

# Reliability Society

N E W S L E T T E R

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



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## C O N T E N T S

|   |    |
|---|----|
| President's Message   | 1  |
| Editor's Column   | 2  |
| Chapter Activities  | 4  |
| Reliability Society President AdCom Nominations Requested   | 6  |
| AdCom Meeting Minutes   | 7  |
| IEEE Reliability Society AdCom Meeting Agenda for March 21, 1999  | 8  |
| Branding and Logo Status and History  | 8  |
| New Standards Published   | 9  |
| Meeting Notice: Microelectronic Systems Education (MSE-99)  | 10 |
| Preliminary Notice: HighSys'99 First International Workshop on High Reliable Hard- & Software Systems   | 10 |
| Preliminary Notice: 1999 Pacific Rim International Symposium on Dependable Computing (PRDC 1999)  | 11 |
| Preliminary Notice: CSCWD'99 Computer Supported Cooperative Work in Design 99   | 19 |
| Call for Papers: IEE Telecom Conference Changes Name & Calls for Papers   | 12 |
| Preliminary Announcement and Call for Papers: IEEE Transactions on Intelligent Transportation Systems   | 13 |
| 6th Electronic Devices and Systems International Conference   | 13 |
| Announcing the 2nd Annual Polymeric Materials for Microelectronics & Photonics Applications: Mechanics, Physics, Reliability, Processing Workshop | 14 |
| Call for Participation: New and Emerging Technologies (NET*2000)  | 15 |
| More on Triangles   | 15 |
| Conference Calendar   | 20 |
| Preliminary Notice: InterPack '99 The Pacific Rim/ ASME International, Intersociety Electronic Packaging Conference                               | 20 |

## President's Message

### Statics and Dynamics

Before I explain the "Statics and Dynamics" theme of my message in this issue, I want to thank all of you for supporting me in my election to the position of President. It is indeed an honor to be in this position. My predecessors, Loretta Arellano, Dick Doyle, and the others have provided me with an excellent base from which to move into the next century. I give my thanks to them and to all who have supported them. I also thank the AdCom members with whom I worked as Vice President for Technical Operations. They were a great group! We have new AdCom members, who I welcome heartily. I look forward to the same kind of support and enthusiasm from them that brought the Society to this point. Finally I'd like to note with pleasure the increasingly international nature of our AdCom. As one who has worked international programs in the past, I can say from experience that the addition of international perspectives is absolutely exciting. I certainly welcome this broader representation within the AdCom.



You probably wonder why I chose the "Statics and Dynamics" theme for a reliability newsletter. After all, many of us have "fond" memories of those subjects in college. Statics was tough enough, but when things started moving - dynamics - then they really got tough! Well, we're in something of that type of situation now, as I perceive the reliability discipline. We have the statics of the more traditional reliability disciplines such as prediction, demonstration, growth testing, FMECA, and others. They are evolving, but basically the evolution is one of the enhancement of a pretty sound base. Now, impose upon that the very dynamic technology environment. Electronic technologies "roll over" every six months to one year and new technologies are being matured and deployed at an increasing rate. Dynamic new technologies such as microsystems, information technology, new medical technologies, and new transportation technologies are maturing rapidly.

These new technologies and the rapidity of their deployment will require that reliability engineers and managers adapt rapidly. A reliability engineer or manager who limits himself or herself to rote applications of the traditional disciplines will be lost (i.e. probably unemployed). Since the new technologies tend to be deployed without packages of information on how reliability disciplines might be applied to them, it is essential that reliability engineers and managers exercise a little (or a lot) of creativity regarding which reliability disciplines should be applied and how they should be applied. The Re-

continued on page 3

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## President's Message

continued from page 1

liability Society can help generate this creativity in a collective sense. Indeed, one of my objectives during my term as President will be to provide information to our membership and others regarding the application of reliability disciplines to new, rapidly emerging technologies. The Society has taken the first steps toward achieving this objective with its video program. Under the leadership of Sam Keene, our video program coordinator, we have set

forth a program of cutting-edge video tutorials that address software, concurrent engineering, MEMS, and human performance. I would like to see this objective supported also by our standards program, so that engineers and managers have documented collective advice on how to approach new technologies from a reliability perspective.

However the Reliability Society AdCom cannot do this by itself. We need your active participation in our technical committees and other activities. Join us to help create a win-win situation for your-

selves and the Reliability Society in the current dynamic, world-wide technology environment by participating actively.

Finally, we are always looking for ways to improve our service to our Reliability Society members. If you have any suggestions please contact the other AdCom members, or me. If I may assist you in any way, please contact me directly.

**Ken  
Kenneth P. LaSala, Ph.D.  
President, IEEE Reliability Society  
k.lasala@ieee.org**



ness Environment. Please visit our web site at <http://www.chanel1.com/users/ieee/home.html> for details and registration form or contacts Joe Dzekevich, Symposium Chair at (508) 323-1983, or at [Joe\\_Dzekevich@ne.3com.com](mailto:Joe_Dzekevich@ne.3com.com).

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## Los Angeles Chapter

Desktop Video-conferencing on the Internet, or "I'll See You Online" was presented by Lee Johnson of Raytheon Learning Institute (RLI) at our May meeting.

With large corporations having facilities located nationwide and cross-country travel not always feasible, it can be a real challenge to get all the parties required for a particular meeting together in the same place. Enter the latest high-tech solution to that dilemma: Video-conferencing via the Internet.

Lee Johnson, the manager of computer training for Raytheon Learning Institute - Western Region, talked about this new technology. His topics of discussion included Internet telephony, video-conferencing technology, collaboration and virtual meetings, and available software/hardware. He will also give a live demonstration of Microsoft® NetMeeting™.

Lee began training people on computer applications in 1983 and has been involved in training for Raytheon Sys-

tems Company (formerly Hughes Aircraft Company) since 1990. He also coordinated the deployment of Computer-Based Training for the company during the period of 1997-1998. Lee is now with the Raytheon Learning Institute, which is the training organization for all of Raytheon. His current projects include Interactive Distance Learning and other alternative training methods.

**David L Franklin  
Chair  
[d.l.franklin@ieee.org](mailto:d.l.franklin@ieee.org)**

## Philadelphia Chapter

On November 17, 1998 Dr William G Duff presented a talk on Electromagnetic Interference (EMI): The Nemesis of Medical electronics. Sensitive medical electronic equipments are subject to performance degradation or failure as a result of the severe ambient electromagnetic environment in hospitals or clinics in which they must operate. Numerous instances of fatalities and life threatening situations have been reported and documented. In addition to the problems that have been recognized or reported as resulting from EMI, there have probably been numerous other EMI problems that were not recognized or reported. In order to avoid EMI problems, (which are expected to become more frequent and more serious), medical equipment designers and manufacturers must ensure that: (1) equipment performance is not compromised by EMI; and, (2) all legal and regulatory requirements are satisfied. This talk addressed the problems associated with EMI in medical electronics and identified methods and techniques that may be used to design medical electronic equipments for electromagnetic compatibility.

We also heard Mr Arnie Wolfman address Improving Your Companies Time to Market - Even If You Have a Limited Budget. In many very large companies, process reengineering of the company's new product development (NPD) process has yielded some very significant operating improvements when intelligently applied. However, small to moderate sized companies trying to emulate these concepts have met mixed results - sometimes downright disappointing. How does a smaller company - with its limited finan-

cial, people and management resources - manage the daunting challenges associated with the "clean sheet of paper" approach that process reengineering purists extol. Is it unrealistic for a small company to seek quantum gains through the vehicle of process reengineering? Can such companies successfully reengineer their NPD processes to significantly reduce their time to market, reduce product development time and cost, and improve their ability to hit home runs with their new product entries?

A talk entitled System architecture for "Human-Computer Interface was presented" by Raymond Martel on January 26, 1999. He described how computer process and control systems perform real-time work that humans, unaided, cannot perform. These complex systems, however, continue to require continuous human control and intervention but do not currently contain the necessary system control architectures. Paradoxically, automated systems are experiencing an ever-increasing frequency of design-induced human error, caused by information deficit and control encumbrances. Mr Martel briefly explored system information architecture, a theoretical model and its application to legacy systems.

Gary Fenical then presented "Galvanic Corrosion of Electrically Conductive Elastomers". Electrically conductive elastomers are effective shielding materials, because they provide good attenuation to electromagnetic radiation, while at the same time providing an environmental seal. When conductive elastomers are assembled in an enclosure, they are in close contact with a metal flange and readily conduct current. These two conditions, close contact with a metallic substrate and electrical conductivity, create a galvanic couple. Significant corrosion of one of the components of the couple can occur under suitable conditions including conductive environment (salt, water, acid, etc.), and the potential difference between the elastomer and the metal flange (the difference between the EMF values of the two materials). If the elastomer corrodes, an insulating corrosion product is formed that reduces the conductivity of the elastomer. This presentation addressed the design issues and the processes to minimize these conditions. The data provided was intended as a

The data provided was intended as a guide to help in choosing the appropriate type of couple(s).

