# Tenth ISSAT International Conference

## Reliability and Quality in Design

### August 5-7, 2004

**Las Vegas, Nevada, USA**

## Conference Program

### Sponsor

**The International Society of Science and Applied Technologies (ISSAT)**

### Location

**Circus Circus Hotel, Casino and Theme park**

2880 Las Vegas Blvd. South  
Las Vegas, Nevada  89109  U.S.A.

**Phone:** (800) 634-3450  
**Website:** [www.circuscircus.com](http://www.circuscircus.com)

*Conference website: [www.issatconferences.org](http://www.issatconferences.org)*

### Conference Chairs

- **Hoang Pham**  
  Rutgers University
- **Ming-Wei Lu**  
  DaimlerChrysler Corporation

### Program Chair

**Shigeru Yamada**  
Tottori University

### Arrangements Chair

**Hanh K. Phan**  
Energy Northwest

### Program Committee Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<td>Philip L. Y. Chan</td>
<td>Hong Kong</td>
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**THURSDAY, AUGUST 5, 2004**

**8:00 am – 3:00 pm** Registration

**8:45 am – 9:00 am** Opening Remarks

**SESSION 1**

**Thursday, August 5, 9:00 am – 11:00 am**

**Special Lecture:**

**Uniform Experimental Designs and Their Applications**

Speakers: Kai-Tai Fang, Hong Kong Baptist University
Ling-Yau Chan, The University of Hong Kong

This lecture introduces a type of experimental design, called the uniform design (UD), which has been studied theoretically for several decades. Recently, Ford Motor Company has employed the UD as a standard practice for their computer experiments on engine development. Uniform designs are robust to the underlying response surface model, and can be used effectively in computer experiments. This lecture will explain the rationale of uniformity in design, introduce discrepancy measures and methods for construction of UD's, and give examples of applications of UD's in the industry and in reliability design. Further applications of the UD, experiments with mixtures, designs for accelerated stress testing are also discussed.

Kai-Tai Fang is a founder of uniform design. He is the Chair Professor and Head of Department of Mathematics at Hong Kong Baptist University. In the last two decades he has studied uniform designs intensively, and has applied them successfully in more than 500 industrial cases. He has published more than 170 papers and the authors of several books. He is an elected fellow of ASA, ISI, and IMS. Ling-Yau Chan is an Associate Professor and Head of Department of Industrial and Manufacturing Systems Engineering at The University of Hong Kong. He is a Fellow of the Royal Statistical Society.

**11:00 am – 11:15 am** Coffee Break

**SESSION 2**

**Thursday, August 5, 11:15 am – 12:30 pm**

**Reliability and Robust Design in Automotive Engineering**

Chair: Everett Y. Kuo (Ford Motor Company, USA)

*Reliability of Disc Brake Squeal Predictive Models*
Yitzong Chern (Ford Motor Company, USA)
Rena H. Basch (Ford Motor Company, USA)
Dale L. Hartsock (Ford Motor Company, USA)

*An Improved and Automated Finite Element Analysis for Fatigue Initiation Life Predictions of Notched Components*
Ramanathan M. Ranganathan (Oakland University, USA)
Yung-Li Lee (DaimlerChrysler Corp., USA)
Randy J. Gu (Oakland University, USA)

*On the Relation between High Mileage NVH Performance and Consumers’ subjective Feeling of Vehicles on Solid and Durable Construction*
Everett Y. Kuo (Ford Motor Company, USA)
Frank Chen (Ford Motor Company, USA)

**SESSION 3**

**Thursday, August 5, 11:15 am – 12:30 pm**

**Software Reliability**

Chair: Shigeru Yamada (Tottori University, Japan)

*Architecture-Based Heterogeneous Software Reliability*
Swapna S. Gokhale (University of Connecticut, USA)

*Optimal Software Release Problem Based on the Number of Debuggings with Availability Requirement*
Koichi Tokuno (Tottori University, Japan)
Shigeru Yamada (Tottori University, Japan)

