



# DSN

**Final Program**

**2002**

THE INTERNATIONAL CONFERENCE ON

## DEPENDABLE SYSTEMS AND NETWORKS



Sponsored by IEEE CS TC on  
Fault-Tolerant Computing and IFIP WG 10.4



**June 23–26, 2002**  
**Washington, D.C., USA**

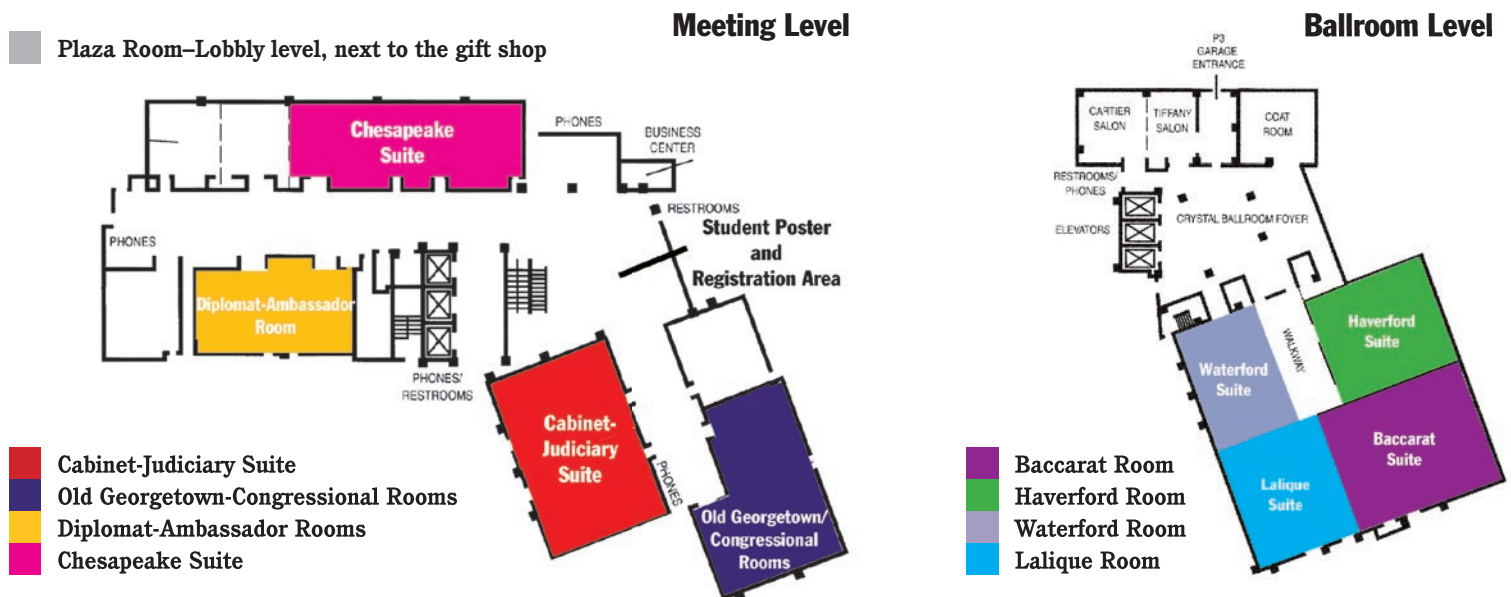


**Waterford-Lalique Rooms**

- 7:30–8:30** *Registration (Meeting Level) and Continental Breakfast (Meeting- and Ballroom-Level Foyers)*
- 8:30–8:45 Opening Remarks  
*Jay Lala, DSN General Chair*
- 8:45–8:55 Jean-Charles Fabre and Farnam Jahanian, DSN Program Co-Chairs
- 8:55–9:00 Sachin Garg and Zbigniew Kalbarczyk, IPDS Program Co-Chairs
- 9:00–9:05 Carter Award Presentation  
*William Sanders, TC Chair, and Jean Arlat, IFIP Chair*
- 9:05–9:10 Student Travel Award Presentations  
*Nuno Neves, Student Forum Chair*
- 9:10–9:15 Keynote Speaker Introduction  
*Jay Lala*
- 9:15–9:45 Keynote Speech  
*The Honorable Richard M. Russell*
- 9:45–10:00 Questions for Keynote Speaker  
*Jay Lala, Moderator*
- 10:00–10:30** *Break*
- 12:00–13:30** *Lunch*
- 13:00–13:30 Awards Presentations
  - 2002 IEEE Emanuel R. Piore Award to Brian Randell
  - IEEE Fellow Award to Nirmal Saxena
  - IEEE Fellow Award to Takashi Nanya



**Guide to Meeting Rooms**



# PROGRAM AT-A-GLANCE

Sunday, June 23, 2002

7:30–20:30 — Registration (Ballroom-Level Foyer)

8:00–12:00

8:00–12:00	
<b>Tutorial #1</b> Waterford Room	<b>Tutorial #2</b> Haverford Room
<i>Fault Tolerance Against Design Faults</i> Co-chairs: Bev Littlewood and Lorenzo Strigini	<i>Power of Negative Thinking</i> Chair: Chuck Howell

12:00–13:30 — Lunch (Cabinet–Judiciary Suite)

13:30–17:30

13:30–17:30	
<b>Tutorial #3</b> Waterford Room	<b>Tutorial #4</b> Haverford Room
<i>Safety Cases SOUP/COTS</i> Co-chairs: Robin Bloomfield and Peter Bishop	<i>Intrusion-Tolerant Systems</i> Chair: Paulo Veríssimo

17:30 — Tutorials Adjourn

18:00–21:00 — Reception (Fellini's Restaurant, Lobby-Level)

# PROGRAM AT-A-GLANCE

**Monday, June 24, 2002**

**7:30–8:30 — Registration (Ballroom Foyer) and Continental Breakfast (Meeting- and Ballroom-Level Foyers)**

**8:30–10:00 — Plenary Session (Waterford-Lalique Rooms)**

**10:00–10:30 — Break (Meeting- and Ballroom-Level Foyers)**

**10:30–12:00**

<b>DCC Session 1A</b> Baccarat Room	<b>DCC Session 1B</b> Cabinet-Judiciary Suites	<b>IPDS Session 1C</b> Haverford Room	<b>Workshop #1</b> Old Georgetown- Congressional Suites	<b>Workshop #2</b> Diplomat-Ambassador Suites
<i>Distributed Systems I</i>	<i>Practical Experience Reports I</i>	<i>Practical Experience Reports</i>	<i>Intrusion-Tolerant Systems</i>	<i>Robotics and Dependability</i>

