

# Conference Organization

<b>General Chair:</b>	Per Stenström, Chalmers Univ. of Technology, Sweden
<b>Program Chair:</b>	Michel Dubois, Univ. of Southern California, USA
<b>Tutorials:</b>	Josep Torrellas, Univ. of Illinois, Urbana-Champaign, USA
<b>Workshops:</b>	Fredrik Dahlgren, Ericsson Mobile Communications, Sweden
<b>Publicity and Publications:</b>	Margaret Martonosi, Princeton University, USA
<b>Treasurer:</b>	Erik Hagersten, Uppsala University, Sweden
<b>Local Arrangements:</b>	Ewa Wäingelin and Jan Jonsson, Chalmers Univ. of Technology, Sweden

## ISCA Program Committee

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John P. Shen, Intel/CMU, USA  
Jaswinder Pal Singh, Princeton University, USA  
Guri Sohi, University of Wisconsin-Madison, USA  
Josep Torrellas, University of Illinois, USA  
Dean Tullsen, UC San Diego, USA  
Mateo Valero, UPC, Barcelona, Spain

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David Patterson, Univ. of California, Berkeley, USA  
Guri Sohi, Univ. of Wisconsin-Madison, USA  
Mateo Valero, UPC, Barcelona, Spain

## With support from



## Dates to remember

- Deadline for contribution to pre-conference workshops  
W1 - April 13  
W2 - May 4  
W3 - April 16
- ISCA Student Travel Grants.  
Application deadline April 20
- Deadline for early registration fee May 25
- Deadline for hotel reservation May 29

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## What, Where & When?

### Saturday June 30

- Pre-Conference Registration – Svenska Mässan\*
- Pre-Conference Program: Workshops & Tutorials – Svenska Mässan

### Sunday July 1

- Pre-Conference Registration – Svenska Mässan
- Pre-Conference Program: Workshops & Tutorials – Svenska Mässan
- Conference Registration (evening) – Svenska Mässan
- Get-Together-Cocktail (evening) – Svenska Mässan/Hotel Gothia Towers

### Monday July 2

- DSN & ISCA Conference Registration – Svenska Mässan
- DSN & ISCA Technical Sessions – Svenska Mässan
- Reception hosted by the City of Göteborg – The City Hall

### Tuesday July 3

- Conference Registration – Svenska Mässan
- DSN & ISCA Technical Sessions – Svenska Mässan
- Excursion & Banquet Dinner, Carlstens Fortress, Marstrand

### Wednesday July 4

- Conference Registration – Svenska Mässan
- DSN & ISCA Technical Sessions – Svenska Mässan

\*) Svenska Mässan – The Swedish Exhibition and Congress Centre

# Program at a Glance

 = DSN-Activities     = ISCA-Activities

## Monday, July 2, 2001

08.30-09.05 OPENING REMARKS DSN		08.45-09.05 OPENING REMARKS ISCA	
09.15-10.15 Joint Keynote Speech: Dr Greg Papadopoulos, CTO, Sun Microsystems Inc., USA			
10.15-10.45 COFFEE BREAK			
10.45-12.15 Session 2A – DSN Modeling	10.45-12.15 Session 2B – DSN Algorithms	10.45-12.15 Session 2C – DSN Panel - Dependability of Mobile Networks and Services: Can we rely on them?	10.45-12.15 Session 1 – ISCA Multithreading and Speculation
12.15-13.45 LUNCHEON			
13.45-15.15 Session 3A – DSN Software Demos	13.45-15.15 Session 3B – DSN Replication	13.45-16.30 Session 3/4C – DSN Special Track: European Dependability Initiative	13.45-15.15 Session 2 – ISCA Memory System Issues
15.15-15.45 COFFEE BREAK			
15.45-17.45 Session 4A – DSN Software Robustnes	15.45-17.45 Session 4B – DSN Survivability and Security	13.45-16.30 Session 3/4C – DSN <i>Continuing</i>	15.45-17.15 Session 3 – ISCA Processor Architecture
			ACM SIGARCH and IEEE TCCA Business Meeting
RECEPTION			

