# IEEE Sensors Journal New for 2001!

The **IEEE Sensors Journal**, a print and electronic journal to be published bimonthly beginning in June 2001, will be a fully refereed publication with an online peer review system and electronic submission of papers. **IEEE Sensors Journal** covers the theory, design, fabrication and application of devices for sensing and transducing physical, chemical, and biological phenomena. With an emphasis on the application of sensors and focusing on the electronics and physics aspects of sensors and integrated sensor-actuators, **IEEE Sensors Journal** will cover the numerous sensor technologies spanned by the IEEE as well as emerging sensor technologies.



an affordable information exchange. And it's important that the papers be rapidly peer-reviewed and available online," said Vig.

### Endorsed by SPARC

SPARC (the Scholarly Publishing and Academic Resources Coalition) has announced its collaboration with IEEE to produce the **IEEE Sensors Journal**. "IEEE is a high-quality non-profit publisher that's well prepared to bring a low cost alternative to market," said Rick Johnson, SPARC Enterprise Director. "Moreover, they have an impressive record of publishing economical, high-impact journals. Their average institutional subscription price is about half that of all engineering titles."

### Publish in a Journal You Can Afford!

Professor Vladimir Lumelsky of the University of Wisconsin, who is currently on sabbatical at the National Science Foundation, was recently named Editor-in-Chief of **IEEE Sensors Journal**. "With 37 review paper commitments for the inaugural issue by the top names in the sensor field, we are well on our way toward our goal of publishing a journal of the highest quality," said John Vig, President of the IEEE Sensors Council. "We want to provide a place where the best authors can publish in a journal they and their libraries can afford. It is imperative that the major players in this evolving technology create a forum for

**Issues Per Year:** 4 in 2001, 6 in 2002

Member Price:	IEEE Pub ID:	ISSN:
\$ 19 print	500-186-1	1530-437X
\$ 19 online	500-186-E	1530-437X
\$ 29 print AND online	500-186-P	1530-437X

Institutional Price:	IEEE Pub ID:	ISSN:
\$395 print	500-186-1	1530-437X
\$395 online	500-186-E	1530-437X
\$495 print AND online	500-186-P	1530-437X

For further information, please see: <http://www.ieee.org/sensors>. For ordering information, please see reverse.

# Also New for 2001! IEEE Transactions on Device and Materials Reliability

This new publication will provide in-depth analysis of the measurement and understanding of the reliability of electronic materials and devices at each phase, from concept through research and development and into manufacturing scale-up. Available solely online, the scope of this publication includes the reliability of Devices, Materials, Processes, Interfaces, Integrated Microsystems, Transistors, Integrated Circuits, and Thin Film Transistor Applications.

<b>ISSN:</b>	1530-4388
<b>IEEE Pub ID:</b>	500-187-E
<b>Issues Per Year:</b>	4 (online only)
<b>Member Price:</b>	FREE
<b>Institutional Price:</b>	FREE to all in first year (\$485 value)

To access after March 2001 please go to: <http://www.ieee.org/ieeexplore> and select this title under journals



# HYPERVISION's Emission Technologies

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For FA and yield labs



For functional testing  
on the test floor



PTF1 stand



Advanced sensors



Backside preparation for  
wafers and packaged devices



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