**12:00–13:30 — Lunch and Awards (Waterford-Lalique Rooms)**

**13:30–15:30**

<b>DCC Session 2A</b> Baccarat Room	<b>DCC Session 2B</b> Cabinet-Judiciary Suites	<b>IPDS Session 2C</b> Haverford Room	<b>Workshop #1 (cont'd.)</b> Old Georgetown- Congressional Suites	<b>Workshop #2 (cont'd.)</b> Diplomat-Ambassador Suites
<i>Dependable Networking</i>	<i>Student Forum</i>	<i>Security and Fault Tolerance</i>	<i>Intrusion-Tolerant Systems</i>	<i>Robotics and Dependability</i>

**15:30–16:00 — Break (Meeting- and Ballroom-Level Foyers)**

**16:00–17:30**

<b>DCC Session 3A</b> Baccarat Room	<b>DCC Session 3B</b> Cabinet-Judiciary Suites	<b>IPDS Session 3C</b> Haverford Room	<b>Workshop #1 (cont'd.)</b> Old Georgetown- Congressional Suites	<b>Workshop #2 (cont'd.)</b> Diplomat-Ambassador Suites
<i>Modeling and Evaluation</i>	<i>Software Techniques</i>	<i>Modeling, Simulation and Evaluation Tools</i>	<i>Intrusion-Tolerant Systems</i>	<i>Robotics and Dependability</i>

**17:30 — Day One Adjourns**

# PROGRAM AT-A-GLANCE

**Tuesday, June 25, 2002**

**8:00–9:00 — Registration (Ballroom Foyer) and Continental Breakfast (Meeting- and Ballroom-Level Foyers)**

**8:30–10:00**

DCC Session 4A Baccarat Room	DCC Session 4B Cabinet-Judiciary Suites	IPDS Session 4C Haverford Room	Workshop #3 Old Georgetown- Congressional Rooms	Workshop #4 Lalique Room
<i>Distributed Systems II</i>	<i>Practical Experience Reports II</i>	<i>Performance and Dependability Modeling</i>	<i>Dependability of e-Commerce Systems</i>	<i>Joint IPDS Panel on Dependability Benchmarking: Methods, Techniques and Approaches</i>

**10:00–10:30 — Break (Meeting- and Ballroom-Level Foyers)**

**10:30–12:30**

DCC Session 5A Baccarat Room	DCC Session 5B Cabinet-Judiciary Suites	IPDS Session 5C Haverford Room	Workshop #3 (cont'd.) Old Georgetown- Congressional Rooms	Workshop #4 (cont'd.) Lalique Room
<i>Security and Intrusion Tolerance</i>	<i>Fast Abstracts I</i>	<i>Fault Tolerant Design and Evaluation</i>	<i>Dependability of e-Commerce Systems</i>	<i>Dependability Benchmarking</i>

**12:30–14:00 — Lunch (Fellini's Restaurant–Lobby Level)**

**14:00–16:00**

DCC Session 6A Baccarat Room	DCC Session 6B Cabinet-Judiciary Suites	IPDS Session 6C Haverford Room	Workshop #3 (cont'd.) Old Georgetown- Congressional Rooms	Workshop #4 (cont'd.) Lalique Room
<i>Panel on Dependability and the Grid</i>	<i>Software and System Demonstrations</i>	<i>Modeling Techniques</i>	<i>Dependability of e-Commerce Systems</i>	<i>Dependability Benchmarking</i>

**16:00 — Day Two Adjourns**

**17:30 — Buses depart from Lobby front door**

**18:00–22:00 — Dinner Cruise on the Potomac (Tickets are required; business casual attire; no jeans or shorts.)**

# PROGRAM AT-A-GLANCE

**Wednesday, June 26, 2002**

**8:00–9:00 — Registration (Ballroom Foyer) and Continental Breakfast (Meeting- and Ballroom-Level Foyers)**

**8:30–10:00**

DCC Session 7A Baccarat Room	DCC Session 7B Cabinet-Judiciary Suites	IPDS Session 7C Haverford Room	Workshop #5 Waterford Room	Workshop #6 Chesapeake Suite
<i>Group Communication</i>	<i>Practical Experience Reports III</i>	<i>Invited Industry Session Measurement and Evaluation</i>	<i>Dependable Middleware-based Systems</i>	<i>Scalable Uninterruptible Computing</i>

**10:00–10:30 — Break (Meeting- and Ballroom-Level Foyers)**

**10:30–12:30**

DCC Session 8A Baccarat Room	DCC Session 8B Cabinet-Judiciary Suites	IPDS Session 8C Haverford Room	Workshop #5 (cont'd.) Waterford Room	Workshop #6 (cont'd.) Chesapeake Suite
<i>Consensus and Failure Detectors</i>	<i>Fast Abstracts II</i>	<i>Internet Performance and Dependability</i>	<i>Dependable Middleware-based Systems</i>	<i>Scalable Uninterruptible Computing</i>

**12:30–14:00 — Lunch (Fellini's Restaurant–Lobby Level)**

**14:00–16:00**

DCC Session 9A Plaza Room—Lobby	DCC Session 9B Cabinet-Judiciary Suites	IPDS Session 9C Old Georgetown- Congressional Rooms	Workshop #5 (cont'd.) Chesapeake Suite	
<i>Hardware Architecture and Design</i>	<i>Detection and Correction</i>	<i>Modeling, Measurement and Analysis of Distributed Systems</i>	<i>Dependable Middleware-based Systems</i>	

**16:00 — DSN 2002 Conference Adjourns**

**16:30–17:30 — IEEE Technical Committee on Fault-Tolerant Computing Business Meeting (All are invited to attend.)  
(Cabinet-Judiciary Suites)**

10:30–12:00

### DCC Session 1A (Baccarat Room)

#### Distributed Systems I

Chair: Brian Randell

#### ■ Exactly-once Delivery in a Content-based Publish-Subscribe System

*Sumeer Bhola, Robert Strom, Saurabh Bagchi, Yuanyuan Zhao and Joshua Auerbach (IBM T. J. Watson Research Center, Yorktown Heights, N.Y., USA)*

#### ■ An Adaptive Framework for Tunable Consistency and Timeliness Using Replication

*Sudha Krishnamurthy and William Sanders (Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, Ill., USA), Michel Cukier (University of Maryland, College Park, Md., USA)*

#### ■ Generic Timing Fault Tolerance Using a Timely Computing Base

*António Casimiro and Paulo Veríssimo (Faculdade de Ciências, Universidade de Lisboa, Lisboa, PORTUGAL)*

### DCC Session 1B (Cabinet-Judiciary Suites)

#### Practical Experience Reports I

Chair: Jim Plank

#### ■ Lessons Learned in Building a Fault-Tolerant CORBA System

*Priya Narasimhan (Carnegie Mellon University, Pittsburgh, Pa., USA), Louise Moser and Michael Melliard-Smith (University of California, Santa Barbara, Calif., USA)*