## Tuesday, July 3, 2001

08.30-10.00 Session 5A – DSN Wireless and Mobile Communications	08.30-10.00 Session 5B – DSN Student's Cyber Cafe and Poster Session	08.30-15.00 Session 5/6/7C – DSN Information/System Survivability Workshop	09.00-10.00 Session 4 – ISCA Communication Support
10.00-10.30 COFFEE BREAK			
10.30-12.00 Session 6A – DSN Consistency	10.30-12.00 Session 6B – DSN Fast Abstracts 1	08.30-15.00 Session 5/6/7C – DSN <i>Continuing</i>	10.30-12.00 Session 5 – ISCA Cache Management
12.00-13.00 LUNCHEON			
13.00-15.00 Session 7A – DSN Real-Time	13.00-15.00 Session 7B – DSN Testing and Runtime Error Detection	08.30-15.00 Session 5/6/7C – DSN <i>Continuing</i>	12.00-14.00 ISCA AWARD LUNCHEON 14.00-15.00 Session 6A – ISCA Architectural Impact of Emerging Technologies
			14.00-15.00 Session 6B – ISCA Shared-Memory Multiprocessors
EXCURSION AND BANQUET			

## Wednesday, July 4, 2001

08.30-10.00 Session 8A – DSN Models for Fault Tolerance	08.30-10.00 Session 8B – DSN Hardware Architecture and Design	08.30-10.00 Session 7 – ISCA Energy-Effective Designs
10.00-10.30 COFFEE BREAK		
10.30-12.30 Session 9A – DSN Group-Oriented Systems	10.30-12.30 Session 9B – DSN Practical Experience I	10.30-12.00 Session 8 – ISCA Performance Tools and Evaluations
12.30-14.00 LUNCHEON		ADJOURN
14.00-16.00 Session 10A – DSN Practical Experience II	14.00-16.00 Session 10B – DSN Fast Abstracts II	
16.15-17.45 Business Meeting: IEEE Technical Committee on Fault Tolerance		

## ISCA/DSN Workshops & Tutorials

### Saturday, June 30, 2001

09.00 – 17.00 <b>W1</b> Memory Performance Issues	09.00 – 17.00 <b>W2</b> WCED'01 – Complexity Effective Design	09.00 – 12.30 <b>T1</b> VIA and InfiniBand Communication Architecture
		13.30 – 17.00 <b>T2</b> Virtual Machines: Architectures Implementations and Applications

### Sunday, July 1, 2001

09.00 – 17.00 <b>W1</b> <i>Continuing:</i> Memory Performance Issues	09.00 – 17.00 <b>W3</b> EASY: Evaluating and Architecting Systems for Dependability	09.00 – 17.00 <b>T3</b> Power-Efficient Design: Modeling and Optimizations	09.00 – 12.30 <b>T4</b> Fault-tolerant CORBA
			13.30 – 17.00 <b>T5</b> System Survivability Analysis and Simulation

W1 and W2 are hosted by ISCA, W3 is jointly hosted by DSN & ISCA. T1, T2 and T3 are hosted by ISCA and T4 and T5 are hosted by DSN.

## ... two birds with one stone ...

We are entering an exciting new era where computers are becoming ubiquitous and offer information services to everyone, everywhere and anytime. From the users perspective, the key driving force is that these services must be trustworthy; they must be available in a timely and dependable fashion as they will form the foundation for products we rely upon in daily life such as cars, telephones; i.e., information processing in general. This boils down to how we design every single networked computer-based component (HW, SW or middleware) in the information infrastructure to meet the challenging, and often conflicting, requirements regarding performance, power consumption, dependability, safety, security, and cost-effectiveness among others.

DSN-2001 and ISCA-2001 bring over 25 years of experience to stand as the premier forum to present advances in state of the art/use in dependable computing systems and networks (DSN-2001) and high-performance computer system design (ISCA-2001). Needless to say, the arenas of dependability and high-performance are synergistically entwined at all levels of systems design and services! And, for the first time ever, we are hitting two birds with one stone by co-locating these conferences. This provides a unique opportunity, we hope, for researchers across these two disciplines to meet, discuss and jointly pursue new research topics arising from the general industrial and societal needs we are encountering in the IT driven society. We envision a lively interaction between researchers and industrial practitioners to identify issues for the future in the general area of computing.

Locating the conferences in Göteborg is not by chance. Apart from Chalmers University of Technology that traditionally has contributed significantly to these technology areas, Göteborg hosts many world-leading industries such as Volvo, Saab, and Ericsson to mention a few. In addition, the surroundings offer a sample of Scandinavian beauty with its myriad summertime vistas!

