

# Table of Contents

## Keynote Speech

- Reliable and Secure Operation of Smart Cards . . . . . 3  
*H.H. Henn, IBM Germany, Böblingen, Germany*

## Session 1: Dependability Modelling

*Chair: Jean-Claude Laprie, LAAS-CNRS, Toulouse, France*

- Dependability Modelling and Sensitivity Analysis of Scheduled Maintenance Systems . . . . . 7  
*A. Bondavalli, I. Mura (CNUCE/CNR, Pisa, Italy), K.S. Trivedi (Duke University, Durham, USA)*

- Evaluation of Video Communication over Packet Switching Networks . . . . . 24  
*K. Heidtmann (University of Hamburg, Germany)*

- Dependability Evaluation of a Distributed Shared Memory Multiprocessor System 42  
*M. Rabah, K. Kanoun (LAAS-CNRS, Toulouse, France)*

## Session 2a: Panel

*Moderator: Fevzi Belli, University of Paderborn, Germany*

- Software Reliability Engineering – Risk Management for the New Millenium . . . . 63  
*F. Belli (University of Paderborn, Germany)*

## Session 2b: Fast Abstracts

*Chair: Dimiter Avresky, Boston University, USA*

- List of Fast Abstracts . . . . . 67

## Session 3: Protocols

*Chair: István Majzik, Technical University of Budapest, Hungary*

- Muteness Failure Detectors: Specification and Implementation . . . . . 71  
*A. Doudou (EPFL, Lausanne, Switzerland), B. Garbinato (United Bank of Switzerland, Zürich, Switzerland), R. Guerraoui, A. Schiper (EPFL, Lausanne, Switzerland)*

- A Fault Tolerant Clock Synchronization Algorithm for Systems with Low-Precision Oscillators . . . . . 88  
*H. Lonn (Chalmers University of Technology, Gothenburg, Sweden)*

- Avoiding Malicious Byzantine Faults by a New Signature Generation Technique . 106  
*K. Echtle (University of Essen, Germany)*

- An Experimental Evaluation of Coordinated Checkpointing in a Parallel Machine 124  
*L.M. Silva, J.G. Silva (Universidade de Coimbra, Portugal)*

### **Session 4: Fault Injection 1**

*Chair: Janusz Sosnowski, Warsaw University of Technology, Poland*

- MAFALDA: Microkernel Assessment by Fault Injection and Design Aid . . . . . 143  
*M. Rodríguez, F. Salles, J.-C. Fabre, J. Arlat (LAAS-CNRS, Toulouse, France)*

- Assessing Error Detection Coverage by Simulated Fault Injection . . . . . 161  
*C. Constantinescu (Intel Corporation, Hillsboro, USA)*

- Considering Workload Input Variations in Error Coverage Estimation . . . . . 171  
*P. Folkesson, J. Karlsson (Chalmers University of Technology, Göteborg, Sweden)*

### **Session 5: Fault Injection 2**

*Chair: David Powell, LAAS-CNRS, Toulouse, France*

- Fault Injection into VHDL Models: Experimental Validation of a Fault-Tolerant Microcomputer System . . . . . 191  
*D. Gil (Universidad Politécnica de Valencia, Spain), R. Martínez (Universitat de València, Spain), J.V. Busquets, J.C. Baraza, P.J. Gil (Universidad Politécnica de Valencia, Spain)*

- Can Software Implemented Fault-Injection be Used on Real-Time Systems? . . . . . 209  
*J.C. Cunha (Instituto Superior de Engenharia de Coimbra, Portugal), M.Z. Relá, J.G. Silva (Universidade de Coimbra, Portugal)*

### **Session 6: Safety**

*Chair: Bernd Eschermann, ABB Power Automation AG, Baden, Switzerland*

- Integrated Safety in Flexible Manufacturing Systems . . . . . 229  
*R. Apfeld (Berufsgenossenschaftliches Institut für Arbeitssicherheit, St. Augustin, Germany), M. Umbreit (Fachauschuß Eisen und Metall II, Mainz, Germany)*