#### ■ Model-Checking Safety Properties of Servo-Loop Control Systems

*Edwin Johnson (ITT Industries, Reston, Va., USA)*

#### ■ Formal Development of an Embedded Verifier for Java Card Byte Code

*Ludovic Casset, Lilian Burdy and Antoine Requet (Gemplus Research Lab, Gémonos, FRANCE)*

### IPDS Session 1C (Haverford Room)

#### Practical Experience Reports

Chair: Henrique Madeira

#### ■ Measuring End-User Availability on the Web: Practical Experience

*Matthew Merzbacher and Dan Patterson (Computer Science Division, University of California, Berkeley, Calif., USA)*

#### ■ Advanced Pattern Recognition for Detection of Complex Software Aging Phenomena in Online Transaction Processing Servers

*Karen Cassidy (SmartSignal Corp., Lisle, Ill., USA), Kenny Gross (Sun Microsystems, San Diego, Calif., USA), Amir Malekpour (Sun Microsystems, Palo Alto, Calif., USA)*

■ **JACA: A Reflective Fault Injection Tool Based on Patterns**  
*Eliane Martins, Cecilia Mary, Fisher Rubira, Nelson Guilherme and Mendes Leme (Institute of Computing, State University of Campinas, Campinas, BRAZIL)*

■ **Automatic Generation of Availability Models in RAScad**  
*Dong Tang, Ji Zhu and Roy Andrada (Sun Microsystems, Palo Alto, Calif., USA)*

### Workshop #1 (Old Georgetown-Cong. Suites)

#### Intrusion-Tolerant Systems

Co-chairs: Steven Bellovin and Carl Landwehr

*Moderator: Carl Landwehr*

(order subject to change)

■ **An Adaptive Intrusion-Tolerant Server Architecture**  
*Al Valdes (SRI International, USA)*

■ **The Willow Architecture**  
*John Knight (University of Virginia, Charlottesville, Va., USA)*

■ **Intrusion Tolerance Through Unpredictable Adaptation (ITUA)**

*Franklin Webber (BBN Technologies, USA)*

■ **Hierarchical Adaptive Control for QoS Intrusion Tolerance (HACQIT)**

*James Just (Teknowledge Corp., USA)*

■ **Intrusion-Tolerant Database System (ITDB)**  
*Peng Liu (University of Maryland–Baltimore County, USA)*

■ **A Middleware Architecture for Intrusion- and Fault-Tolerant Service Replication**

*Paul Ezilchelvan, University of Newcastle, Newcastle, UK)*

■ **SPECIAL NOTE: Demonstrations will be conducted during lunch in this room.**

### Workshop #2 (Diplomat-Amb. Suites)

#### Robotics and Dependability

Co-chairs: Raja Chatila and Jean-Claude Laprie

#### ■ Setting the Stage

*Jean-Claude Laprie and Raja Chatila (LAAS-CNRS, Toulouse, FRANCE)*

■ **Dependability and Control Architectures for Autonomous Robots**

*Raja Chatila (LAAS-CNRS, Toulouse, FRANCE)*

■ **Speaker on Dependability**



13:30–15:30

### DCC Session 2A (Baccarat Room)

#### Dependable Networking

Chair: Elmootabellah Elnozahy

- **Detection of Invalid Routing Announcement in the Internet**  
*Xiaoliang Zhao (North Carolina State University, Raleigh, N.C., USA), Dan Pei, Lan Wang and Lixia Zhang (University of California, Los Angeles, Calif., USA), Daniel Massey and Allison Mankin (University of Southern California Information Sciences Institute, Arlington, Va., USA), Felix Wu (University of California, Davis, Calif., USA)*
- **An Adaptive Architecture for Monitoring and Failure Analysis of High-Speed Networks**  
*Benjamin Floering, Benjamin Brothers, Zbigniew Kalbarczyk and Ravishankar Iyer (Center for Reliable and High-Performance Computing, University of Illinois at Urbana-Champaign, Urbana, Ill., USA)*
- **Edge-Based Fault Detection in a DiffServ Network**  
*Aaron Striegel and G. Manimaran (Dependable Computing and Networking Laboratory, Dept. of Electrical and Computer Engineering, Iowa State University, Ames, Iowa, USA)*
- **An Evaluation of Connectivity in Mobile Wireless Ad Hoc Networks**  
*Paolo Santi (Istituto di Matematica Computazionale, CNR, Pisa, ITALY), Douglas Blough (Georgia Institute of Technology, Atlanta, Ga., USA)*

### DCC Session 2B (Cabinet-Judiciary Suites)

#### Student Forum

Chair: Nuno Neves

### IPDS Session 2C (Haverford Room)

#### Security and Fault Tolerance

Chair: Tim Tsai

- **Evaluating the Security Threat of Firewall Data Corruption Caused by Instruction Transient Errors**  
*Shuo Chen, Jun Xu, Keith Whisnant and Ravishankar Iyer (Center for Reliable and High-Performance Computing, University of Illinois at Urbana-Champaign, Urbana, Ill., USA)*
- **Modeling and Quantification of Security Attributes of Software Systems**  
*Bharat Madan, Kalyanaraman Vaidyanathan and Kishor Trivedi (Dept. of ECE, Duke University, Durham, N.C., USA), Katerina Goseva-Popstojanova (Dept. of Computer Science and Electrical Engineering, West Virginia University, Morgantown, W. Va., USA)*
- **Step-wise Construction and Refinement of Dependability Models**  
*Claudia Betous-Almeida and Karama Kanoun (LAAS-CNRS, Toulouse, France)*

#### ■ Ditto Processor

*Shih-Chang Lai (Dept. of ECE, Oregon State University, Corvallis, Ore., USA), Shih-Lien Lu and Konrad Lai (Microprocessor Research Labs, Intel Corp., USA), Jih-Kwon Peir (Dept. of Computer Science, University of Florida, Gainesville, Fla., USA)*

### Workshop #1 (Old Georgetown-Cong. Suites)

#### Intrusion-Tolerant Systems

Co-chairs: Steven Bellovin and Carl Landwehr

#### ■ Red Team Panel

*Moderator: Steven Bellovin*

*Panelists: Fred Avolio, Avolio Consulting Inc.; Bill Cheswick, Lumeta Inc.; Sekar Chandrasekaran, Institute for Defense Analysis*

- **SPECIAL NOTE: Demonstrations will be conducted from 15:00–15:30 in this room.**