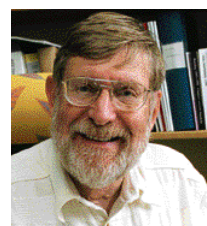
The DSN/ISCA organizing committees have put together a variety of offerings:

- Joint DSN/ISCA: Keynote Speech, Panel, Workshop & Social Events
- Co-located Technical Sessions, Breaking Research Forum, Student Papers
- Tutorial, Academic & Industrial Exhibits and Demonstrators

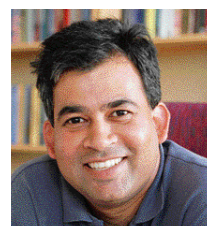
Let's make the co-located DSN and ISCA a melting pot to distil ideas that will have a long-standing impact for the future design of our information infrastructure.



*Per Stenström*  
**ISCA-2001 General Chair**



*Jan Torin & Neeraj Suri*  
**DSN-2001 General and Vice Chair**



# The International Conference on Dependable Systems and Networks

## PROGRAM

Monday, July 2, 2001

8:30 – 10:15

### SESSION 1 PLENARY

Opening Remarks

Presentation of Awards

Joint DSN/ISCA Keynote Speech: The New Software  
*Dr. Greg Papadopoulos, CTO, Sun Microsystems Inc., U.S.A.*

10:45 - 12:15

### SESSION 2A

#### MODELING

The Reliability of Diverse Systems: A Contribution Using Modelling of the Fault Creation Process

*Peter Popov and Lorenzo Strigini (City University)*

Difficulties Measuring Software Risk in an Industrial Environment

*Elaine J. Weyuker (AT&T Labs: Research)*

Techniques for Estimation of Design Diversity for Combinational Logic Circuits

*Subhasish Mitra, Nirmal R. Saxena and Edward J. McCluskey (Stanford University)*

### SESSION 2B

#### ALGORITHMS

Concurrent Error Detection in Fast Unitary Transform Algorithms

*Robert G. Redinbo (University of California, Davis)*

Fault-Tolerant High-Performance Matrix Multiplication: Theory and Practice

*John A. Gunnels and Robert A. van de Geijn (University of Texas at Austin)*

*Daniel S. Katz (Jet Propulsion Laboratory) and Enrique S. Quintana-Orti (Universidad Jaume I)*

How to Model Link Failures: A Perception-Based Fault Model

*Ulrich Schmid (Technical Univ. of Vienna)*

10:45 - 12:15

## SESSION 2C

### PANEL

Dependability of mobile networks and services: Can we rely on them?  
Organizer: *Michele Morganti (Siemens, Italy) and Aad van Moorsel, Hewlett-Packard, USA*

13:45 – 15:15

## SESSION 3A

### SOFTWARE DEMOS

A Checkpointing Tool for Palm Operating System  
*Sy-Yen Kuo, and Chi-Yi Lin (National Taiwan University)*  
*Yennun Huang (AT&T Labs Research)*

Model-Based Synthesis of Fault Trees from Matlab-Simulink Models  
*Yiannis I. Papadopoulos (University of York) and Matthias Maruhn (DaimlerChrysler AG)*

GOOFI - A Generic Fault Injection Tool  
*Joakim L. Aidemark, Jonny P. Vinter, Peter Folkesson, and Johan Karlsson (Chalmers University of Technology)*

Quantifying the Reliability of Embedded Systems by Automated Analysis  
*Peter Liggesmeyer (University of Potsdam) and Oliver Maeckel (Siemens AG)*

## SESSION 3B

### REPLICATION

Avoiding Priority Inversion on the Processing of Requests by Active Replicated Servers  
*Yun Wang, (Southeast University), Francisco Brasileiro (Federal University of Paraiba), Anceaume Emmanuelle, Fabiola Greve, and Michel Hurfin (IRISA)*

A Dynamic Replica Selection Algorithm for Tolerating Timing Faults  
*Sudha Krishnamurthy, William H. Sanders, and Michel Cukier (Univ. of Illinois at Urbana-Champaign)*

Online Reconfiguration in Replicated Databases Based on Group Communication  
*Bettina Kemme (McGill University), Alberto Bartoli (University of Trieste) and Ozalp Babaoglu (University of Bologna)*