- A Method for Implementing a Safety Control System Based on Its Separation into Safety-Related and Non-Safety-Related Parts . . . . . 239  
*T. Shirai, M. Sakai, K. Futsuhara (Nippon Signal Co., Japan), M. Mukaidono (Meiji University, Japan)*

### **Session 7: Hardware Testing**

*Chair: Raimund Ubar, Tallin Technical University, Estonia*

- Design of Totally Self-Checking Code-Disjoint Synchronous Sequential Circuits . 251  
*J.W. Greblicki, S.J. Piestrak (Wrocław University of Technology, Poland)*

Path Delay Fault Testing of a Class of Circuit-Switched Multistage Interconnection Networks . . . . .	267
<i>M. Bellos (University of Patras, Greece), D. Nikolos (University of Patras, and Computer Technology Institute, Patras, Greece), H.T. Vergos (Computer Technology Institute, Patras, Greece)</i>	
Diagnostic Model and Diagnosis Algorithm of a SIMD Computer . . . . .	283
<i>S. Chessa (CNR, Pisa, and University of Trento, Italy), B. Sallay, P. Maestrini (CNR, Pisa, Italy)</i>	
<b>Session 8: Built-In Self-Test</b>	
<i>Chair: Bernd Straube, Fraunhofer Gesellschaft, Institute for Integrated Circuits, Germany</i>	
Pseudorandom, Weighted Random and Pseudoexhaustive Test Patterns Generated in Universal Cellular Automata . . . . .	303
<i>O. Novák (Technical University Liberec, Czech Republic)</i>	
A New LFSR with D and T Flip-Flops as an Effective Test Pattern Generator for VLSI Circuits . . . . .	321
<i>T. Garbolino, A. Hławiczka (Silesian Technical University of Gliwice, Poland)</i>	
Transparent Word-Oriented Memory BIST Based on Symmetric March Algorithms	339
<i>V.N. Yarmolik (Belorussian State University, Minsk, Belarus, and Bialystok University of Technology, Poland), I.V. Bykov (Belorussian State University, Minsk, Belarus), S. Hellebrand, H.-J. Wunderlich (University of Stuttgart, Germany)</i>	
<b>Session 9: Networks and Distributed Systems</b>	
<i>Chair: Gilles Muller, INRIA/IRISA, Rennes, France</i>	
Achieving Fault-Tolerant Ordered Broadcasts in CAN . . . . .	351
<i>J. Kaiser, M.A. Livani (University of Ulm, Germany)</i>	
Directional Gossip: Gossip in a Wide Area Network . . . . .	364
<i>M.-J. Lin (University of Texas at Austin, USA), K. Marzullo (University of California, San Diego, USA)</i>	
Efficient Reliable Real-Time Group Communication for Wireless Local Area Networks . . . . .	380
<i>M. Mock (GMD, St. Augustin, Germany), E. Nett (University of Magdeburg, Germany), S. Schemmer (GMD, St. Augustin, Germany)</i>	
<b>Session 10: Software Testing and Self-Checking</b>	
<i>Chair: Luca Simoncini, CNUCE/CNR, Pisa, Italy</i>	
A Case Study in Statistical Testing of Reusable Concurrent Objects . . . . .	401
<i>H. Waeselync, P. Thévenod-Fosse (LAAS-CNRS, Toulouse, France)</i>	

Fault-Detection by Result-Checking for the Eigenproblem . . . . . 419  
*P. Prata (Universidade da Beira Interior, Covilhã, Portugal),*  
*J.G. Silva (Universidade de Coimbra, Portugal)*

Concurrent Detection of Processor Control Errors by Hybrid Signature Monitoring 437  
*Y.-Y. Chen (Chung-Hua University, Hsin-Chu, Taiwan)*

**Author Index** . . . . . 455