### Workshop #2 (Diplomat-Amb. Suites)

#### Robotics and Dependability

Co-chairs: Raja Chatila and Jean-Claude Laprie

- **Towards Automatic Verification of Autonomous Systems**  
*Reid Simmons (Carnegie Mellon University, Pittsburgh, Pa., USA)*
- **Dependability and Safety Issues with Medical Robots**  
*Russ Taylor (Johns Hopkins University, Baltimore, Md., USA)*
- **Speaker on Dependability**

16:00–17:30

### DCC Session 3A (Baccarat Room)

#### Modeling and Evaluation

Chair: Andrea Bondavalli

- **Model-Checking Performance Properties**  
*Boudewijn Haverkort and Lucia Cloth (Dept. of Computer Science, RWTH Aachen, GERMANY), Holger Hermanns and Joost-Pieter Katoen (Dept. of Computer Science, University of Twente, Enschede, NETHERLANDS), Christel Baier (University of Bonn, GERMANY)*
- **Process Modeling to Support Dependability Arguments**  
*Robin Bloomfield and Sofia Guerra (Adelard and CSR, City University, London, UK)*
- **On the Use of Disaster Prediction for Failure Tolerance in Feedback Control Systems**  
*João Cunha and Marió Zenha Relá (Dep. Engenharia Informatica e de Sistemas Instituto Superior de Engenharia de Coimbra, Coimbra, PORTUGAL), João Gabriel Silva (Dep. Engenharia Informatica, Universidade de Coimbra, Coimbra, PORTUGAL)*



## DCC Session 3B (Cabinet-Judiciary Suites)

### Software Techniques

Chair: Hermann Kopetz

#### ■ On the Placement of Software Mechanisms for Detection of Data Errors

*Martin Hiller, Arshad Jhumka and Neeraj Suri (Dept. of Computer Engineering, Chalmers University of Technology, Göteborg, SWEDEN)*

#### ■ Robust Software—No More Excuses

*John DeVale and Phil Koopman (Dept. of ECE, Carnegie Mellon University, Pittsburgh, Pa., USA)*

#### ■ Increasing the Robustness of C-libraries using Robustness Wrappers

*Christof Fetzer and Zhen Xiao (AT&T Labs Research, Florham Park, N.J., USA)*

## IPDS Session 3C (Haverford Room)

### Modeling, Simulation and Evaluation Tools

(Short presentations of tools followed by on-site demonstrations)

Chair: Mohamed Kaaniche

#### ■ CAVEAT: A Tool for Software Validation

*P. Baudin, A. Pacalet, Jacques Raguideau, D. Schoen, N. Williams (CEA Saclay, DTSS-SLA, Paris, FRANCE)*

#### ■ CLAIRE: An Event-Driven Simulation Tool for Test and Validation of Software Programs

*Adriana Carloganu and Jacques Raguideau (CEA Saclay, DTSS-SLA, Paris, FRANCE)*

#### ■ C-Sim: The C Language Enhancement for Discrete-Time Systems Simulation

*Jan Hlavicka (Czech Technical University, Prague, CZECH REPUBLIC), Stanislav Racek (University of West Bohemia, Pilsen, CZECH REPUBLIC)*

#### ■ DrawNet++: A Flexible Framework for Building Dependability Models

*G. Franceschinis, C. Bertinello (Università del Piemonte Orientale, Torino, ITALY), M. Gribaudo (Università di Torino, Torino, ITALY), M. Iacono (Seconda Università di Napoli, Aversa, ITALY), V. Vittorini (Università di Napoli "Federico II", Napoli, ITALY)*

#### ■ Libsafe: Transparent Systemwide Protection against Buffer Overflow Attacks

*Tim Tsai and N. Singh (Avaya Labs Research, Basking Ridge, N.J., USA)*

#### ■ NFTAPE: Networked Fault Tolerance and Performance Evaluator

*D. Stott, P.H. Jones, Michael Hamman, Zbigniew Kalbarczyk and Ravishankar Iyer (Center for Reliable and High-Performance Computing, University of Illinois at Urbana-Champaign, Urbana, Ill., USA)*

#### ■ PhFit: A General Phase-type Fitting Tool

*Andrea Bobbio (DISTA, Università del Piemonte Orientale, Alessandria, ITALY), Andras Horvath and Miklos Telek (Dep. of Telecommunications, Budapest University of Technology and Economics, Budapest, HUNGARY)*

#### ■ SHARPE 2002: Symbolic Hierarchical Automated Reliability and Performance Evaluator

*Kishor Trivedi (Center for Advanced Computing and Communication, Dept. of Electrical and Computer Engineering, Duke University, Durham, N.C., USA)*

#### ■ SMART: Stochastic Model Analyzer for Reliability and Timing

*Gianfranco Ciardo, R. L. Jones, III, R. M. Marmorstein and R. Siminiceanu (Dept. of Computer Science, College of William and Mary, Williamsburg, Va., USA), Andrew Miner (Dept. of Computer Science, Iowa State University, Ames, Iowa, USA)*

#### ■ SREPT: A Tool for Software Reliability Estimation and Prediction

*Kishor Trivedi (Center for Advanced Computing and Communication, Dept. of Electrical and Computer Engineering, Duke University, Durham, N.C., USA)*

#### ■ Xception™—Enhanced Automated Fault-Injection Environment

*Ricardo Maia, L. Henriques and Diamantino Costa (Critical Software, Coimbra, PORTUGAL), Henrique Madeira (Universidade de Coimbra, Coimbra, PORTUGAL)*

## Workshop #1 (Old Georgetown-Cong. Suites)

### Intrusion-Tolerant Systems

Co-chairs: Steven Bellovin and Carl Landwehr

#### ■ Rebuttal, Summary and R&D Discussions

*Moderator: Carl Landwehr*

*Panelists: Fred Schneider, Cornell University; Michael Reiter, Carnegie Mellon University; John McLean, Naval Research Laboratory; Paulo Verissimo, Universidade de Lisboa; and Richard Hale, U.S. Defense Information Systems Agency*

#### ■ SPECIAL NOTE: Demonstration will be conducted from 17:00–18:00 in this room.

## Workshop #2 (Diplomat-Amb. Suites)

### Robotics and Dependability

Chairs: Raja Chatila and Jean-Claude Laprie

#### ■ Panel Discussion

*Moderators: Jean-Claude Laprie and Raja Chatila*

8:30–10:00

**DCC Session 4A (Baccarat Room)**

**Distributed Systems II**

Chair: Luca Simoncini

- **Hydra: Secure Replication on the Internet**  
*Christian Cachin and Jonathan Poritz (IBM Research, Zurich Research Laboratory, Rüschlikon, SWITZERLAND)*
- **Coordination of Mobile Processes with Mobile Groups**  
*Raimundo de A Macédo and Flávio M Assis Silva (Distributed System Laboratory–LaSiD Federal University of Bahia, Salvador-BA, BRAZIL)*
- **Optimizing Buffer Management for Reliable Multicast**  
*Zhen Xiao (AT&T Labs Research, Florham Park, N.J., USA)*  
*Kenneth Birman and Robert van Renesse (Dept. of Computer Science, Cornell University, Ithaca, N.Y., USA)*