**Fulvio E Oliveto**  
**Philadelphia Section**  
**609-722-3147**

## San Diego Chapter

At the march chapter meeting Dick Doyle presented a talk on Micro-Mechanical Reliability. This presentation was made in conjunction with the world renowned "International Reliability Physics Symposium" held this year in San Diego. In addition to attending the Chapter meeting, members were allowed to attend the Exhibits part of the Symposium. The meeting was held on 23 March 99 at the Town and Country Hotel, Hotel Circle, San Diego, CA. The presenter, Dick Doyle is the Reliability Chapter Secretary. He recently gave a similar presentation in Zurich Switzerland last October. He has taught tutorials and written chapters for Reliability Handbooks on Mechanical Reliability. He outlined the process for predicting failures of small parts, both electrical and mechanical and

showed how to determine the catastrophic stresses. Included with the presentation was a 20-page instruction booklet that he has prepared.

**Richard L. Doyle,**  
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## Singapore Chapter (ED/Reliability/CPMT Joint Chapter)

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## New IEEE Web Site Features Virtual Reading Room

PISCATAWAY, NJ, 3 March 1999 – The IEEE Educational Activities Department announces the release of its Online Education Reading Room at:

<http://www.ieee.org/eab>

Once inside the virtual room, viewers can click on any book in the best-selling IEEE Selected Readings series or *Engineers' Guides To Business Series*, and "flip through" the full text of its pages. Titles up for browsing include *Cellular Radio And Personal Communications*, *Smart Antennas*, *Recent Developments in Power Electronics*, *Marketing for Engineers*, *Working In A Global Environment*, *Writing For Career Growth*, and more!

Logical and user-friendly in its design, the reading room features:

- Keyword, title, and author search options
- Full table-of-contents displays for each title
- Navigation tools that enable viewers to move from page to page and section to section, and to zoom in for a closer look at diagrams and formulas
- Online ordering options

"Having a reading room on the Internet gives visitors the opportunity to browse through books before buying them, just as they would in a traditional bookstore," says Alan Trembly, Business Development Manager for IEEE Educational Activities. "A distribution medium such as this really enhances the IEEE's image as practitioner of the technology of the future." For more information about the reading room contact Alan Trembly at [a.trembly@ieee.org](mailto:a.trembly@ieee.org).



## Reliability Society AdCom Nominations Requested

It is time to consider nominations for the Reliability Society Administrative Committee Members who will serve the Society from 2000 through 2002. There are two ways for a candidate to be placed on the ballot:

1. A nominating petition signed by ten or more Reliability Society Members in good standing (excluding student members),
2. Selection by the Reliability Society's Nominating Committee.

Candidates placed on the ballot are not designated between type 1 and type 2 candidates. The sponsor of a nominee should secure the candidate's willingness to serve (The AdCom meets four times per year. Expenses for attending the meetings are not borne by the Reliability Society). A Nominating Petition signed by at least ten members of the Reliability

Society (excluding student members) and a biographical sketch should be included in the submittal. For uniformity, the biographical sketch should be typed and include four sections:

1. Education: Degrees, Universities, Subjects
2. Work Experience
3. IEEE Experience
4. Other

The biographical sketch should be limited to one side of one 8.5" x 11" sheet of paper. The nominating material: 1) Agreement to serve if elected (signed), 2) Biographical sketch, and 3) Nominating petition, should be sent before August 1, 1999 to: Loretta Arellano Nominating Committee Chair, C/O Raytheon Systems, P.O. Box 92426, Los Angeles, CA 90009. Questions can also be e-mailed to [l.arellano@ieee.org](mailto:l.arellano@ieee.org)

# AdCom Meeting Minutes

Hilton and Towers  
Washington D.C.  
January 16-17, 1999

**Attendees:** J. Voas, M. Roush, L. Arellano, W. Tonti, R. Kowalski, M. Lively, T. Rost, Y. Lord, B. Trapp, K. Inoue, B. Gauger, A. Campbell, S. Keene, D. Hoffman, D. Doyle, B. Loomis, K. LaSala, D. Franklin

**CALL TO ORDER**, the meeting started at 1:40 p.m. on 1/16. We agreed to the agenda and a motion was approved accepting the minutes from the October 1998 Zurich AdCom meeting.

Dick Kowalski gave the Treasurers report. He noted that 1/3 fewer pages occurred in the '98 Trans. on Reliability. IEEE will pay the less because of this. Dick still projects a surplus in '99.

For her presidents report Loretta reported on the TAB Meeting. Loretta recommended that Ken LaSala work on "decision streamlining", Dick Kowalski work on the IEEE's "new financial model", and Phil Tsung work on "branding". Loretta also talked to the IEEE about getting an executive director for the RS.

Loretta is taking the lead on Objective #5, to Identify Section / Chapter Support Requirements. She hopes to be done with it by the end of '99.

VP meetings Bob Gauger reported that RS was asked for SAE TOPTEC sponsorship. No one at the AdCom meeting knew what TOPTEC stood for, so Bob Gauger took an action item to find out what TOPTEC is and will report back at next AdCom meeting.

Technical (non-financial) sponsorship of 1999 Pacific Rim International Symposium on Dependable Computing was approved. Financial sponsorship to the next PRDC conference (presumably it is in 2000) was also approved. Bob Gauger took an action item to notify Michael Lyu of this action since Lyu is in charge of PRDC'99.

Ann Campbell gave an overview of the IRPS '99 status (symposium was held in late March).

Ann Campbell also informed the adcom that the EDS Device Reliability Physics Committee is considering estab-

lishing a new multi- society sponsored journal on Device Reliability Physics. Many AdCom members expressed interest in the project.

The 3rd AdCom meeting of '99 will be held on July 31.

## *Membership issues:*

Ken LaSala took an action item to look into the activities of the Italy and Spain Chapters.

Dennis Hoffman talked about Membership activities.

January 17, 1999

Dave Morton talked about his activities with the IEEE History Center in NJ. They are looking for a total of \$10M in endowment support, gathering a small amount from each IEEE entity.

The publications report was presented by Dennis Hoffman, who took an action item to look into the 75% camera ready charge for Transactions on Reliability and will be talking to Ralph Evans more about this. Dennis also will also determine if our support person at HQ can do the "support for the review process" tasks and therefore save the charge currently expended for this task. Additional action items for Dennis include determining what to do when Ralph retires and how should we handle electronic publishing of RS publications in the future. He will be coming back with recommendations.

Transactions Editor Search Status was reported by Dennis. He said the Committee first needs to form a consensus on the editor's requirements and focus. More people may be added to search committee. J. Dugan is currently acting as editor.

Bob Loomis gave update on the web site. Many improvements have occurred and all AdCom members seemed pleased with the material there. Getting more hits on the RS web site is a future goal to achieve. Bob Loomis was authorized to hire a service that will enable web crawlers to more rapidly find the RS web site. Currently, Bob Loomis said that searches on "reliability" eventually find the RS web site but find many other sites before ours.



Introduction of the New AdCom class, Jeff Voas, Bill Tonti, Koichi Inoue, Marsha Abromo, Ann Campbell, Ken LaSala (pres.)

Sam Keene then talked about Video Program Status and revenue to date. Four videos have been made to date, costing the RS \$77.5K with a total return to date is \$51,828. Sam said that software videos sold well.

Sponsorship of a Software Testing Video and an Accelerated Testing Video was approved

Publication of ISSRE Papers in RS Transactions

J. Dugan agreed to investigate technical sponsorship for SRDS'99 and arrange sponsorship if the other sponsors agreed.

In addition J. Dugan was asked to try to get 2 or 3 symposia to place their very best papers into the Transaction, where these papers met all other publication requirements.

## **TECHNICAL OPERATIONS**

IEEE Sensors Council, Ken LaSala talked about a newly proposed council on sensors. A motion was approved giving RS support to the council.

AdCom approved participation in the superconductivity council and to support one person to attend the meetings.

## **NEW BUSINESS**

Voas was given an action item to redo the Roster, and to give the AdCom Roster to Bob Loomis for future control and placement on the web site.





Society identify itself with the IEEE? What about the large and growing Computer Society, with all the software professionals who grew up in the digital world and have no formal training or interest in power engineering, electromagnetic theory, etc.? Given the breadth of membership in IEEE, the scope of this branding effort is large and it is difficult to please all member societies. We at the Reliability Society can help the IEEE Branding Committee by doing the following:

- a. Fill out a survey re: the branding and image issue. This survey should be available in Spring/Summer 1999.
- b. Solicit opinions re. how the IEEE should position itself to address all the different societies (about 40) and interests. In particular, given the diversity of the organization, should we try to have a centralized system on image, or keep it decentralized (i.e. every society for itself?).
- c. Provide any unique issues that the Reliability Society needs to be consulted on re: branding and image. Any inputs on the above issues would be appreciated.