13.45 – 16.30

## SESSION 3/4C

### SPECIAL TRACK: EUROPEAN DEPENDABILITY INITIATIVE

Organizer: *Andrea Servidas, European Commission, Brussels*

15:45 – 17:45

## SESSION 4A

### SOFTWARE ROBUSTNESS

Improving Driver Robustness: An Evaluation of the Devil Approach  
*Laurent Reveillere (University of Bordeaux) and Gilles Muller (IRISA/INRIA)*

Robustness Testing and Hardening of CORBA ORB Implementations  
*Jiantao Pan, Philip Koopman, Daniel Siewiorek, and Mimi Ling Jiang (Carnegie Mellon University) Yennun Huang, Robert Gruber (AT&T Labs: Research)*

An Approach for the Construction of Self-Testable Software Components  
*Eliane Martins, Cristina Maria Toyota, and Rosileny Lie Yanagawa (State University of Campinas)*

An Approach for Analysing the Propagation of Data Errors in Software  
*Martin Hiller, Arshad Jhumka, and Neeraj Suri (Chalmers University of Technology, Sweden)*

## SESSION 4B

### SURVIVABILITY AND SECURITY

Enhancing Survivability of Security Services Using Redundancy  
*Matti A. Hiltunen and Richard D. Schlichting (AT&T Shannon Laboratory)*  
*Carlos Ugarte (University of Arizona)*

Distributing Trust on the Internet  
*Christian Cachin (IBM Research)*

Protection of Software-Based Survivability Mechanisms  
*Chenxi Wang, Jack Davidson, John C. Knight, and Jonathan Hill (University of Virginia)*

Intrusion-Tolerant Group Management in Enclaves  
*Bruno Dutertre, Hassen Saidi, and Victoria Stavridou (SRI International)*

**Reception at the City Hall**

8:30 – 10:00

SESSION 5A

WIRELESS AND MOBILE COMMUNICATIONS

FATOMAS - A Fault-Tolerant Mobile Agent System Based on the Agent-Dependent Approach

*Stefan Pleisch (IBM Zurich Research Laboratory) and Andre Schiper (Swiss Federal Inst. of Tech.)*

A Framework for Database Audit and Control Flow Checking for a Wireless Telephone Network Controller

*Saurabh Bagchi, Yiyuan Liu, Zbigniew Kalbarczyk, and Ravishankar Iyer (Univ. of Illinois at Urbana-Champaign), Y. Leventel and L. Votta (Motorola Software Technology Center (USA))*

Analysis of the Effects of Outages on the Quality of Service of GPRS Network Systems

*Felicita Di Giandomenico (IEI-CNR), Francesco Tataranni (CNUCE-CNR) Stefano Porcarelli (University of Pisa), and Andrea Bondavalli (University of Firenze)*

SESSION 5B

STUDENTS' CYBER CAFE and POSTER SESSION

8:30 – 15:00

SESSION 5/6/7C

INFORMATION/SYSTEM SURVIVABILITY WORKSHOP

Organizers: Tom Longstaff, CERT, USA and Sami Saydjari, SRI, USA

10:30 – 12:00

SESSION 6A

CONSISTENCY

A Secure and Highly Available Distributed Store for Meeting Diverse Data Storage Needs

*Subramanian Lakshmanan, Mustaque Ahamad, and H. Venkateswaran (Georgia Institute of Technology)*

State Synchronization and Recovery for Strongly Consistent Replicated CORBA Objects

*Priya Narasimhan, Louise E. Moser, and Michael Melliar-Smith (Univ. of California, Santa Barbara)*

A Procedure-Based Dynamic Software Update

*Janghoon Lyu and Inhwan Lee (Hanyang University)*

SESSION 6B

FAST ABSTRACTS 1

13:00 – 15:00

SESSION 7A

REAL-TIME

Design and Evaluation of Routing Schemes for Dependable Real-Time Connections  
*Kang G. Shin, Songkuk Kim, Daji Qiao, and Sharath Kodase (University of Michigan)*

Performance Evaluation of Dependable Real-Time Communication with Elastic QOS  
*Kang G. Shin (University of Michigan) and Jong Kim (Pohang Univ. of Science & Technology)*

Experimental Evaluation of the Fail-Silent Behavior of a Distributed Real-Time Run-Time Support Built from COTS Components  
*Pascal Chevochet and Isabelle Puaut (IRISA)*