*Customer-Perceived Software Failure Rate Prediction Before Field Deployment*
Xuemei Zhang (Lucent Technologies, USA)
Hoang Pham (Rutgers University, USA)

**SESSION 4**

**Thursday, August 5, 1:30 pm – 3:00 pm**

**Reliability Methods and Its Applications**

Chair: Guangbin Yang (Ford Company, USA)

*The Chance Constraint Assignment Problem*
Tetsuo Ichimori (Osaka Institute of Technology, Japan)
Asuka Yamakawa (Kobe International University, Japan)

*Introduction of a Selection Parameter in Genetic Algorithm for a Constrained Reliability Problem*
Laure Rigal (Ecole des Mines de Nantes & IRCyN, France)
Bruno Castanier (Ecole des Mines de Nantes & IRCyN, France)
Philippe Castagliola (Ecole des Mines de Nantes & IRCyN, France)

*Experimental Investigation on Electric Fans for Domestic Appliances: Product Development and Reliability Tests*
M. Bevilacqua (Università di Bologna, Italy)
Filippo Emanuele Ciarapica (Università Politecnica delle Marche, Italy)
G. Giacchetta (Università Politecnica delle Marche, Italy)
The Use of Monte Carlo Simulation in the Development of a Step-Stress Test Profile
John Donovan (Institute of Technology Sligo, Ireland)
Valter Loll (Nokia Mobile Phones, Denmark)
Jeff Punch (University of Limerick, Ireland)

SESSION 5
Thursday, August 5, 1:30 pm – 3:00 pm
Quality Planning and Measurements
Chair: Yi-Kuei Lin (Vanung University, Taiwan)

Design Process Error-Proofing: Challenges and Methods in Quantifying Design Elements
Lawrence P. Chao (Stanford University, USA)
Kosuke Ishii (Stanford University, USA)

External Operating Environment and Managerial Efficiency of International Tourist Hotels in Taiwan: Application of Four-Stage DEA Procedure
Fei-Ching Wang (Jin-Wen Institute of Technology, Taiwan)
Wei-Ting Hung (Vanung University, Taiwan)
Jui-Kou Shang (Jin-Wen Institute of Technology, Taiwan)

Productivity and Quality Changes in Taiwan International Tourist Hotels: A Malmquist Index and Bootstrap Approach
Wei-Ting Hung (Vanung University, Taiwan)
Fei-Ching Wang (Jin-Wen Institute of Technology, Taiwan)
Jui-Kou Shang (Jin-Wen Institute of Technology, Taiwan)

Evaluate the System Performance of an E-Commerce Network with Failure Nodes
Yi-Kuei Lin (Vanung University, Taiwan)

3:00 pm – 3:15 pm Coffee Break

SESSION 6
Thursday, August 5, 3:15 pm – 5:00 pm
Automotive Reliability Challenges
Chair: Julius Wang (Mbtech - North America, USA)

Lead-Free Soldering for Automotive Application - A Challenge to Meet the Reliability Requirement
Viktor Tiederle (RMCtech, Germany)
Joerg Mahrle (RMCtech, Germany)

Virtual Qualification: a New Reliability Paradigm
Anoop Rawat (Mbtech Group North America, USA)
Julius Wang (Mbtech Group North America, USA)

Optical MOST Devices for Automotive Applications - Qualification Procedure and Experiences
Viktor Tiederle (RMCtech, Germany)
Joerg Angstenberger (RMCtech, Germany)

A Method for Correlating Accelerated life Testing to Field Life for Electronics Modules
David W. Coit (Rutgers University, USA)
John L. Evans (Auburn University, USA)
Nathan Vogt (Auburn University, USA)
James R. Thompson (DaimlerChrysler Huntsville Electronics, USA)

Reliability Engineering in Electronic Systems - Innovative Methods for the Automotive Industry
Martin Heine (RMCtech, Germany)