**Please e-mail comments or suggestions to Phil Tsung at [pwtsung@aol.com](mailto:pwtsung@aol.com)**

This history of the current IEEE logo is taken from the IEEE Student Journal, May 1963. The IEEE Logo, represents an organization formed by the consolidation of the American Institute of Electrical Engineers (AIEE) and the Institute of Radio Engineers (IRE) in 1963. The emblem of IEEE derives its design from the insignia of the two constituents. However, it is not a mere compound of these two components. Rather, it continues the trend toward an emphasis of basic concepts characteristic not only of the evolution of the emblems of the constituent organizations, but of the whole electrical engineering education and practice. In this, it also conforms to the best modern design and traditional heraldry.

Both the emblems of AIEE and IRE had as a central motif the association of electricity and magnetism, perhaps the most fundamental concept lending itself to graphical representation. In the IRE case, two arrows represent current and

magnetomotive force. In the AIEE case, linked circles suggest the relation of the electric and magnetic fields. In IEEE, as in its two predecessor organizations, the choice of an emblem was the subject of much careful consideration. AIEE was founded in 1884. Its first badge was adopted in 1893 after three years of discussion during which a committee headed by Dr. Alexander Graham Bell, who was the President of AIEE from 1891 – 1892, offered various designs.. The badge’s outline represented Franklin’s kite. An actual coil of gold wire marked its periphery, with midpoints spanned by a galvanometer complete with blued steel needle and covered by an amber disc. Thus, it was sought to embody the Wheatstone bridge. For good measure, Ohm’s law and the letters AIEE were imprinted in gold on the enamel base. But this badge was abandoned after four years.

In 1897, AIEE adopted the emblem, which served essentially unchanged until 1963. Here, the central theme is the linked circles representing the relation of the electric and magnetic fields. The symmetrical outline approximates a hypocycloid of four cusps. It may still suggest a kite and a bridge, but in any event it provides for a balanced distribution of the four initials of the society. The IRE, founded in 1912, chose the now familiar triangle and arrows representing electrical and magnetic forces in the conventional “right-hand rule” relationship. In choosing this emblem, the IRE rejected designs of its predecessor organizations, the Society of Wireless Telegraph Engineers (SWTE) and The Wireless Insti-

tute (TWI), both of which has used as their insignia the Hertz oscillator and receiver loop. IRE judged that emblems embodying specific techniques or equipment were inadequate symbols for a dynamic organization. The triangular outline of the IRE emblem also provided for a balanced display of three initials.

The IEEE badge then, evolved rationally from its predecessors and retains in its outline and central device readily recognizable features of the emblems of both the AIEE and IRE. It was proportioned and designed by competent artists. The design of the IEEE badge was settled in less than 15 minutes actually. It was perceived that the AIEE and IRE badges had features that could be combined. The four-sided “kite” outline of the AIEE badge was retained with minor adjustment. The central feature of the IRE badge, the straight and curved arrows symbolizing the “right-hand rule” of electromagnetism, was recognized as basic in electrical theory from megawatt power generators to radio waves. One change, however, was to have the central arrow point upward rather than down. One notable difference between the new IEEE badge (circa 1963) and its predecessors was the absence of lettering. A badge without lettering could be read in any language. Additionally, it was thought that letters would clutter the design. There was an implied hope that in time, the outline of the badge would become so familiar in engineering and scientific professions that further identification would not be needed.



## New Standards Published

Below are the standards published from 1 January 1999 to 31 March 1999. Details about these standards and other standards published or in development can be found on the IEEE Standards Web page at <http://standards.ieee.org/ca=talog> or e-mailing [stds.info@ieee.org](mailto:stds.info@ieee.org)

### IEEE Computer Society

IEEE Std 802.1Q-1998, IEEE Standards for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks

IEEE Std 1220-1998, IEEE Standard for Application and Management of the Systems Engineering Process

IEEE Std 1320.2-1998, IEEE Standard for Conceptual Modeling Language Syntax and Semantics for IDEFIX97 (IDEF object)

IEEE Std 1490-1998, IEEE Guide-Adoption of PMI Standard, A Guide to the Project Management Body of Knowledge ISO/IEC 15068-2 1999 (IEEE Std 1387.1-1995), Information technology-Portable Operating System

Interface (POSIX) system administration-Part 2: Software administration

### IEEE Electron Devices Society

IEEE Std 1005-1998, IEEE Standard Definitions and Characterization of Floating Gate Semiconductor Arrays

### IEEE Power Engineering Society

IEEE Std 492-1998, IEEE Guide for Operation and Maintenance of Hydro-Generators

IEEE Std 1416-1998, IEEE Recommended Practice for the Interface of New Gas-Insulated Equipment in Existing Gas-Insulated Substations

### IEEE Reliability Society

**IEEE Std 1413-1998, IEEE Standard Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment**

### IEEE Standards Coordinating Committee (SCC)

IEEE Std 1231.2-1998, IEEE Trial-Use Standard for Artificial Intelligence Exchange and Service Tie to All Test Environments (AI-ESTATE); Service Specification IEEE Std 1445-1998, IEEE Standard for Digital Test Interchange

For additional information on Standards contact:

Karen McCabe Manager,  
Marketing IEEE Standards Activities  
k.mccabe@ieee.org  
1-732-562-3824;  
FX: 1-732-562-1571

<http://standards.ieee.org/>  
The Institute of Electrical and Electronics Engineers, Inc.  
445 Hoes Lane,  
PO Box 1331,  
Piscataway, NJ 08855-1331, USA

### Preliminary Notice

## HighSys'99 First International Workshop on High Reliable Hard- & Software Systems

September 28 - 30, 1999

(Tuesday - Thursday)

Sindelfingen (Messehalle),  
Federal Republic of Germany

The congress HighSys'99:

High availability receives the highest priority for many computer systems inside industrial as well as non-industrial applications. Based on the reliability of used hardware and software components, this is only obtained by the system knowledge of developers and users. The congress HighSys'99 aims to present a scientific platform for exchange in the areas of High Reliability and High Availability, from theory to practice and vice versa. This is driven by the increasing importance and by the requirements for explaining such complex technologies. Inside the congress, workshops and free presentations will be included. The topics include, but are not restricted to

- Real-time systems and requirements
- Bus systems
  - PCI
  - Industrial PCs
  - Responsive systems
- Telecommunications
  - Reconfigurable hardware
  - Tele-services inside small and medium size companies
- Internet
  - Internet technologies
  - Java
- General topics
  - Fault tolerance
  - Fault resilience
  - High availability, high reliability
  - Redundant systems
  - Hot swapping, life insertion

### Meeting Notice

## Microelectronic Systems Education (MSE-99)

Jul. 19-21, 1999; Arlington, VA

1999 IEEE Computer Society International Conference on Microelectronic Systems Education "Systems Education in the 21st Century"

The 1999 Microelectronic Systems Education conference (MSE-99) is dedicated to furthering undergraduate and graduate education in designing and building innovative microelectronic systems.

The meeting will focus on the following topics: Needs and Expectations of Industry Capabilities and Constraints of Academia Mixing Educational Concepts and Technology-Dependent Issues Infrastructure Support Mentoring and Partnering Among Institutions Using Complementary Research to Facilitate Educa-

tion Distributed Learning — What Works and What Doesn't Contributing and Sharing Educational Modules Project-oriented Education Distributed Design and use of IP in Education

For Information go to:

[http://microsys6.engr.utk.edu/ece/bouldin\\_contact.html](http://microsys6.engr.utk.edu/ece/bouldin_contact.html)

A EUROPEAN CONFERENCE is also held. Conferences on this subject are being held in the U.S. on odd years and in Europe in even years. Please note that the European Workshop on Microelectronics Education will be held during May 18-19, 2000, in France.

Parallel to all workshops and presentations, scientific poster sessions as well as industrial forum with topics like OSEK, telecommunications internet/intranet and real-time systems will occur. HighSys'99 is embedded into the exhibition IT Engineering '99 - Informa-

tion-Technology-Engineering - which covers the following topics: telecommunication, industrial applications, automotive, aircraft, space, controls and processes technologies, medical applications. Further information is obtainable from <http://www.it-engineering>.



## Preliminary Notice

# 1999 Pacific Rim International Symposium on Dependable Computing (PRDC 1999)

December 16-17, 1999  
Hong Kong, China

The symposium is sponsored by, the IEEE Reliability Society, the IEEE Computer Society Technical Committee on Fault-Tolerant, the Computing (approval pending) IEEE Hong Kong Section Computer Chapter. With the support of: the Chinese University of Hong Kong, the City University of Hong Kong, the Hong Kong Polytechnic University, Hong Kong University, the Hong Kong University of Science and Technology.