**DCC Session 4B (Cabinet-Juciciary Suites)**

**Practical Experience Reports II**

Chair: Basil Smith

- **Reliability and Survivability in the Reduced Ship's Crew by Virtual Presence System**  
*Gary Schwartz (Charles Stark Draper Laboratory Inc., Cambridge, Mass., USA)*
- **Impact of Deep Submicron Technology on Dependability of VLSI Circuits**  
*Constantinescu Cristian (Intel Corp., Hillsboro, Ore., USA)*
- **Experimental Evaluation of Time-redundant Execution for a Brake-by-wire Application**  
*Joakim Aidemark, Jonny Vinter, Peter Folkesson and Johan Karlsson (Dept. of Computer Engineering, Chalmers University of Technology, Göteborg, SWEDEN)*

**IPDS Session 4C (Haverford Room)**

**Performance and Dependability Modeling**

Chair: Aad van Moorsel

- **Performance Analysis of a Consensus Algorithm Combining Stochastic Activity Networks and Measurements**  
*Andrea Coccoli (CNUCE-CNR, Pisa, ITALY), Peter Urban and Andre Schiper (Ecole Polytechnique Fédérale de Lausanne, Lausanne, SWITZERLAND), Andrea Bondavalli (Università di Firenze, Firenze, ITALY)*
- **Performability Analysis of Guarded-Operation Duration: A Successive Model-Translation Approach**  
*Ann Tai and Kam Tso (IA Tech, Inc. Los Angeles, Calif., USA), William Sanders (Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, Ill., USA), Leon Alkalai and Savio Chau (Jet Propulsion Laboratory, Pasadena, Calif., USA)*

- **A Simple Characterization of Provably Efficient Prefetching Algorithms**

*Wei Jin, Rakesh Barve and Kishor Trivedi (Center for Advanced Computing and Communication, Dept. of ECE, Duke University, Durham, N.C., USA)*

**Workshop #3 (Old Georgetown-Cong. Suites)**

**Dependability of e-Commerce Systems**

Co-chairs: Lisa Spainhower, Nicholas Bowen and Steven Hunter

- **Introductory Remarks**

*Lisa Spainhower*

**Section 1**

- **Internet-based Business: Dependability Opportunities and Challenges**

*John Patrick, Attitude LLC*

*Eric Siegel, Keynote Systems Inc.*

**Workshop #4 (Lalique Room)**

**Dependability Benchmarking—Methods, Techniques and Approaches**

Co-chairs: Philip Koopman and Henrique Madeira

- **Joint Panel with IPDS on Dependability Benchmarking**

*Moderator: Ravi Iyer*

*Panelists: Gunter Heiner (Daimler-Chrysler, GERMANY), Karama Kanoun (LAAS-CNRS, Toulouse, FRANCE), Haim Levendel (Motorola, USA), Brendan Murphy (Microsoft, Cambridge, UK), Larry Votta (Sun Microsystems, USA)*

*Organizers: Ravi Iyer and Zbigniew Kalbarczyk (Center for Reliable and High-Performance Computing, University of Illinois at Urbana-Champaign, Urbana, Ill., USA), Philip Koopman (Dept. of ECE, Carnegie Mellon University, Pittsburgh, Pa., USA), Henrique Madeira (Universidade de Coimbra, Coimbra, PORTUGAL)*

10:30–12:30

**DCC Session 5A (Baccarat Room)**

**Security and Intrusion Tolerance**

Chair: Yves Deswarte

- **Masquerade Detection**

*Roy Maxion and Tahlia Townsend (Dependable Systems Laboratory, Carnegie Mellon University, Pittsburgh, Pa., USA)*

- **Quantifying the Cost of Providing Intrusion Tolerance in Group Communication Systems**

*HariGovind Ramasamy, Prashant Pandey, James Lyons and William Sanders (Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, Ill., USA), Michel Cukier (University of Maryland, College Park, Md., USA)*

■ **Developing a Heterogeneous Intrusion-Tolerant CORBA System**

*Durward McDonell, Brian Niebuhr, Brian Matt, David Sames, Gregg Tally, Szu-Chien Wang and Brent Whitmore (NAI Labs–Network Associates Inc., Glennwood, Md., USA), David Bakken (Washington State University, Pullman, Wash., USA)*

■ **Distributed Object Middleware to Support Dependable Information Sharing between Organisations**

*Nick Cook and Santosh Shrivastava (Dept. of Computing Science, University of Newcastle, Newcastle, UK), Stuart Wheeler (HP Arjuna Lab, Newcastle, UK)*

**DCC Session 5B (Cabinet-Judiciary Suites)**

**Fast Abstracts I**

Chair: David Bakken

**IPDS Session 5C (Haverford Room)**

**Fault-Tolerant Design and Evaluation**

Chair: Rick Harper

■ **An Experimental Evaluation of the REE SIFT Environment for Spaceborne Applications**

*Keith Whisnant, Ravi Iyer and Phillip Jones (Center for Reliable and High-Performance Computing, University of Illinois at Urbana-Champaign, Urbana, Ill., USA), David Rennels (University of California, Los Angeles, Calif., USA), Raphael Some (Jet Propulsion Laboratory, Pasadena, Calif., USA)*

■ **Pinpoint: Problem Determination in Large, Dynamic Systems**

*Mike Chen and Eric Brewer (Computer Science Division, University of California, Berkeley, Calif., USA) Emre Kiciman, Eugene Fratkin and Armando Fox (Stanford University, Stanford, Calif., USA)*

■ **Minimizing Mean-Time-To-Recover in a Recursively Restartable Software System**

*George Candea, James Cutler, Armando Fox, Rushabh Doshi, Priyank Garg and Rakesh Gowda (Stanford University, Stanford, Calif., USA)*

■ **Recovery and Performance Balance of a COTS DBMS in the Presence of Operator Faults**

*Marco Vieira (ISEC Polytechnic Instituto de Coimbra, Coimbra, PORTUGAL), Henrique Madeira (DEI-FCTUC, Universidade de Coimbra, Coimbra, PORTUGAL)*