SESSION 7
Thursday, August 5, 3:15 pm – 5:00 pm
Optimal Maintenance Modeling
Chair: Toshio Nakagawa (Aichi Institute of Technology, Japan)

Optimal Random Replacement Policies
Toshitsugu Sugiura (Aichi Institute of Technology, Japan)
Satoshi Mizutani (Aichi Institute of Technology, Japan)
Toshio Nakagawa (Aichi Institute of Technology, Japan)

A Survey of Finite Inspections Models
Satoshi Mizutani (Aichi Institute of Technology, Japan)
Kazuyuki Teramoto (Aichi Institute of Technology, Japan)
Toshio Nakagawa (Aichi Institute of Technology, Japan)

Optimal Maintenance Policies for a System with Given Damage Level
Toshio Nakagawa (Aichi Institute of Technology, Japan)
Kodo Ito (Mitsubishi Heavy Industries, LTD., Japan)

Bitariate Failure Interaction Models and Its Age Replacement Policy
Takashi Satow (Tottori University, Japan)
Qing Zhao (Tottori University, Japan)
Hajime Kawai (Tottori University, Japan)

An Inspection-Maintenance Model for Repairable Systems with Multiple Competing Processes
Wenjian Li (Rutgers University, USA)
Hoang Pham (Rutgers University, USA)

5:30 pm – 7:00 pm Reception

FRIDAY, AUGUST 6, 2004

SESSION 8
Friday, August 6, 8:30 am – 10:00 am
Applied Reliability Modeling
Chair: Shouji Nakamura (Kinjo Gakuin University, Japan)

Optimal Scheme of Window-Flow Control for a Communication System with Congestion
Mitsutaka Kimura (Gifu city Women’s College, Japan)
Mitsuhiro Imaizumi (Aichi Institute of Technology, Japan)
Kazumi Yasui (Aichi Institute of Technology, Japan)
Optimal Checkpointing Number for Multiple Recovery Schemes
Kenichiro Naruse (Aichi Institute of Technology, Japan)
Sayori Nakagawa (Kinjo Gakuin University, Japan)
Shigeru Yamada (Tottori University, Japan)

Optimal Database Construction Interval for Certificate Revocation List in PKI
Syouji Nakamura (Kinjo Gakuin University, Japan)
Miwako Arafuka (Kinjo Gakuin University, Japan)
Toshio Nakagawa (Aichi Institute of Technology, Japan)

AGES: Automatic Generation of EFSMs from SDL Specifications
Eric Wong (University of Texas at Dallas, USA)
Xiao Ma (University of Texas at Dallas, USA)
Dan Zhuo (University of Texas at Dallas, USA)
Kendra Cooper (University of Texas at Dallas, USA)

SESSION 9
Friday, August 6, 8:30 am – 10:00 am
Probabilistic Modeling & Forecasting Methods
Chair: D. Gary Harlow (Lehigh University, USA)

System Availability
Ming-Wei Lu (DaimlerChrysler Corporation, USA)
Richard J. Rudy (DaimlerChrysler Corporation, USA)
William D. Carlson (DaimlerChrysler Corporation, USA)

Forecasting Methods for Lumpy Demand of Aircraft Spare Parts
Alberto Regattieri (Bologna University, Italy)
M. Gamberi (University of Padova, Italy)
R. Manzini (University of Padova, Italy)
Alessandro Persona (University of Padova, Italy)

A Binomial-Weibull Model for Forecasting L.T.I. (Low Turnaround Index) Parts Needs
Arrigo Pareschi (Bologna University, Italy)
Alessandro Persona (University of Padova, Italy)
Alberto Regattieri (Bologna University, Italy)
Marco Catena (University of Padova, Italy)

Error Management
D. Gary Harlow (Lehigh University, USA)