## General Information:

The Pacific Rim International Symposium on Dependable Computing (formerly Pacific Rim International Symposium on Fault-Tolerant Systems) is a biennial symposium for dissemination of the state-of-the-art research in dependable computing, with particular emphasis on systems and software. This will be the sixth in the series of biennial symposia organized since 1989. Research papers ranging from fundamental theoretical contributions to practical experimental projects are welcome. PRDC 1999 will be held in conjunction with the International Computer Congress 1999 which also features The Fifth International Computer Science Conference

(ICSC'99) and The Sixth International Conference on Real Time Computing Systems and Applications (RTCSA'99).

## Topics of interest include, but not limited to:

- Design for system dependability
- Fault-tolerant systems and software
- Software and hardware reliability, testing, verification and validation
- Dependability measurement, modeling and evaluation
- Safety-critical systems and software
- Security issues and approaches
- Tools for design and evaluation of dependable systems
- Component-based technology and dependability
- Dependability issues related to the Year 2000 problem
- Application-specific dependability issues in distributed and parallel systems, computer networks, real-time systems, database and transaction processing systems, world wide web and Internet

Symposium Home Page:

## Preliminary Notice

# CSCWD'99 Computer Supported Cooperative Work in Design 99

September 29 - October 1,  
1999, Compigne, France

Details concerning the above conference can also be found at

<http://www.hds.utc.fr/~barthes/CSCWD99/CSCW99-CFP.html>

## Themes:

Design of complex new artifacts requires the cooperation of a number of specialists working in different domains. New trends are currently appearing:

- The addition of new computer technology to increase the efficiency of communications
- The requirement to reuse R&D results from previous projects

The necessity to take into account results and criticisms, occurring during the entire life cycle of the designed product.

Thus, new supporting technologies, mostly centered on computer networks, cannot be restricted any longer to their computer or software components. Design strongly interacts at least with manufacturing, and then, CSCW must consider such strong interactions.

In parallel the human component of CSCW should not be forgotten, and the social and organizational aspects of the domain deserve more attention than currently given. Thus, specialists of social sciences (e.g., cognitive ergonomists, cognitive psychologists) must now be invited to participate in our discussions.

## The themes of CSCWD'99 include the following topics:

- Techniques, methods, and tools for improving CSCW in Design
- Social organization of the CSC process
- Integration of tools and methods within the work organization

- Interaction between design and other steps in the production cycle (e.g. production planning, scheduling, and control)
- Interaction between the CSC approach and knowledge reuse as found in knowledge management
- Internet and CSCW in Design
- Applications and testbeds

This year we are organizing for the first time a new track on collaboration technologies and applications to electronic commerce. Recently, in particular since the advancement of the Internet and the World Wide Web for business purposes, there has been considerable interest in the modeling and execution of collaborative business and other organizational processes. The design and the development of new and improved collaborative organizational computing and communication platforms and electronic commerce technologies is now emerging as one of the most active research areas in applied computer science and management information systems. Information technology supported organizational collaborations occur both within organizational units (intra-organizational collaborations) and across organizational boundaries (inter-organizational collaborations). Electronic commerce encompasses all aspects of conducting business that are essentially mediated by electronic computing and

communication infrastructures. This includes, for example, business activities such as marketing, opportunity finding, sales, bidding, negotiation, production, inventory management, procurement, supply chain networks, distribution channels, payment, customer service and support, and so on. This track concerns the theory, methods, systems as well as the adoption, application and usage of collaboration technologies in business environments. Hence, methodological issues, theoretical issues, implementation issues, case studies, empirical studies and behavioral research are all relevant to our discussion.

We anticipate original research papers that are theoretical, applied, conceptual or descriptive in nature but position papers, survey papers, and tutorials. Papers will be specifically but not exclusively related to one of the following areas.

- Workflow management systems
- Office automation systems
- Business Process Reengineering
- Collaborative decision-making
- Group Support Systems
- Electronic Meeting Systems
- Collaborative learning infrastructures and systems
- Distributed learning networks
- Business-to-business collaborations in electronic commerce
- Auctioning and trading in electronic markets

- Electronic intermediaries and brokerage systems
- Digital money and electronic banking
- Organizational memory systems
- Digital document management
- Intelligent business agents
- Negotiation Support Systems
- Digital contracting
- Virtual Organizations
- Telework and organizational connectivity
- Collaborative virtual environments and digital landscapes
- Adoption and diffusion of collaboration technologies
- Social issues of collaboration technologies
- Interaction and relationships in cyberspace and virtual communities
- Computer-mediated communication and discourse
- Collaboration systems user experience
- Collaboration technology
- Human factors and usability

Information about the previous workshops can be found at the following address:

<http://img.enme.ucalgary.ca/CSCWID/>

## Call for Papers IEE Telecom Conference Changes Name; & Calls for Papers

London, UK, 26 Mar — To reflect the changes in communications that are occurring worldwide, the International Switching Symposium will become The World Telecommunications Congress in the year 2000. The new event will take place in Birmingham, United Kingdom in May 2000. A formal call for papers has been announced for topics including; The IP World-how will we make it work?; Switching Investments: Living with Risk; What's Your Network IQ?; Towards the Mobility

Dream; Access Technologies Beyond 2000; Smarter Network and Service Management; Information Services Beyond 2000; and Who Will Create the Future?

For information contact IEE Conventions, Ltd, Savoy Place, London, WC2R 0BL: Telephone: +44 (0)171 344 5478; Fax: +44 (0)171 240 8830; Email [wtc@iee.org.uk](mailto:wtc@iee.org.uk).

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<http://www.ieee.org/newsinfo>

# Preliminary Announcement and Call for Papers

## IEEE Transactions on Intelligent Transportation Systems

The IEEE Intelligent Transportation Systems Council (ITSC) announces a new transactions journal, the IEEE Transactions on Intelligent Transportation Systems. Contingent on formal IEEE approval, the ITSC plans to begin publishing the first quarterly issue March 2000.

Improved planning, design, management, and control of future transportation systems requires conducting both basic and applied research to expand the knowledge base on transportation. The new IEEE Transactions on ITS will focus on the design, analysis, and control of information technology as it is applied to transportation systems. Topics to be considered will include, but will not be limited to:

- Sensors (infrastructure & vehicle-based)
- Communications (wide area & vehicle-to-roadside)
- Man-Machine Interfaces (displays, artificial speech)
- Decision Systems (expert systems, intelligent agents)
- Simulation (continuous, discrete, real-time)
- Reliability & Quality Assurance
- Imaging and Image Analysis
- Information Systems (databases, data fusion, security)
- Computers (hardware, software)

- Control (adaptive, fuzzy, cooperative, neuro, large systems)
- Technology Forecasting & Transfer
- Systems (engineering, architecture, evaluation)
- Signal Processing
- Standards.

Transportation systems are usually large-scale in nature and are invariably geographically distributed. The complexity of transportation systems arises from many sources. Transportation systems can involve humans, vehicles, shipments, information technology, and the physical infrastructure—all interacting in complex ways. Many aspects of transportation systems are uncertain, dynamic and nonlinear, and such systems may be highly sensitive to perturbations. Controls can involve multiple agents that are distributed and hierarchical. Personnel who invariably play critical roles in a transportation system have a diversity of objectives and a wide range of skills and education.

Despite such complexity, the emergence of new technologies—such as sensors, communications, low-cost, faster computation, and new control and optimization algorithms—provides new opportunities to substantially improve efficiency, safety and environmental impact. With the use of these

technologies, new and faster measurements are possible and more data can be managed and processed. Additionally, new strategies for management and control will be developed to deal with both the static and the dynamic nature of transportation systems. So, while most of the classical transportation problems raised in the past continue to exist, there now are new approaches to deal with many of them.

The intent of the IEEE Transactions on ITS will be to serve as a forum for the technological aspects of applications of information technology to transportation, thus providing researchers with an outlet for publication for these new approaches.

Please send five (5) copies of your manuscript for possible publication to:

Chelsea C. White, III, Editor  
Department of Industrial and Operations Engineering  
College of Engineering  
University of Michigan  
Ann Arbor, Michigan 48109-2117  
USA.

For further publication guidelines, contact the editor at mailto: ccwiii@umich.edu or by call 734-764-5723.

## 6th Electronic Devices and Systems International Conference

November 19-20, 1999, Brno, Czech Republic

The 6th Electronic Devices and Systems International Conference aims at providing a place to discuss Electronic Devices, Circuits, Systems and related topics.