A Study of Failure Models in Feedback Control Systems

*Joao C. Cunha (Coimbra Institute of Engineering) Ricardo Maia, Mario Z. Rela, and Joao G. Silva (University of Coimbra)*

13:00 – 15:00

SESSION 7B

TESTING AND RUNTIME ERROR DETECTION

A Strategy for Testing MetaObject Protocols in Reflective Architectures  
*Juan-Carlos Ruiz-Garcia, Pascale Thevenod-Fosse, and Jean-Charles Fabre (LAAS-CNRS)*

Applicability of Non-Specification-Based Approaches to Logic Testing for Software  
*Noritaka Kobayashi, Tatsuhiro Tsuchiya, and Tohru Kikuno (Osaka University)*

Reducing Critical Failures for Control Algorithms Using Executable Assertions and Best Effort Recovery

*Jonny P. Vinter, Joakim Aidemark, Peter Folkesson, and Johan Karlsson (Chalmers University of Technology)*

Run-Time Fault Detection in Monitor Based Concurrent Programming

*Jiannong Cao, Nick K.C. Cheung, and Alvin T.S. Chan (Hong Kong Polytechnic University)*

**Excursion & Banquet**

Wednesday, July 4, 2001

8:30 – 10:00

**SESSION 8A**

**MODELS FOR FAULT TOLERANCE**

Synergistic Coordination Between Software and Hardware Fault Tolerance Techniques  
*Ann T. Tai, and Kam S. Tso (IA Tech, Inc.), Leon Alkalai, and Savio N. Chau (Jet Propulsion Laboratory), and William H. Sanders (Univ. of Illinois at Urbana-Champaign)*

Performance Validation of Fault-Tolerance Software: A Compositional Approach  
*Susanna Donatelli and Bernardi Simona (University of Torino)*

Graybox Stabilization  
*Anish Arora and Murat Demirbas (Ohio State University) and Sandeep S. Kulkarni (Michigan State University)*

**SESSION 8B**

**HARDWARE ARCHITECTURE AND DESIGN**

REESE: A Method of Soft Error Detection in Microprocessors  
*Arun K. Somani and Joel Nickel (Iowa State University)*

A Fault Tolerant Approach to Microprocessor Design  
*Chris Weaver and Todd Austin (University of Michigan)*

An Experimental Study of Security Vulnerabilities Caused by Errors  
*Jun Xu, Shuo Chen, Zbigniew Kalbarczyk, and Ravishankar K. Iyer (Univ. of Illinois at Urbana-Champaign)*

8:30 – 12:30

**SESSION 9A**

**GROUP-ORIENTED SYSTEMS**

Scalable Fault-Tolerant Aggregation in Large Process Groups  
*Indranil Gupta, Robbert van Reness, and Kenneth P. Birman (Cornell University)*

Lightweight Probabilistic Broadcast  
*Patrick Th. Eugster, Rachid Guerraoui, Sidath B. Handurukande and Petr Kouznetsov (EPFL) Anne-Marie Kermarrec (Microsoft Research)*

Middleware Support for Voting and Data Fusion  
*David E. Bakken and Zhiyuan Zhan (Washington State University) Christopher Jones and David Karr (BBN Technologies)*

The SIMBA User Alert Service Architecture for Dependable Alert Delivery  
*Yi-Min Wang, P. (Victor) Bahl, and Wilf Russell (Microsoft Research)*

10:30 – 12:30

**SESSION 9B**

**PRACTICAL EXPERIENCE I**

Recovery in Fault-Tolerant Distributed Microcontrollers  
*David A. Rennels and Riki Hwang (UCLA)*

Ensuring Dependable Processor Performance: An Experience Report on Pre-Silicon Performance Validation  
*Pradip Bose (IBM T.J. Watson Research Center)*

The Design and Use of Persistent Memory on the DNCP Hardware Fault-Tolerant Platform  
*Thomas C. Bressoud, Tom Clark, and Ti Kan (Lucent San Jose Labs)*

Validating The Pentium 4 Microprocessor  
*Robert M. Bentley (Intel Corporation)*

14:00 – 16:00

**SESSION 10A**

**PRACTICAL EXPERIENCE II**

A Software-Implemented Fault Injection Methodology for Design and Validation of System Fault Tolerance  
*Raphael R. Some, Won S. Kim, Garen Khanoyan, Leslie Callum, Anil Agrawal, and John J. Beahan (Jet Propulsion Laboratory)*