SESSION 10
Friday, August 6, 10:15 am – 11:45 am
Security and Reliability
Chair: Taghi M. Khoshgoftaar (Florida Atlantic University, USA)

A Software Process Improvement and Its Quantification Technique
Takaji Fujiwara (Fujitsu Peripherals Limited, Japan)
Shigeru Yamada (Tottori University, Japan)

A Comparative Study of Classification Algorithms for Network Intrusion Detection
Taghi M. Khoshgoftaar (Florida Atlantic University, USA)
Kehan Gao (Florida Atlantic University, USA)
Yunling Wang (Florida Atlantic University, USA)

Evaluating Clustering Techniques for Network Intrusion Detection
Shi Zhong (Florida Atlantic University, USA)
Taghi M. Khoshgoftaar (Florida Atlantic University, USA)
Naeem Seliya (Florida Atlantic University, USA)

Subsystem Identifier as a Software Quality Predictor
Taghi M. Khoshgoftaar (Florida Atlantic University, USA)
Andres Folleco (Florida Atlantic University, USA)

SESSION 11
Friday, August 6, 10:15 am – 11:45 am
Quality of Education
Chair: Che-Jen Chuang (Vanung University, Taiwan)

A Note on the Distribution Fairness Score Function
Zhenmin Chen (Florida International University, USA)
Chi Zhang (Florida International University, USA)

Quality Service of Students’ Perceptions: In Taiwan’s Technological and Vocational Higher Education Sector
Shyi-Huey Wu (Vanung University, USA)

Study of Customer Satisfaction upon Service Quality and Commercial Friendship – Example of a Sports Goods Company
Che-Jen Chuang (Vanung University, Taiwan)
Jui-Chuan Yang (Vanung University, Taiwan)
Bo-Chin Huang (Vanung University, Taiwan)

The Identification Tendency and Difference of Physical Education Attitude in College Student
Jui-Chuan Yang (Vanung University, Taiwan)
Sun-Chin Yang (Vanung University, Taiwan)
Shiow-Chyn Jeng (Vanung University, Taiwan)

SESSION 12
Friday, August 6, 1:15 pm – 2:45 pm
Reliability and Maintenance Modeling
Chair: Elsayed A. Elsayed (Rutgers University, USA)

Yoichi Higashiyama (Ehime University, Japan)

Optimisation of Ventilation Layout Design
T. T. Wong (The Hong Kong Polytechnic University, Hong Kong)
T. Y. Cheung (The Hong Kong Polytechnic University, Hong Kong)
K. C. Heung (The Hong Kong Polytechnic University, Hong Kong)
Sze Ming Wu (The Hong Kong Polytechnic University, Hong Kong)  
K. S. Fung (Hong Kong Institute of Vocational Education, Hong Kong)

**Maintenance Policy of a System with Several Modes of Deterioration**
Bassem Saassouh (University of Technologie of Troyes, France)  
Laurence Dieulle (University of Technologie of Troyes, France)  
Antoine Grall (University of Technologie of Troyes, France)

**Maintenance of Continuously Monitored Degrading Systems**
Haitao Liao (Rutgers University, USA)  
Ling-Yau Chan (The University of Hong Kong, Hong Kong)  
Elsayed A. Elsayed (Rutgers University, USA)

**SESSION 13**

**Friday, August 6, 1:15 pm – 2:45 pm**

**Quality Engineering and Optimization**
Chair: Ming-Wei Lu (DaimlerChrysler Corporation, USA)

**Monitoring of Unequal Length Batch Processes**
Ariane Ferreira-Porto-Rosa (Ecole des Mines de Nantes / IRCCyN, France)  
Philippe Castagliola (Ecole des Mines de Nantes / IRCCyN, France)

**Bivariate Process Capability Indices for Non-Normal Distributions**
José-Victor García-Castellanos (Ecole des Mines de Nantes / IRCCyN, France)  
Philippe Castagliola (Ecole des Mines de Nantes / IRCCyN, France)