Possible topics to be addressed include

- Electronic Devices
- Signal Processing
- Semiconductor Structures
- Microelectronic Sensors
- Physics of Semiconductors
- Mixed-Signal Testing
- Integrated Circuit Design
- Electromagnetic Compatibility

- Integrated Circuit Technology
- CAD and CAE Tools
- Electronic Circuits and Systems
- Software Tools for Education

Submit Papers to-  
EDS'99 - UMEL FEI VUT  
Údolní 53  
CZ-60200 Brno  
Czech Republic

**Deadlines and Key Dates**  
*Submission of Camera-ready Full Papers*  
August 23, 1999

*Notification of Acceptance*  
September 15, 1999  
*Conference Sessions*  
November 19 - 20, 1999

**For General Information**  
E-mail: eds99@umel.fee.vutbr.cz  
<http://www.umel.fee.vutbr.cz/conf/eds99.html>  
Phone: +420 5 4316 7159,  
+420 5 4621 1690  
Fax: +420 5 4316 7298

## Announcing the 2nd Annual

# Polymeric Materials For Microelectronics & Photonics Applications: Mechanics, Physics, Reliability, Processing Workshop

Paris, France / December 12-15, 1999

Sponsored by the IEEE Components, Packaging & Manufacturing Technology Society (IEEE-CPMT); American Society of Mechanical Engineers (ASME International), in cooperation with the Society of Plastics Engineers (SPE); Materials Research Society (MRS); Association Francaise de Mecanique (AFM);

Polymeric materials are widely used in engineering, including the areas of microelectronics and photonics. Examples are: plastic packages of integrated circuit (IC) devices, adhesives, various enclosures and plastic parts, polymeric coatings of optical silica fibers, and even polymeric lightguides. There are numerous and rapidly growing opportunities for the application of polymers for diverse functions in the high-technology field. Polymeric materials are inexpensive and lend themselves easily to processing and mass production techniques. The reliability of these materials, however, is usually not as high as the reliability of inorganic materials and is often insufficient for particular applications, thereby limiting the area of the technical use of polymers. We intend to bring together mechanical, electrical, optical, reliability, industrial and manufacturing engineers; materials scientists, applied physicists and chemists, to discuss and advance experimental and theoretical methods, techniques and approaches aimed at the prediction and improvement of the short/long-term performance of polymeric materials for different applications, and particularly those used in plastic packages of IC devices.

The objective of the workshop is to address the state-of-the-art knowledge in the field of mechanics, physics and reliability of polymers employed in microelectronics and photonics engineering.

The scope of the workshop includes, but is not limited to, the following major topics:

- Mechanical behavior and short and long-term performance of polymeric materials;

- Polymeric materials characterization;
- Thermal, mechanical, electrical, optical and other properties of polymers;
- Fracture mechanics of polymeric materials;
- Moisture sensitivity of polymeric materials and plastic packages of IC devices;
- Organic microelectronics;
- Polymer lightguides;
- Polymers for wireless applications;
- Aging and its effects on the long-term reliability of polymeric materials;
- Thermal and electric field effects on damage and fracture of polymeric materials;
- Accelerated testing of polymeric materials and plastic electronic packages: approaches and techniques;
- Mechanics, physics and chemistry of adhesion, adhesives and adhesively bonded joints;
- Stress concentration effects in polymeric materials and plastic electronic packages;
- Performance of polymeric materials at high/low temperatures and in harsh environments;
- Role of fillers in the mechanical behavior and performance of polymeric materials;
- Thermal management of systems employing polymeric materials (including electronic components and photonic devices);
- Interfacial phenomena affecting the polymeric materials reliability;
- Response of polymeric materials to dynamic and thermal loading;
- Manufacturing processes in plastics engineering;
- Reliability problems associated with manufacturing, testing,

- Surface mounting, and operation of plastic electronic packages.
- New and emerging technologies for future electronic and photonic systems.

The program of the workshop will include tutorials (short courses) on various aspects of the reliability of polymeric materials for microelectronics and photonics applications. The (partial) list of tutorials includes:

Failures in Plastic Packages of IC Devices: Understanding, Prediction and Prevention. Instructor: Ephraim Suhir, Lucent Technologies, USA

Polymers for Electronic Packaging: Materials, Processes and Reliability. Instructor: C.P. Wong, Georgia Tech, USA

Adhesives in Electronic Packaging. Instructors: J. Morris, SUNY-Binghamton, USA, J. Liu, IVF, Sweden  
Application of Computational Heat Transfer to Thermal Management of Plastic Packages of IC Devices. Instructor: Dereje Agonafer, IBM, USA

Reliability and Lifetime Assessments for Polymeric Materials. Instructor: A. Chudnovsky, University of Illinois at Chicago, USA

## Audience:

Engineers and scientists dealing with, and/or interested in the mechanical reliability of polymeric materials, especially those used in the high-technology field.

<http://www.asme.org/conf/POLY99/index.htm>

or contact:  
Brian Bigalke,  
Meetings & Conferences,  
ASME International  
Tel: 212.591.7057  
Fax: 212.591.7856  
Email: bigalkeb@asme.org

## CALL FOR PARTICIPATION

Announcing a New ECTC Session:

# New and Emerging Technologies (NET\*2000)

Las Vegas, NV, May 21-24

Sponsored by the CPMT New Technology Directions  
Technical Committee (TC-15)

**BACKGROUND:** It is well known that new technologies are creating new markets and provide new opportunities. Companies that make aggressive use of technological innovation gain an enormous advantage. Those that do not make use of technical innovation will find it hard to remain competitive. The future of a company may well depend on the ability of its leaders to stay on the cutting edge of technology. A new IEEE CPMT Technical Committee, New Technology Directions Committee (NTDC, TC-15), has been recently formed to assist CPMT Society members to obtain information on new technologies. One important activity of the committee activities is to organize

workshops and conferences on new technology directions. We have decided to start with organizing a session on new and emerging technologies. The advertised session is the first one of its kind. It will be held during the 2000 ECTC in Las Vegas, NV, May 21-24, 2000.

**OBJECTIVE:** We intend to bring together engineers, technical managers, researchers and market specialists to discuss new and emerging technologies related to the scope of the CPMT society; new applications of the existing technologies, as well as new markets for the CPMT related products, technologies and businesses.

**INTENT TO PARTICIPATE:** If you feel that what you are going to present at the 2000 ECTC conference has to do with a new or emerging technology, a new application of the existing technology, a new innovative approach or technique, or a new market for a CPMT related technology, please contact:

E. SUHIR  
Bell Laboratories,  
Lucent Technologies, Inc.  
600 Mountain Ave.,  
Room 1D-443,  
Murray Hill, NJ 07974 USA  
Ph: 908.582.530  
Fx: 908.582.5106  
email: suhir@lucent.com

## More on Triangles

Dear Dick:

In regard to your article about Pythagorean triples in the "Reliability Society", Oct, 1998, Vol. 44, No. 4, I have composed a brief exposition on what is known about this topic. I know this is quite a bit after the fact (it just shows how hard it is to keep up with all of my journal reading!), but I hope it is interesting and useful.

### Primitive Pythagorean Triples & Fermat's Last Theorem

I will address just two aspects of your article, namely (1) the generation of primitive Pythagorean triples and (2) Fermat's Last Theorem.

(1) Generating primitive Pythagorean triples: By a *primitive Pythagorean triple*, we mean a threesome  $(a, b, c)$  of positive integers such that  $c^2 = a^2 + b^2$  and  $a$ ,

$b$ , and  $c$  have no common divisor (other than 1). There is an interesting history to this subject, which goes back to ancient times. The following historical notes are taken from Stillwell[1] (pages 3 and following): It is known that there was at least a partial understanding of this problem in China (examples can be given for the period between 200 B.C. and 220 A.D.) and India (examples between 500 and 200 B.C.). The most complete understanding in ancient times was achieved by the Greeks, between Euclid (~300 B.C.) and Diophantus (~250 A.D.). Special formulas for generation of these triples were known to Pythagoras himself and Plato. The first known completely general statement and general proof was given by Euclid in his *Elements*, Book X (lemma following Prop. 28).

The most general method for generating primitive Pythagorean triples is of course well known today, and the solu-

tion appears in most books on elementary number theory. I recommend, for example, the classic Uspensky and Heaslet[2] (see pages 37 and following). The solution, quite elegant and beautiful is this:

Pick any two positive integers  $p$  and  $q$ , where  $p$  and  $q$  are relatively prime, of opposite parity, and  $p > q$ . By relatively prime, we mean  $p$  and  $q$  have no common divisor (other than 1). By opposite parity, we mean that one of  $p$  and  $q$  is even and one is odd. Then the numbers

$$a = p^2 - q^2 \quad b = 2pq \quad c = p^2 + q^2$$

form a primitive Pythagorean triple. It is simple algebra to show that  $c^2 = a^2 + b^2$ . It is a little more work to show that  $a$ ,  $b$ , and  $c$  have no common divisor (other than 1), and I will not do this here. This is an interesting (and not too difficult) exercise, which I will leave to the reader. What is most germane to your article,

though, is the fact that this procedure generates *all primitive Pythagorean triples*. Thus, in one fell swoop, we see that there are an infinite number of such triples, and furthermore, have a simple procedure for generating them. For more details, consult Uspensky and Heaslet[2].

(2) Fermat's Last Theorem was, for over 350 years, one of the most famous (if not the most famous) unsolved problems of mathematics. This is due to the following facts. The statement of the problem is understandable by anyone who knows a modicum of algebra. Furthermore, Fermat claimed he had a simple proof (which he never gave, the margin of his notes being too small to contain it), but its solution eluded every great mathematician (and every graduate student hoping to *be* a great mathematician) for almost four centuries.