**Workshop #3 (Old Georgetown-Cong. Suites)**

**Dependability of e-Commerce Systems**

Co-chairs: Lisa Spainhower, Nicholas Bowen and Steven Hunter

**Section 1 (cont'd.)**

■ **Internet-based Business: Dependability Opportunities and Challenges**

*Carl Hutzler (AOL Time-Warner, USA)*

■ **Section 1 Q&A**

**Section 2**

■ **Internet-based Business: Perspective of Major IT Vendors**  
*Matthew Kerner (Microsoft Corp., USA)*

**Workshop #4 (Lalique Room)**

**Dependability Benchmarking—Methods, Techniques and Approaches**

Co-chairs: Philip Koopman and Henrique Madeira

■ **Progress on Defining Standardized Classes for Comparing the Dependability of Computer Systems\*\***

*Don Wilson (Compaq/Tandem Labs, USA), Lisa Spainhower (IBM, USA), Brendan Murphy (Microsoft, Cambridge, UK)*

■ **A Framework for Dependability Benchmarking\***

*Karama Kanoun (LAAS-CNRS, FRANCE), Henrique Madeira (Universidade de Coimbra, Coimbra, PORTUGAL), Jean Arlat (LAAS-CNRS, FRANCE)*

■ **Including the Human Factor in Dependability Benchmarks\*\***

*Aaron Brown, Leonard Chung and David Patterson (University of California, Berkeley, Calif., USA)*

■ **Benchmarking Semantic Availability of Dynamic Data Feeds\***

*Orna Raz, Philip Koopman and Mary Shaw (Carnegie Mellon University, Pittsburgh, Pa., USA)*

■ **Using Bayesian Theory for Estimating Dependability Benchmark Measures\***

*Michel Cukier and Carol Smidts (University of Maryland, College Park, Md., USA)*

■ **Empirical Evaluation of Techniques and Methods Used for Achieving and Assessing High Dependability\***

*Ioana Rus (Fraunhofer Center for Empirical Software Engineering, USA), Victor Basili and Marvin Zelkowitz (University of Maryland, College Park, Md., USA), Barry Boehm (University of Southern California, USA)*

■ **Questions for Panel of Presenters**

*Moderator: Philip Koopman*

*Note: \* = position; \*\* = paper*

**13:30–15:30**

**DCC Session 6A (Baccarat Room)**

**Panel on Dependability and the Grid**

Moderator: Richard Schlichting

*Panelists:*

*Andrew Chien (University of California–San Diego, San Diego, Calif., USA), Jim Plank (University of Tennessee, Nashville, Tenn., USA), Santosh Shrivastava (University of Newcastle, UK), Ewa Deelman (University of Southern California Information Sciences Institute, USA), Jeff Nick (IBM, USA)*

## DCC Session 6B (Cabinet-Judiciary Suites)

### Software and System Demonstrations

Chair: Wendy Bartlett

- **MAFALDA-RT: A Tool for Dependability Assessment of Real-Time Systems**  
*Manuel Rodriguez, Arnaud Albinet and Jean Arlat (LAAS-CNRS, Toulouse, FRANCE)*
- **Mr. Fusion: A Programmable Data-Fusion Middleware Sub-system with a Tunable Statistical Profiling Service**  
*Andy Franz, Radek Mista, David Bakken, Curtis Dyreson and Murali Medidi (Washington State University, Pullman, Wash., USA)*
- **A Dependable SNMP-based Tool for Distributed Network Management**  
*Elias Duarte Jr. and Luis De Bona (Dept. of Informatics, Universidade Federal do Paraná, Curitiba, BRAZIL)*
- **The Design and Implementation of an Intrusion-Tolerant System**  
*James Reynolds, James Just, Ed Lawson, Larry Clough and Ryan Maglich (Teknowledge Corp., Fairfax, Va., USA), Karl Levitt (University of California, Davis, Calif., USA)*

## IPDS Session 6C (Haverford Room)

### Modeling Techniques

Chair: Boudewijn Haverkort

- **The Scale Factor: A New Degree of Freedom in Phase Type Approximation**  
*Andrea Bobbio (DISTA, Università del Piemonte Orientale, Alessandria, ITALY), Andras Horvath and Miklos Telek (Dep. of Telecommunications, Budapest University of Technology and Economics, Budapest, HUNGARY)*
- **Efficient State Space Generation of GSPNs Using Decision Diagrams**  
*Andrew Miner (Dept. of Computer Science, Iowa State University, Ames, Iowa, USA)*
- **An Adaptive Decomposition Approach for the Analysis of Stochastic Petri Nets**  
*Peter Buchholz (Institute for Applied Computer Science, Dresden University of Technology, Dresden, GERMANY)*
- **Parallel Randomization for Large Structured Markov Chains**  
*Kemper Peter (Informatik IV, Universität Dortmund, Dortmund, GERMANY)*

## Workshop #3 (Old Georgetown-Cong. Suites)

### Dependability of e-Commerce Systems

Co-chairs: Lisa Spainhower, Nicholas Bowen and Steven Hunter

#### Section 2 (cont'd.)

- **Internet-based Business: Perspective of Major IT Vendors**  
*Stuart Feldman, IBM Corp.*
- **Section 2 Q&A**
- **Section 3**
- **e-Commerce Dependability Papers**

## Workshop #4 (Lalique Room)

### Dependability Benchmarking—Methods, Techniques and Approaches

Co-chairs: Philip Koopman and Henrique Madeira

- **The Set-Check-Use Methodology for Detecting Error Propagation Failure in I/O Routines\*\***  
*Michael Bigrigg and Jacob Vos (Carnegie Mellon University, USA)*
  - **Defect and Fault Seedling in Dependability Benchmarking\***  
*Barry Boehm and Daniel Port (University of Southern California, USA)*
  - **System Recovery Benchmarking\***  
*Ji Zhu, James Mauro and Ira Pramanick (Sun Microsystems, USA)*
  - **Faultload Representativeness for Dependability Benchmarking\***  
*Jean Arlat and Yves Crouzet (LAAS-CNRS, FRANCE)*
  - **What's Wrong with Fault Injection as a Benchmark Tool?\***  
*Philip Koopman (Carnegie Mellon University, Pittsburgh, Pa., USA)*
  - **Questions for Panel of Presenters**  
*Moderator: Henrique Madeira*
- Note: \* = position; \*\* = paper



8:30–10:00

### DCC Session 7A (Baccarat Room)

#### Group Communication

Chair: Matti Hiltunen

#### ■ Reducing the Cost of Group Communication with Semantic View Synchrony

*José Pereira and Rui Oliveira (Universidade do Minho, Braga, PORTUGAL), Luís Rodrigues (Universidade de Lisboa, Lisboa, PORTUGAL)*