**Application of Taguchi Dynamic Parametric Design for the Optimal Combination of UV Ink Photoinitiators**
Jhy-Ping Jhang (Hua Fan University, Taiwan)  
Kuo Hwa Lin (Hua Fan University, Taiwan)  
Gro Ger Huang (Hua Fan University, Taiwan)

**A 2-Stage Cumulative Quantity Control Chart**
Jintao Ouyang (The University of Hong Kong, Hong Kong)  
Ling-Yau Chan (The University of Hong Kong, Hong Kong)

**SESSION 14**

**Friday, August 6, 3:00 pm – 4:30 pm**

**Software Reliability Modeling**
Chair: Mitsuhiro Kimura (Hosei University, Japan)

**A Method for Exact MTBF Evaluation of Repairable Systems**
S. Dharmaraja (Indian Institute of Technology Delhi, India)  
Suprasad Amari (Relax Software Corp., USA)

**Software Release Policy with Reliability Requirement Based on a Non-Gaussian Kalman Filter Model**
Yen-Chang Chang (Vanung University, Taiwan)  
Ching-Ti Liu (University of California at Los Angeles, USA)

**Software Reliability Assessment Methods for Integration Testing in Distributed Development Environment**
Yoshinobu Tamura (Tottori University of Environmental Studies, Japan)  
Shigeru Yamada (Tottori University, Japan)

**Stochastic Differential Equation Modeling for Testing-Effort Dependent Software Reliability Assessment**
Shinji Inoue (Tottori University, Japan)  
Shigeru Yamada (Tottori University, Japan)

**SESSION 15**

**Friday, August 6, 3:00 pm – 4:30 pm**

**Information Systems and Routines Analysis**
Chair: Hurdy Su (Sususing Co Ltd., Taiwan)

**An Evaluation of ISMS by SEE CMM Chart**
Kuo-Tung Chen (Tri-East Corporation, Taiwan)  
Keng-Kuang Han (Essior Data & Information Technology, Inc., Taiwan)  
Jaw-Sin Su (Chinese Culture University, Taiwan)  
Zhi-Yuan Liu (Nankai University, China)

**Staffs’ Response and Service Improvement in High Education**
Hengsheng Chen (Chinese Culture University, Taiwan)

**To Improve the Individual Tour’s Schedule Arrangement**
Yung Long Liu (Hsing Wu College, Taiwan)  
Jaw-Sin Su (Chinese Culture University, Taiwan)  
Pe-Ling Wu (Chien Kuo Institute of Technology, Taiwan)

**Increasing More Efficiency through Information System on MNE**
Shi-Huai Lin (Chinese Culture University, Taiwan)  
Jing-Lun Han (Nankai University, China)

**SESSION 16**

**Saturday, August 7, 8:30 am – 10:00 am**

**Key Words Technique and Application**
Chair: Huey-Ming Lee (Chinese Culture University, Taiwan)

**A Study on Keyless-In-Context Technique And Application**
Homer Wu (Chinese Culture University, Taiwan)  
Hurdy Su (Sususing Co Ltd., Taiwan)

**Apply Bhattacharya’s Graphical Method to Stable Product Growth**
Juei-Yang Su (Rhodes University, Taiwan)  
J. Baxter (Rhodes University, Taiwan)

**On Using Bayesian Approach in Recognizing Chinese Electronic Bookstore Web Sites**
Chong-Yen Lee (Chinese Culture University, Taiwan)
A Fuzzy Inventory Model without Backorder
Huey-Ming Lee (Chinese Culture University, Taiwan)
Jershan Chiang (Chinese Culture University, Taiwan)
Tsung-Yen Lee (Bank of Overseas Chinese, Taiwan)
Shu-Yen Lee (China Engineering Consultants, Inc., Taiwan)

SESSION 17
Saturday, August 7, 8:30 am – 10:00 am
Software Reliability and Process Improvements
Chair: Hoang Pham (Rutgers University, USA)