The statement of the theorem is this: The only positive integers  $n$  for which the equation  $c^n = a^n + b^n$  has positive integer solutions  $a, b$ , and  $c$  are  $n = 1, 2$ .

Think about this for a moment: Although we have just claimed that there are an *infinite* number of solutions for  $n = 2$  (and there are obviously infinitely many solutions for  $n = 1$ ), there are no (positive integer) solutions for any other positive integer  $n$ .

Although the complete and final solution was not given until 1993, there is a long history of partial solutions. The following historical notes are taken from Ribet and Hayes[3]. Fermat himself proved that there are no positive integer solutions when  $n = 4$ . Leonhard Euler, the great 18th century Swiss mathematician, proved there are no solutions for  $n = 3$ . In the 1820's, Legendre and Dirichlet disposed of the case  $n = 5$ . In 1840, Kummer made a major advance by showing that Fermat's theorem is true for all values of  $n$  that are divisible by "regular" primes (we will not go into these here). In essence, this disposed of all  $n$  less than 100.

Note that all of this was done long before the computer age! Sometimes we forget that humans can be very clever, and that computers should be used as an aid, not as an all-knowing final arbiter. Of course, in recent years, computers have helped dispose of many more cases. But the final solution was still provided by a human mathematician.

His name is Andrew Wiles, and his historical result appeared in Wiles[4].

This was a monumental event. Articles about this feat have appeared in numerous mathematical and scientific publications, and in such non-scientific publications as the Wall Street Journal and the New York Times. Wiles was named as one of the "25 most intriguing people of 1993" by *People* magazine, along with Princess Diana, Michael Jackson, and the Clintons. Seminars and conferences on this topic were standing-room only for a long time. There are humorous stories of mathematicians behaving like crazed music fans attempting to get into overcrowded conference rooms. There was also a PBS broadcast devoted to the life and times of Andrew Wiles as he struggled in solitude for 7 years to come up with his proof. I believe this is available as a video, and is well worth buying. It also turns up from time to time as a rerun on PBS. There is a whole sub-culture that has sprung up on the WWW about Fermat's Last Theorem and Andrew Wiles. A good starting place would be <http://rendezvous.com/tangledweb/conferences/fermat/>

(This web page has links to ways to obtain the video, among other things).

#### References:

1. John Stillwell, "Mathematics and its History", Springer-Verlag, 1989.
2. J.V. Uspensky and M.A. Heaslet, "Elementary Number Theory", McGraw-Hill, 1939.
3. Kenneth A. Ribet and Brian Hayes, "Fermat's Last Theorem and Modern Arithmetic", *American Scientist*, Vol. 82, March-April, 1994.
4. Wiles first presented his proof in a three-part lecture at the Newton Institute, Cambridge, in June 1993. A revised version of the paper has appeared in the *Bulletin of the AMS*, vol. 31, 1994, pp. 15-38.

Michael L Ulrey

Michael.Ulrey@Boeing.com

"Prime Triangles"  
Article in "Reliability  
Society Newsletter",  
October 1998

Below is a proof, with an explicit construction, that establishes the following:

**Claim:** For every positive integer  $X > 2$ , there exist positive integers  $Y$  and  $H$  so that  $(X^{**2}) + (Y^{**2}) = (H^{**2})$ . (In your words, "every single number that

you can think of can form one leg of a perfect triangle"—adopting the convention that here "number" equates to "positive integer".)

**Proof:** Write  $X = (2^{**P}) * D$  where  $P$  is a nonnegative integer (possibly = 0 if  $X$  is odd) and  $D$  is a positive odd integer. Initially consider the case of  $D > 1$ . Then set  $Y = (2^{**P} - 1) * ((D^{**2}) - 1) = X * \{D - (1/D)\} / 2$ , where the  $\{ \}$  term  $> 0$ , and  $H = Y + (2^{**P}) = Y + (X/D) > 0$ . Observe that  $(H^{**2}) - (Y^{**2}) = [2 * Y * (X/D)] + [(X/D)^{**2}] = [(X^{**2}) - ((X/D)^{**2})] + [(X/D)^{**2}] = X^{**2}$ , which completes the proof for  $D > 1$ .

**Now return to the remaining case of  $D = 1$ ,** or  $X = 2^{**P}$  (and  $X \geq 4$ ). Then set  $Y = ((X/2)^{**2}) - 1$  (which is  $> 0$ ) and  $H = Y + 2 > 0$ . Observe that  $(H^{**2}) - (Y^{**2}) = [4 * Y] + 4 = [(X^{**2}) - 4] + 4 = X^{**2}$ , which completes the proof.

Note: This result recovers most, but not all, of the triangles that you specifically list in your article. It fails to capture your prime triangles when the first side  $X$  is a multiple of a previously established perfect triangle—e.g., for  $X=12$  you have  $Y=35$ , but I merely recover  $Y=16$  and  $H=20$  (being 4 times the standard (3,4,5) triangle).

**From: Arthur Fries**

Thanks for your brilliant input.

**Sincerely,  
Dick Doyle**

Thanks to all who requested the program from my article "Prime Triangles". The program listings follow this letter. The basic file requires a copy of QBasic to run. It possibly could be converted into Visual Basic, but I have not tried that. If you have any problems with the program please let me know. Please let me know if you find a number that does not have a solution. If I get some more comments, I will put them up on the Reliability Society discussion forum (Web Page). Otherwise, I will try to share your information with others that write to me. Thanks for your requests.

**Sincerely,  
Dick Doyle**

TRIANGLE Basic

5 DIM XSPC(10)

7 FF\$ = "PRN"

8 OPEN FF\$ FOR OUTPUT AS #1

10 PRINT #1, "PROPERTIES OF"



```

20 PRINT #1, "PERFECT TRIAN-
GLES"
25 PRINT #1, "BY DICK DOYLE -
DEC 1994"
40 PRINT #1,
45 REM : DATA INPUT MODULE
50 PRINT #1,
55 PRINT "LARGEST NUMBER OF
SHORT LEGS ?"
60 PRINT #1, "LARGEST NUMBER
OF SHORT LEGS ?"
61 INPUT N3
80 PRINT #1,
90 PRINT #1, "TEST FOR LARGEST
DIFERENCE"
100 PRINT #1, "BETWEEN LONG
LEG AND HYPOTINUSE"
110 PRINT #1, "MUST BE AT
LEAST 1"
112 PRINT "TEST FOR LARGEST
DIFERENCE"
114 PRINT "BETWEEN LONG LEG
AND HYPOTINUSE"
116 PRINT "MUST BE AT LEAST 1"
118 PRINT "999 ENDS PROGRAM"
120 PRINT #1,
130 PRINT #1,
140 PRINT #1,
150 PRINT #1, "DEFINITION OF
EXTERIOR CONTOUR"
160 PRINT #1,
170 PRINT #1, "NUMBER OF
MODULES ?"
171 INPUT N1
180 PRINT #1,
190 N = N1
192 X1 = 0
193 X = 1
194 IF N1 = 999 THEN 1400
195 IF N3 < .00001 THEN 10
197 REM ==COMPUTE ELEMENT
PROPERTIES FOR MODULE==
200 Y = (X ^ 2 - N ^ 2) / (2 * N)
210 R = Y - INT(Y)
220 IF R < .00001 THEN GOSUB
1030
230 N = N - 1
233 IF N = 0 THEN 295
235 REM == SIMFLY CONNECTED
DOMAIN PROPERTIES==
240 GOTO 200
295 REM == RUN NEXT BASE NO.
(SHORT LEGS)==
297 X = X + 1
300 IF N3 = X THEN 735

```

```

305 REM == RESET N AND RERUN
==
310 N = N1
320 GOTO 200
495 REM == ASK FOR NEW INPUTS
==
520 PRINT #1,
530 PRINT #1,
540 PRINT #1, "THESE ARE ALL
TRIANGLES"
550 PRINT #1, "UP TO"
560 PRINT #1,
570 PRINT #1, " SHORT LEG OF = ";
N3
580 PRINT #1, " MODULE OF = "; N1
600 PRINT #1,
610 PRINT #1,
620 PRINT #1,
630 PRINT #1,
640 PRINT #1,
650 PRINT #1,
660 PRINT #1,
735 REM == RETURN TO TOP ==
740 GOTO 10
1030 REM
1040 X1 = X1 + 1
1050 REM Y1 = ATAN(Y / X)
1112 PRINT #1, "TRIANGLE NO
AND LEGS AND ANGLE "; X1; X;
Y; Y + N
1113 PRINT #1,
1340 RETURN
1400 PRINT "END OF RUN"
1405 STOP
1410 END