Hazard Analysis in Object Oriented Design of Dependable Systems  
*Per Johannessen, Christian Grante, Anders Alminger, and Ulrik Eklund (Volvo Car Corporation) Jan Torin (Chalmers University of Technology)*

Byzantine Fault Tolerance Can Be Fast  
*Miguel Castro (Microsoft Research) and Barbara Liskov (MIT Laboratory for Computer Science)*

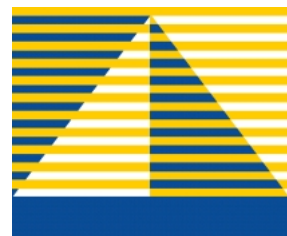
Performance Evaluation of Exception Handling in I/O Libraries  
*John P. DeVale and Philip Koopman (Carnegie Mellon University)*

**SESSION 10B**

**FAST ABSTRACTS II**

16.15 – 17:45

Business Meeting: IEEE Technical Committee on Fault Tolerance  
TC Chair: William H. Sanders



# The 28th Annual International Symposium on Computer Architecture

## ISCA TECHNICAL PROGRAM

Monday, July 2, 2001

8:45 – 10:15

### PLENARY SESSION

Opening Remarks

Joint ISCA/DSN Keynote Speech: The New Software  
*Dr. Greg Papadopoulos, CTO, Sun Microsystems Inc., U.S.A.*

10:45 – 12:15

### SESSION 1

#### MULTITHREADING AND SPECULATION

Execution-based Prediction Using Speculative Slices  
*Craig Zilles and Gurindar Sohi (University of Wisconsin-Madison)*

Speculative Precomputation: Long-range Prefetching of Delinquent Loads  
*Jamison D Collins (UC San Diego), Hong Wang (MRL, Intel), Dean M Tullsen (UC San Diego), Hughes J Christopher (University of Illinois at Urbana-Champaign), Yongfong Lee (MSL, Intel), Dan Lavery (MSL, Intel), John P. Shen (MRL, Intel)*

Dynamically Allocating Processor Resources Between Nearby and Distant ILP  
*Rajeev Balasubramonian, Sandhya Dwarkadas, and David Albonesi (University of Rochester)*

13:45 – 15:15

### SESSION 2

#### MEMORY SYSTEM ISSUES

Tolerating Memory Latency through Software-Controlled Pre-Execution in Simultaneous Multithreading Processors  
*Chi-Keung Luk (Compaq)*

Data Prefetching by Dependence Graph Precomputation  
*Murali M Annavaram, Jignesh M Patel, and Edward S Davidson (University of Michigan)*

Concurrency, Latency, or System Overhead: Which Has the Largest Impact on Uniprocessor DRAM-System Performance?  
*Vinodh Cuppu and Bruce Jacob (University of Maryland)*

15:45 – 17:15

### SESSION 3

#### PROCESSOR ARCHITECTURE

Focusing Processor Policies via Critical-Path Prediction  
*Brian A Fields, Shai Rubin and Rastislav Bodik (University of Wisconsin-Madison)*

Automated Design of Finite State Machine Predictors for Customized Processors  
*Timothy Sherwood and Brad Calder (University of California San Diego)*

Better Exploration of Region-Level Value Locality with Integrated Computation Reuse and Value Prediction  
*Youfeng Wu, Dong-Yuan Chen, and Jesse Fang (MRL, Intel)*

**ACM SIGARCH and IEEE CS TCCA Business Meeting**

**Reception at the City Hall**

Tuesday, July 3, 2001

9:00 – 10:00

**SESSION 4**

**COMMUNICATION SUPPORT**

CryptoManiac: A Fast Flexible Architecture for Secure Communication  
*Lisa Wu, Chris Weaver, and Todd Austin (University of Michigan)*

QoS Provisioning in Clusters: An Investigation of Router and NIC Design  
*Ki H. Yum, Eun J. Kim, and Chita R. Das (Pennsylvania State University)*

10:30 – 12:00

**SESSION 5**

**CACHE MANAGEMENT**

Locality vs. Criticality  
*Srikanth T Srinivasan (Duke University), Roy Dz-ching Ju (MRL, Intel), Alvin R Lebeck (Duke University), and Chris Wilkerson (MRL, Intel)*

Dead-Block Prediction & Dead-Block Correlating Prefetchers  
*An-Chow Lai (Purdue University), Cem Fide (Sun Microsystems), and Babak Falsafi (Carnegie Mellon University)*