#### ■ SWIM: Scalable Weakly-consistent Infection-style Process Group Membership Protocol

*Indranil Gupta, Abhinandan Das and Ashish Motivala (Dept. of Computer Science, Cornell University, Ithaca, N.Y., USA)*

#### ■ Probabilistic Multicast

*Patrick Eugster and Rachid Guerraoui (Swiss Federal Institute of Technology, Lausanne, SWITZERLAND)*

### DCC Session 7B (Cabinet-Juciciary Suites)

#### Practical Experience Reports III

Chair: Eliane Martins

#### ■ Experimental Evaluation of a COTS System for Space Applications

*Henrique Madeira (Universidade de Coimbra, Coimbra, PORTUGAL), Raphael Some (Jet Propulsion Laboratory, Pasadena, Calif., USA), Francisco Moreira and Diamantino Costa (Critical Software, Coimbra, PORTUGAL), David Rennels (University of California, Los Angeles, Calif., USA)*

#### ■ Experimental Analysis of the Errors Induced into Linux by Three Fault Injection Techniques

*Tahar Jarboui, Jean Arlat, Yves Crouzet and Karama Kanoun (LAAS-CNRS, Toulouse, FRANCE)*

#### ■ Reliability and Availability Analysis for the JPL Remote Exploration and Experimentation System

*Dong Chen, Selvamuthu Dharmaraja, Dongyan Chen, Lei Li and Kishor Trivedi (Center for Advanced Computing and Communication, Dept. of Electrical and Computer Engineering, Duke University, Durham, N.C., USA), Raphael Some and Allen Nikora (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif., USA)*

### IPDS Session 7C (Haverford Room)

#### Invited Industry Session—Measurements and Evaluation

Chair: Dong Tang

#### ■ Test and Development Process Retrospective: A Case Study Using ODC Triggers

*R. Chillarege and K. Prasad (Chillarege Inc., New York, USA)*

#### ■ Availability Requirement for a Fault Management Server in High-Availability Communication Systems

*H. Sun, J. Han and H. Levendel (Motorola Inc., Schaumburg, Ill., USA)*

#### ■ Analysis of Failure and Recovery Rates in a Wireless Telecommunications System

*S. Matz, L. Votta and M. Malkawi (Motorola Inc., Arlington Heights, Ill., USA)*

#### ■ Application Performance Assurance via Post-Production Monitoring

*S. Dalal, Yu-Y. Ho, A. Jain and A. McIntosh (Telcordia Technologies, Morristown, N.J., USA)*

### Workshop #5 (Waterford Room)

#### Dependable Middleware-based Systems

##### Session 1—Fault-Tolerant CORBA

Co-chairs: Priya Narashimhan and Pascal Felber

#### ■ Adding Real-Time Support to Fault-Tolerant CORBA

*B. Natarajan and N. Wang (Washington University, St. Louis, Mo., USA), C. Gill (Vanderbilt University, Nashville, Tenn., USA), A. Gokhale and D. Schmidt (University of California, Irvine, Calif., USA)*

#### ■ Characterization Approaches for CORBA Systems by Fault Injection

*Eric Marsden, Jean-Charles Fabre and Jean Arlat (LAAS-CNRS, Toulouse, FRANCE)*

#### ■ A Configurable CORBA Gateway for Providing Adaptable System Properties

*M. Seri, T. Courtney, V. Gupta, Sudha Krishnamurthy, J. Lyons, H. Ramasamy, J. Ren and William Sanders (University of Illinois at Urbana-Champaign, Urbana, Ill., USA), Michel Cukier, University of Maryland, College Park, Md., USA)*

#### ■ Building and Evaluating an FT-CORBA Infrastructure

*D. Szentivanyi and S. Nadjim-Tehrani (Linköpings Universitet, Linköpings, SWEDEN)*

#### ■ Online Upgrades for Java and CORBA

*Lauren Tewksbury, S. Oberg, L. Moser and P. Melliar-Smith (Eternal Systems Inc., Santa Barbara, Calif., USA)*

### Workshop #6 (Chesapeake Suite)

#### Scalable Uninterruptible Computing

Chair: Dimitir Avresky

#### Invited Speakers

#### ■ Network-Centric Infrastructure for Command, Control and Intelligence (NICCI)

*John Salasin (DARPA, Arlington, Va., USA)*

#### ■ Core Technologies for Highly Available and Highly Scalable Commercial Computing

*Lisa Spainhower (IBM, USA)*

#### ■ The Role of Network Storage in Scalable Uninterruptible Computing

*James Plank (Dept of Computer Science, University of Tennessee, Knoxville, Tenn., USA)*

10:30–12:30

## DCC Session 8A (Baccarat Room)

### Consensus and Failure Detectors

Chair: Paulo Verissimo

- **Collapsing the Failure-Detector Hierarchy**  
*Carole Delporte and Hugues Fauconnier (LIAFA, Université de Paris VII, FRANCE), Guerraoui Rachid (Swiss Federal Institute of Technology, Lausanne, SWITZERLAND)*
- **Implementation and Performance Evaluation of an Adaptable Failure Detector**  
*Marin Bertier and Pierre Sens (Laboratoire Informatique, Université de Paris VI, FRANCE), Olivier Marin (Université de Le Havre and LIP6, FRANCE)*
- **A Versatile and Modular Consensus Protocol**  
*Achour Mostefaoui and Michel Raynal (IRISA, Université de Rennes, Rennes, FRANCE), Sergio Rajsbaum (Compaq Research Lab, Cambridge, Mass., USA)*
- **Small Byzantine Quorums**  
*Jean-Philippe Martin, Lorenzo Alvisi and Michael Dahlin (Dept. of Computer Science, University of Texas, Austin, Tex., USA)*

## DCC Session 8B (Cabinet-Judiciary Suites)

### Fast Abstracts II

Chair: Michel Cukier

## IPDS Session 8C (Haverford Room)

### Internet Performance and Dependability

Chair: Andrea Bobbio

- **Resource Management Policies in GPRS Wireless Internet Access Systems**  
*Michela Meo, Marco Ajmone Marsan and Cecilia Batetta (Dip. di Elettronica, Politecnico di Torino, Torino, ITALY)*
- **Evaluating the Impact of Different Document Types on the Performance of Web Cache Replacement Schemes**  
*Christoph Lindemann and Oliver Waldhorst (Dept. of Computer Science, University of Dortmund, Dortmund, GERMANY)*
- **A Validation of the Pseudo Self-Similar Traffic Model**  
*Boudewijn Haverkort, Rachid El Abdouni and Ramin Sadre (Laboratory for Performance Evaluation and Distributed Systems, Dept. of Computer Science, RWTH Aachen, GERMANY)*
- **Evaluation of the Maximum Level Reached by a Queue Over a Finite Period**  
*G. Rubino (IRISA, Université de Rennes, Rennes, FRANCE)*