```

### TRIANGLE2 Basic

```

5 DIM XSPC(10)
7 FF$ = "PRN"
8 OPEN FF$ FOR OUTPUT AS #1
10 PRINT #1, "PROPERTIES OF"
20 PRINT #1, "PERFECT TRIAN-
GLES"
25 PRINT #1, "BY DICK DOYLE -
DEC 1994"
40 PRINT #1,
45 REM : DATA INPUT MODULE
50 PRINT #1,
55 PRINT "LARGEST NUMBER OF
SHORT LEGS ?"
60 PRINT #1, "LARGEST NUMBER
OF SHORT LEGS ?"
61 INPUT N3
80 PRINT #1,
90 PRINT #1, "TEST FOR LARGEST
DIFERENCE"

```

```

100 PRINT #1, "BETWEEN LONG
LEG AND HYPOTINUSE"
110 PRINT #1, "MUST BE AT LEAST
1"
112 PRINT "TEST FOR LARGEST
DIFERENCE"
114 PRINT "BETWEEN LONG LEG
AND HYPOTINUSE"
116 PRINT "MUST BE AT LEAST 1"
118 PRINT "999 ENDS PROGRAM"
120 PRINT #1,
130 PRINT #1,
140 PRINT #1,
150 PRINT #1, "DEFINITION OF EX-
TERIOR CONTOUR"
160 PRINT #1,
170 PRINT #1, "NUMBER OF MOD-
ULES ?"
171 INPUT N1
180 PRINT #1,
190 N = N1
191 X4 = 1 : REM 0 = ALL TRIAN-
GLES, 1 = PRIME TRIANGLES
192 X1 = 0
193 X = 1
194 IF N1 = 999 THEN 1500
195 IF N3 < .00001 THEN 10
197 REM ==COMPUTE ELEMENT
PROPERTIES FOR MODULE==
200 Y = (X ^ 2 - N ^ 2) / (2 * N)
210 R = Y - INT(Y)
220 IF R < .00001 THEN GOSUB
1030
230 N = N - 1
233 IF N = 0 THEN 295
235 REM == SIMFLY CONNECTED
DOMAIN PROPERTIES==
240 GOTO 200
295 REM == RUN NEXT BASE NO.
(SHORT LEGS)==
297 X = X + 1
300 IF N3 = X THEN 735
305 REM == RESET N AND RERUN
==
310 N = N1
320 GOTO 200
495 REM == ASK FOR NEW INPUTS
==
520 PRINT #1,
530 PRINT #1,
540 PRINT #1, "THESE ARE ALL
TRIANGLES"
550 PRINT #1, "UP TO"
560 PRINT #1,
570 PRINT #1, " SHORT LEG OF = ";
N3
580 PRINT #1, " MODULE OF = "; N1
600 PRINT #1,

```

```

610 PRINT #1,
620 PRINT #1,
630 PRINT #1,
640 PRINT #1,
650 PRINT #1,
660 PRINT #1,
735 REM == RETURN TO TOP ==
740 GOTO 10
1030 REM
1040 X1 = X1 + 1
1050 REM Y1 = ATAN(Y / X)
1060 REM == PRINT DUPLICATE
TRIANGLES ==
1070 REM IF X4 = 1 THEN GOSUB
1350
1071 GOTO 1350
1112 PRINT #1, "TRIANGLE NO AND
LEGS AND ANGLE"; X1; X; Y; Y + N
1113 PRINT #1,
1340 RETURN
1350 REM == FILTER DUPLICATE
TRIANGLES ==
1360 IF Y < 0 THEN 1340
1361 IF Y < X THEN 1340
1362 REM == DIVIDE BY PRIME NO.
==
1365 P1 = 2
1366 N5 = 1
1367 R = 0
1370 R = Y/P1 - INT(Y/P1)
1372 R = R + X/P1 - INT(X/P1)
1373 R = R + (Y + N)/P1 - INT((Y +
N)/P1)
1375 IF R < .00001 THEN 1340
1380 REM == LAST PRIME, RETURN
TO NEXT TRIANGLE ==
1390 IF N5 = 6 THEN 1112
1400 N5 = N5 + 1
1405 P1 = 3
1410 IF N5 = 2 THEN 1367
1415 P1 = 5
1420 IF N5 = 3 THEN 1367
1425 P1 = 7
1430 IF N5 = 4 THEN 1367
1435 P1 = 11
1440 IF N5 = 5 THEN 1367
1445 P1 = 13
1450 IF N5 = 6 THEN 1367
1500 PRINT "END OF RUN"
1505 STOP
1510 END

```

### TRICUBE Basic

```

5 DIM XSPC(10)
7 FF$ = "PRN"
8 OPEN FF$ FOR OUTPUT AS #1
10 PRINT #1, "PROPERTIES OF"

```

```

20 PRINT #1, "PERFECT TRIAN-
GLES"
25 PRINT #1, "BY DICK DOYLE -
DEC 1994"
40 PRINT #1,
45 REM : DATA INPUT MODULE
48 PRINT #1,
49 PRINT "TEST FOR LARGEST
DIFERENCE"
50 PRINT "BETWEEN LONG LEG
AND HYPOTINUSE"
52 PRINT "MUST BE AT LEAST 1"
53 PRINT "999 ENDS PROGRAM"
55 PRINT "LARGEST NUMBER OF
SHORT LEGS ?"
60 PRINT #1, "LARGEST NUMBER
OF SHORT LEGS ?"
61 INPUT N3
80 PRINT #1,
90 PRINT #1, "TEST FOR LARGEST
DIFERENCE"
100 PRINT #1, "BETWEEN LONG
LEG AND HYPOTINUSE"
110 PRINT #1, "MUST BE AT
LEAST 1"
119 PRINT " 1 OR -1 ?"
120 PRINT #1,
130 PRINT #1,
140 PRINT #1,
150 PRINT #1, "DEFINITION OF EX-
TERIOR CONTOUR"
160 PRINT #1,
170 PRINT #1, " 1 OR -1 ?"
171 INPUT S1
180 PRINT #1,
183 REM ==RESTRICTION ON N1,
MAY BE LIMIT, MUST RUN -1 ==
185 N1 = INT(0.999 * N3)
190 N = N1
192 X1 = 0
193 X = 1
194 IF N3 = 999 THEN 1400
195 IF N3 < .00001 THEN 10
197 REM ==COMPUTE ELEMENT
PROPERTIES FOR MODULE==
198 A=N*3: B=(N^2)*3: C=(N^3) -
(X^3)
202 Q1 = (B^2 - 4*A*C)
203 IF Q1 < 0 THEN 230
204 Q1 = Q1^.5
205 Y = -1*(B/2/A) + S1* (Q1/2/A)
210 R = Y - INT(Y)
220 IF R < .00001 THEN GOSUB 1030
223 IF R > .99999 THEN GOSUB 1030

```

```

225 REM ***** REMOVE THIS
LINE AND NEXT LINE *****
227 REM **** GOSUB 1030
230 N = N - 1
233 IF N = 0 THEN 295
235 REM == SIMPLY CONNECTED
DOMAIN PROPERTIES==
240 GOTO 197
295 REM == RUN NEXT BASE NO.
(SHORT LEGS)==
297 X = X + 1
300 IF N3 = X THEN 735
305 REM == RESET N AND RERUN
==
306 REM ==RESTRICTION ON X,
MAY BE LIMIT ==
307 IF X > 2 THEN N1 = INT(0.95 *
X) - 1
310 N = N1
320 GOTO 197
495 REM == ASK FOR NEW INPUTS
==
520 PRINT #1,
530 PRINT #1,
540 PRINT #1, "THESE ARE ALL
TRIANGLES"
550 PRINT #1, "UP TO"
560 PRINT #1,
570 PRINT #1, " SHORT LEG OF = ";
N3
580 PRINT #1, " MODULE OF = "; N1
600 PRINT #1,
610 PRINT #1,
620 PRINT #1,
630 PRINT #1,
640 PRINT #1,
650 PRINT #1,
660 PRINT #1,
735 REM == RETURN TO TOP ==
740 GOTO 10
1030 REM
1040 X1 = X1 + 1
1050 REM Y1 = ATAN(Y / X)
1060 IF Y = 0 THEN 1340
1070 IF Y+X = 0 THEN 1340
1112 PRINT #1, "TRIANGLE NO
AND LEGS AND ANGLE "; X1; X; Y;
Y + N
1113 PRINT #1,
1340 RETURN
1400 PRINT "END OF RUN"
1405 STOP
1410 END

```

# Call For Manuscripts For IEEE Potentials Magazine

The IEEE Potentials Magazine is soliciting manuscripts for all aspects of trical / electronic / computer engineering and computer science the IEEE Potentials Magazine goes to all student members of the IEEE (USA and Canada), presently about 45,000. the level of the article is addressed to the undergraduate student and has several objectives: interesting the student in a topic for further study, explaining technological advances in an area, a forum for technical ideas, articles of interest technically.