Code Layout Optimizations for Transaction Processing Workloads  
*Alex Ramirez (UPC, Spain), Luiz Andre Barroso (Compaq WRL), Kouros Gharachorloo (Compaq WRL), Robert Cohn (Compaq), Josep Larriba-Pey (UPC, Spain), Geoff Lowney (Compaq), and Mateo Valero (UPC, Spain)*

12:00 – 14:00

Award Luncheon

14:00 – 15:00

**SESSION 6A**

**ARCHITECTURAL IMPACT OF EMERGING TECHNOLOGIES**

Exploring and Exploiting Wire-Level Pipelining in Emerging Technologies  
*Michael Niemier and Peter Kogge (University of Notre Dame)*

NanoFabrics: Spatial Computing Using Molecular Electronics  
*Seth Copen Goldstein, and Mihai Budiu (Carnegie Mellon University)*

14:00 – 15:00

**SESSION 6B**

**SHARED-MEMORY MULTIPROCESSORS**

A Simple Method for Extracting Models from Protocol Code  
*David J Lie, Andy Chou, Dawson Engler, and David Dill (Stanford University)*

Removing Architectural Bottlenecks to the Scalability of Speculative Parallelization  
*Milos Prvulovic (University of Illinois at Urbana-Champaign), Maria Jesus Garzaran (Universidad de Zaragoza), and Josep Torrellas (University of Illinois at Urbana-Champaign)*

Excursion & Banquet

Wednesday, July 4, 2001

8:30 – 10:00

**SESSION 7**

**ENERGY-EFFECTIVE DESIGNS**

Power and Energy Reduction Via Pipeline Balancing  
*R. Iris Bahar (Brown University & Compaq) and Srilatha Manne (Compaq)*

Energy-Effective Issue Logic  
*Daniele Folegnani and Antonio Gonzalez (Universitat Politecnica de Catalunya, Spain)*

Cache Decay: Exploiting Generational Behavior to Reduce Leakage Power  
*Stefanos Kaxiras (Bell Labs, Lucent Technologies), Zhigang Hu (Princeton University), and Margaret Martonosi (Princeton University)*

10:30 – 12:00

**SESSION 8**

**PERFORMANCE TOOLS AND EVALUATIONS**

Variability in the Execution of Multimedia Applications and Implications for General-Purpose Architectures  
*Christopher J. Hughes, Praful Kaul, Sarita Adve, Rohit Jain, Chanik Park, and Jayanth Srinivasan (University of Illinois at Urbana-Champaign)*

Measuring Experimental Error in Microprocessor Simulation  
*Rajagopalan Desikan, Doug Burger, and Stephen W Keckler (University of Texas at Austin)*

Rapid Profiling via Stratified Sampling  
*Subramanya Sastry, Rastislav Bodik, and James Smith (University of Wisconsin-Madison)*

Adjourn



# Tutorials

(June 30 – July 1)

## T1: VIA and InfiniBand Communication Architecture (half day)

### Presenter:

*Dhabaleswar K. Panda (Ohio State University)*

### Saturday 9:00 AM – 12:30 PM

This tutorial is intended to provide an in-depth overview of both Virtual Interface Architecture (VIA) and InfiniBand Architecture (IBA) standards. Issues related to designing high performance communication and I/O architectures for next generation scalable systems will be emphasized. Basic components of these standards will be discussed. New functionalities associated with the IBA standard such as Quality of Service, Protection Domains, etc., for designing large-scale enterprise servers will be discussed. Open research challenges in designing scalable VIA and IBA implementations and providing support for higher-level programming models will be outlined. The tutorial will conclude with an overview of on-going VIA and InfiniBand related research at universities, industry, and research labs. For more information, see

[http://www.cis.ohio-state.edu/~panda/isca01\\_tut.html](http://www.cis.ohio-state.edu/~panda/isca01_tut.html)

## T2: Virtual Machines: Architectures, Implementations, and Applications (half day)

### Presenters:

*James E. Smith (University of Wisconsin) and Sriram Vajapeyam (IISc, Bangalore)*