A Software Reliability Growth Model with Testing-Coverage Maturity Process
Takafumi Yamamoto (Tottori University, Japan)
Shinji Inoue (Tottori University, Japan)
Shigeru Yamada (Tottori University, Japan)

A Software Reliability Assessment Tool for the System Testing Phase in Distributed Development Environment
Yoshihiro Nodohara (Tottori University, Japan)
Yoshinobu Tamura (Tottori University, Japan)
Shigeru Yamada (Tottori University, Japan)

The CMMI - More Than Just Process
Greg Twaites (General Dynamics, USA)
Jim Collofello (Arizona State University, USA)
Fran Zenzen (General Dynamics Decision Systems, USA)

10:00 am – 10:15 am Coffee Break

SESSION 18
Saturday, August 7, 10:15 am – 11:45 am
Reliability Optimization
Chair: Balbir S. Dhillon (University of Ottawa, Canada)

Designing Cost-Effective Water Distribution Systems Including Pumps and Storage Tanks: Application of Genetic Algorithms
Dagnachew Adlog (Tottori University, Japan)
Yoshihiko Hosoi (Tottori University, Japan)
Takanori Masuda (Tottori University, Japan)

Optimal Cost-Effective Design of Complex Systems
Suprasad V. Amari (Relex Software Corp., USA)
Hoang Pham (Rutgers University, USA)

Human Error in Medication
Balbir S. Dhillon (University of Ottawa, Canada)

From Reliability Demonstration to Reliability Development: Challenges and Opportunities
Jing Ling (DaimlerChrysler Corporation, USA)

SESSION 19
Saturday, August 7, 10:15 am – 11:45 am
Quality Improvements
Chair: Gordon J. Savage (University of Waterloo, Canada)

Replicate or Duplicate Measurements - The Consequence of Misdiagnosis: A Case Study
Shane O’Neill (Institute of Technology Sligo, Ireland)
John Donovan (Institute of Technology Sligo, Ireland)

An Analysis of Errors in Client Server Systems
Muneo Takahashi (Toin University of Yokohama, Japan)
Eisuke Inada (Toin University of Yokohama, Japan)
Takao Shimonura (Tokushima University, Japan)

Improving the Quality of Street Furniture Design
Kin Wai Michael Siu (The Hong Kong Polytechnic University, Hong Kong)

Probabilistic Robust Design of Multiple Response Systems for Functional Design for Six Sigma
Kwan Ryoo (University of Waterloo, Canada)
Young Kap Son (University of Waterloo, Canada)
Gordon J. Savage (University of Waterloo, Canada)

12:00 pm Adjourn
PRESENTATION
The allotted time for presentation is about 22 minutes. Please prepare your presentation using Power Point since only computer projectors will be used for presentations at the conference. Computer laptop and projectors will be provided.

REGISTRATION
All attendants are required to register. Pre-registration is strongly recommended. The registration fee is US$ 480.00, which includes: a copy of the Conference Proceedings, gift, refreshments, luncheon, and dinner reception. Payment can be made by check or money order payable to ISSAT (no credit cards will be accepted).

ACCOMMODATION
Accommodation is available for the attendant of the Tenth ISSAT International Conference on Reliability and Quality in Design at the Circus Circus Hotel, Casino, and Theme Park, Las Vegas, Nevada, U.S.A. for the special rate of US $49.95 per night on August 4-6 and August 9 and of $89.95 per night on August 7-8 for single or double occupancy plus room tax. Registration must be made directly with the Circus Circus Hotel. When making reservations, please be sure to inform the agent that you are booking for the GROUP CODE: B08SSAT-RQD. Registrations must be made with the hotel on or before Tuesday, July 20, 2004 to guarantee the group rate.

REGISTRATION FORM
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AUGUST 5-7, 2004 • LAS VEGAS, NEVADA, U.S.A.

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AUGUST 5-7, 2004