It should be stressed that the article should not try to mystify the student, but to enable the student to learn more about technical material that he/she may/may not become acquainted with in their formal course work. the length of the article can be no more than 10 manuscript pages (8 1/2-11) reduced by number of figures, shorter papers also acceptable the manuscripts are reviewed by: students, faculty, researchers in area and then a decision is made as to whether to publish or not. if interested, contact:

Dr. George W. Zobrist  
Editor, IEEE Potentials Magazine  
Department of Computer Science  
1870 Miner Circle

University Of Missouri-Rolla  
Rolla, MO 65409  
Phone: 573-341-4492  
FAX: 573-341-4501  
Email: zobrist@umr.edu  
Further information can be found at  
[HTTP://WWW.CS.UMR.EDU/POTENTIALS](http://WWW.CS.UMR.EDU/POTENTIALS)

## From the Editor

*continued from page 2*

straightforward process which generates a user ID which is (at least in my case) a cumbersome 8 digit number.

4. Log on to the site. Your IEEE member number (another clumsy 8 digit number) is your password.
5. There are two modes in Opera - Browse and Search. It is easy to switch between Browse and Search. I find the Browse mode to be somewhat more intuitive.
6. When you register, you will be told what publications are available to you. Currently RS members have access to:

*Electromechanical and Solid State Letters, Electron Device Letters, Journal of Electronic Materials, Transactions on Electron Devices*

If you try to choose a publication for which you are not authorized, you get the login screen again. After 3 tries, the system figures you are not really supposed to be there and kicks you out (no permanent damage to your ability to access the site that I could tell)

OPeRA appears to be a good mechanism for the on-line distribution publications. Aside from having to use two eight-digit numbers to get into the system, it seems to be flexible and useful. The Reliability Society is in the preliminary stages of making the Transactions on Reliability available in OPeRA.

**Dr. Robert Loomis,  
RS Webmaster**

## For Your Information

We have been asked to notify our members that the following standard is now available, IEC 60300-3-11, 1999 Application guide - Reliability Centered Maintenance is now available for purchase from ANSI's Customer Service Department at the price of US\$135.00 plus shipping and handling.

## Conference Calendar

### Boston IEEE Reliability Chapter Spring Reliability Symposium

The purpose of this message is to notify you about a Call For Participation for this year's May 5th Boston IEEE Reliability Chapter Spring Reliability Symposium. As in past years, IEEE and ASQ members receive the membership rate. Students and retired folks are admitted for half-price.

This year's theme is, "The Reliability Engineer on the Job, The Reliability Engineering Profession in Today's Business Environment." We have seven papers scheduled and I am still working on a keynote speaker.

The registration fee of \$175 members (IEEE or ASQ) and \$200 non-members covers the proceedings, morning coffee and muffins, a buffet lunch and an evening reception and dinner.

For information contact:

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Preliminary Notice for a Conference on Accelerated Product Qualification  
**InterPack '99 The Pacific Rim/ASME International,  
Intersociety Electronic Packaging Conference**

Westin Maui Kaanapali Beach Hotel  
Lahaina, Hawaii, USA  
June 13-19, 1999

InterPack'99, to be held in Hawaii, June 13-19, 1999. InterPack is sponsored by ASME International and is intended as a forum for dissemination of information related to the field of Electronic and Photonic Packaging. The objectives of the conference are to foster international cooperation, understanding and promotion of efforts in Microelectronics, Optoelectronics, and Photonics Packaging Engineering in an East/West business setting.

The Accelerated Product Qualification track invites papers that report on aspects of accelerated testing that include and not limited to: state-of-the-art in accelerated testing, complex stress envi-

ronments, stress interaction in combined stress testing, state-of-the-art test hardware and software, predictive failure models and mechanisms, computer modeling and simulation, field to test correlation, role of material characterization, role of failure analysis, statistical issues in determining sample sizes, and quantitative estimate of field reliability from testing. Overall, the session is intended to provide a broad coverage of the state-of-the-art in accelerated testing, physics, and modeling techniques.

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Fax: 818 249-5714

## 10th IEEE International Workshop on Rapid System Prototyping

June 16-18, 1999

Sheraton Sankley, Clearwater, Florida, U.S.A

<http://www-src.lip6.fr/rsp/>

The IEEE International Workshop on Rapid System Prototyping (RSP) presents and explores the trends in rapid prototyping of Computer Based Systems including, but not limited to, communication, information, and manufacturing systems. It aims to bring together researchers from both hardware and software to share their experience with rapid prototyping.

The 10th annual workshop will focus on improved approaches to resolve prototyping issues and problems raised by incomplete specifications, increased system complexity and reduced time to market requirements for a multitude of products. The workshop will include a keynote presentation and formal paper sessions with a wide range of system prototyping topics including, but not limited to:

- System Emulation
- Virtual Prototyping
- Hardware-Software Codesign
- Tools for Hardware Prototyping
- Tools for Software Prototyping
- Methodologies for Hardware Prototyping
- Methodologies for Software Prototyping
- The Role of FPGAs in System Prototyping
- Prototyping Case Studies
- Very Large Scale System Engineering
- Hardware/Software Tradeoffs
- System Verification/Validation
- Prototype to Product Transition
- Prototyping of Real-Time Systems

The program committee invites authors to submit a full paper (preferred) or an extended Summary. Submissions should be electronic in pdf format (preferred) or PostScript presenting original and unpublished work. Clearly describe the nature of the work, explain its significance, highlight its novel features, and state its current status. Authors of selected papers will be requested to prepare a manuscript for the workshop proceedings. Papers' length should not exceed 7 pages in the standard IEEE format.

- Papers due: January 29, 1999
- Notification of Acceptance: February 26, 1999
- Final Camera Ready Manuscript due: March 26, 1999

## Preliminary Notification

# The Third International Workshop on Advanced Parallel Processing Technologies APPT`99

October 19-20, 1999 Changsha, P. R. China

<http://www.njtu.edu.cn/APPT`99>

The great mutual acceptance of the first and second International Workshop APPT`95 and APPT`97 in Beijing and Koblenz encourages us to continue the fruitful scientific dialogue among China, Germany and other countries. Based on the established cooperation during the past meetings, the third meeting should increase the strength of cooperation, and provide a forum for exchanging new ideas at the higher technical level. This should be realized by the respective selected topics of the Workshop on Advanced Parallel Processing Technologies, which will be held in Changsha, Oct. 19-20, 1999.

This workshop results from cooperation between Northern Jiaotong University and the University of Koblenz-Landau as well as the National Laboratory for Parallel and Distributed Processing, University of Hamburg, the

University of Applied Sciences of Heide and the City University of Hong Kong. This workshop has been planning to take place biannually alternately in China and Germany. It will act as a forum for technology exchange for the university and industrial side to present up-to-date research results and project works in order to establish new cooperation in developing innovative concepts and solutions for products towards future markets and setting up long-term cooperation. The workshop will focus on both theory/methodology and practice/application realizations. The working language is English. The topics of interest include, but are not limited to, the following:

- Parallel & distributed architectures
- Parallel & distributed algorithms
- Parallel programming & parallelizing compilers

- Applications of parallel and distributed computing
- Meta-computing, and Internet applications
- Network security
- Heterogeneous computing environments
- Reliability and fault-tolerance for parallel & distributed systems
- Wireless networks and mobile computing
- Artificial intelligence techniques for parallel processing
- Neural networks and their applications
- Computer-supported cooperative work
- Distributed operating system
- Hardware/software co-design
- Novel VLSI architectures
- Optical technology in high-performance architectures



# CORROSION ASIA 2000



## Singapore June 26 - 28 2000

# CALL FOR PAPERS/FIRST ANNOUNCEMENT

Following on from the success of the first and second CORROSION ASIA conferences in 1992 & 1994, the Corrosion Association of Singapore is pleased to announce the planning of CORROSION ASIA 2000.

The main emphasis of the technical programme will be on problems faced by energy related industries, reflecting their importance in the region. However, a diverse range of addi-

tional topics will also be covered, ensuring that there will be something of interest to all those involved in the field. The organising committee is also particularly interested in receiving abstracts on topics related to the electronic or semiconductor industries.

Persons wishing to present a paper should submit a proposal containing the topic, a 100 to 200 word abstract and full

particulars of their address, phone and fax to: J. K. Shen c/o Cathodic Protection Technology Ltd, No. 4 Tuas Drive 1, Singapore 638671.

Delegate registration fee: S\$850.00 (USD610.00). Special rate early bird registration (4 months before conference): S\$750.00 (USD540.00). No frills package: S\$500.00 (USD360.00) per head from groups of 5 or more delegates from the same academic institution (does not include tickets to the banquet or cocktail reception and covers only one set of conference papers per group). Student rate: S\$25.00 per day.

**Please send me the following information  
(please check)**

- Call For Papers
- Registration Form
- Advance Programme
- Exhibitor Information
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- Corporate Sponsorships

I am considering attending as  
 a delegate  an author  an exhibitor

I am interested in submitting a paper to CA 2000

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