## Workshop #5 (Waterford Room)

### Dependable Middleware-based Systems

#### Session 2—Dependability and Other “ilities”

Co-chairs: Priya Narashimhan and Pascal Felber

- **A Two-Tier Approach to Building Dependable Middleware Services**  
*Paul Ezhilchelvan and N. Spiers (University of Newcastle, Newcastle, UK)*

- **Middleware Support for Pervasive Dependability**  
*Christof Fetzer and K. Hogstedt (AT&T Labs, USA)*
- **Reachability Snapshots in the Presence of Failures: An Exercise in Protocol-Service Composition**  
*S. Gutierrez-Nolasco and N. Venkatasubramanian (University of California, Irvine, Calif., USA)*
- **A Middleware Service for Dynamic System Reconfiguration in Real-Time, Fault-Tolerant, Distributed-Object Computing Systems**  
*J. Liu and K. Kim (University of California, Irvine, Calif., USA)*
- **Middleware Policies for Intrusion Tolerance**  
*Franklin Webber, Partha Pal, C. Jones, M. Atighetchi and P. Rubel (BBN Technologies, USA)*

## Workshop #6 (Chesapeake Suite)

### Scalable Uninterruptible Computing

Chair: Dimitir Avresky

#### Invited Speakers (cont'd.)

- **The Network Atom of Computing**  
*Micah Beck (Dept of Computer Science, University of Tennessee, Knoxville, Tenn., USA)*
- **Discussion: Scalable Uninterruptible Computing Trends and Future Directions**  
*John Salasin, Lisa Spainhower, James Plank, Micah Beck, Dimitir Avresky, Roy Maxion, F. Lombardi, Barry Johnson and John Hayes*
- **Workshop #6 Adjourns at 12:30**

14:00–16:00

## DCC Session 9A (Plaza Room–Lobby)

### Hardware Architecture and Design

Chair: Takashi Nanya

- **Modeling the Effect of Technology Trends on Soft Error Rate of Combinational Logic**  
*Premkishore Shivakumar, Michael Kistler, Stephen Keckler, Doug Burger and Lorenzo Alvisi (Dept. of Computer Science, University of Texas, Austin, Tex., USA)*
- **Detecting Processor Hardware Faults by Means of Automatically Generated Virtual Duplex Systems**  
*Markus Jochim (Computer Science Dept., University of Essen, GERMANY)*
- **A Portable and Fault-Tolerant Microprocessor Based on the SPARC V8 Architecture**  
*Jiri Gaisler (Gaisler Research, Göteborg, SWEDEN)*
- **Soft Error Sensitivity Characterization for Microprocessor and Dependability Enhancement Strategy**  
*Seongwoo Kim and Arun Somani (Dependable Computing and Networking Laboratory, Dept. of Electrical and Computer Engineering, Iowa State University, Ames, Iowa, USA)*

## DCC Session 9B (Cabinet-Juciciary Suites)

### Detection and Correction

Chair: Jean-Claude Laprie

#### ■ Track-Based Disk Logging

*Tzi-cker Chiueh, Lan Huang (State University of New York, Stony Brook, N.Y., USA)*

#### ■ Transactional Rollback for Language-Based Systems

*Algis Rudys and Dan Wallach (Dept. of Computer Science, Rice University, Houston, Tex., USA)*

#### ■ Time-Constrained Failure Diagnosis in Distributed Embedded Systems

*Nagarajan Kandasamy and John Hayes (Advanced Computer Architecture Lab., University of Michigan, Ann Arbor, Mich., USA)  
Brian Murray (Delphi Automotive Systems, Brighton, Mich., USA)*

#### ■ 32-Bit Cyclic Redundancy Codes for Internet Applications

*Philip Koopman (Dept. of ECE, Carnegie Mellon University, Pittsburgh, Pa., USA)*

## IPDS Session 9C (Old George.-Cong. Suites)

### Modeling, Measurement and Analysis of Distributed Systems

Chair: Gianfranco Ciardo

#### ■ Modeling the Coverage and Effectiveness of Fault-Management Architectures in Layered Distributed Systems

*Olivia Das and C. M. Woodside (Dept. of Systems and Computer Engineering, Carleton University, Ottawa, Ontario, CANADA)*

#### ■ Self-Organizing Systems with Self-Diagnostication

*Kiyooki Yoshida and Yasumasa Sujaku (Kurume Institute of Technology, Kurume, Fukuoka, JAPAN), Tohru Kohda (Kyushu University, Higashi, Fukuoka, JAPAN)*

#### ■ A Compositional Approach to Monitoring Distributed Systems

*Mohammad Zulkernine and Rudolph Seviara (Bell Canada Software Reliability Laboratory, University of Waterloo, Waterloo, Ontario, CANADA)*

#### ■ Validation and Evaluation of a Software Solution for Fault-Tolerant Distributed Synchronization

*Paolo Ballarini, Simona Bernardi and Susanna Donatelli (Dip. di Informatica, Università di Torino, Torino, ITALY)*

## Workshop #5 (Chesapeake Suite)

### Dependable Middleware-based Systems

#### Session 3—Transactions

Co-chairs: Priya Narashimhan and Pascal Felber

#### ■ Deterministic Scheduling and Online Recovery for Replicated Multithreaded Transactional Servers

*R. Jimenez-Peris and M. Patino-Martinez (Universidad Politécnica de Madrid, Madrid, SPAIN)*

#### ■ Strong Replication in the GLOBADATA Middleware

*R. Rodrigues, H. Mitanda, R. Almeida, J. Martins and P. Vicente, (Universidade de Lisboa, Lisboa, PORTUGAL)*

#### ■ Transactional Attitudes: Reliable Enterprise Application Integration Using Web Services

*Thomas Mikalsen, S. Tai and I. Rouvellou (IBM T. J. Watson Research, Yorktown, N.Y., USA)*

#### ■ Lessons Learned from Using Adaptive DOC Middleware in Real Application Contexts

*C. Gill, J. Loyall and R. Schants (Washington University, St. Louis, Mo., USA), D. Schmidt (University of California, Irvine, Calif., USA)*

#### ■ Realizing Software Fault Tolerance in Radar Systems Through Fault-Tolerant Middleware and Fault Injection

*D. Blough (George Institute of Technology, Atlanta, Ga., USA), T. Bracewell (Raytheon, USA), J. Cooper and Robert Oravits (U.S. Army SMDC, Huntsville, Ala., USA)*

#### ■ Testability of Complex Middleware-based System

*D. Wells, R. Bernstein and A. Vadlamundi (Open Group)*