### Saturday 1:30 PM – 5:00 PM

Virtual machines (VMs) – program execution environments implemented via a combination of hardware and hidden software – have emerged as a powerful means for tackling a number of important engineering problems, including software mobility and security, processor performance, and power optimization. We present an introduction to several hardware- software VM techniques, focusing primarily on combined hardware-software interaction. Topics to be covered include "classic" VMs, application VMs, platform-independent VMs (e.g. JavaVM), whole-system VMs, binary translation, and dynamic hardware optimization. Several case studies from both commercial implementations and research projects will be discussed. We conclude by discussing future directions for VM research. For more information, see

<http://www.csa.iisc.ernet.in/~sriram/isca01-tutorial/>

## T3: Power-Efficient Design: Modeling and Optimizations (1 day)

### Presenters:

*Pradip Bose (IBM), David Brooks (Princeton), Mary Jane Irwin (Penn State Univ.), Mahmut Kandemir (Penn State Univ), Margaret Martonosi (Princeton), and Narayanan Vijaykrishnan (Penn State Univ.)*

### Sunday 9:00 AM – 5:00 PM

With the rapid proliferation of battery-operated mobile systems and power-hungry high-performance systems, design for power efficiency has become of utmost importance. This tutorial will introduce the sources for the power consumption and identify the motivation for limiting the power consumption. Next, the tutorial will introduce the appropriate power and energy metrics to utilize based on the target system. Techniques for modeling energy consumption at different levels of accuracy will be illustrated. Following that both static and dynamic optimization techniques at the hardware and software levels will be presented. The talk will conclude with a discussion of future trends. For more information, see [www.cse.psu.edu/~mdl/isca01](http://www.cse.psu.edu/~mdl/isca01) or [www.ee.princeton.edu/~mrm/tutorial](http://www.ee.princeton.edu/~mrm/tutorial)

## T4: Fault-tolerant CORBA (half day)

### Presenter:

*Priya Narasimhan (Eternal Systems, Inc)*

### Sunday 9:00 AM – 12:30 PM

In March 2000, the Object Management Group (OMG), the CORBA standards body, added reliability to the list of CORBA's attractive features by approving a new Fault-Tolerant CORBA standard. The tutorial will cover (i) the interfaces of the new standard, (ii) the requirements that a conformant fault-tolerant CORBA implementation must satisfy, (iii) the limitations of the standard, and (iv) some approaches for going beyond the standard, for instance, to cope with multithreaded CORBA applications. For more information, see

<http://www.dsn.org>

## T5: System Survivability Analysis and Simulation (half day)

### Presenters:

*Richard C. Linger, Nancy R. Mead, and David Fisher (Software Engineering Institute, Carnegie Mellon University)*

### Sunday 1:30 PM – 5:00 PM

Increasing dependence on critical systems amplifies the consequences of intrusions and compromises. Survivability is the capability of a system to fulfill its mission despite attacks, failures, and accidents. This tutorial describes the Survivable Network Analysis (SNA) method for assessing and improving survivability characteristics of systems. It also introduces Easel, a discrete event simulation system for simulating system survivability in general and emergent algorithms in particular. For more information, see <http://www.dsn.org>

# Workshops

(June 30 – July 1)

*If you want to contribute, please check the home pages associated with each workshop*

## **W1: Workshop on Memory Performance Issues (2 days)**

Saturday 9:00 AM – 5:00 PM & Sunday 9:00 AM – 5:00 PM

### **Organizers:**

*Haldun Hadimioglu (Polytechnic University), David Kaeli (Northeastern University), Jeff Kuskini (Growth Networks), Ashwini Nanda (IBM), and Josep Torrellas (University of Illinois, Urbana)*

This workshop combines two existing workshops (Scalable Shared Memory Multiprocessors and Solving the Memory Wall). The goal of this new workshop is to provide a forum for researchers and practitioners from industry and academia to discuss advances in technology, architecture, and algorithms that address the need for scalability in multiprocessors and the growing gap between CPU/network and memory speeds. Both hardware and software approaches to addressing scalability and speed disparities are encouraged. We are especially interested in attracting new, experimental or paper techniques, technologies and algorithms that address these issues. For more information, see <http://www.ece.neu.edu/conf/wmpi2000>.

## **W2: Workshop on Complexity-Effective Design (WCED'01) (1 day)**

Saturday 9:00 AM – 5:00 PM

### **Organizers:**

*David Albonesi (Univ. of Rochester), Pradip Bose (IBM), and Subbarao Palacharla (Intel).*

The quest for higher performance via deep pipelining (for high clock rate) and speculative, out-of-order execution (for high IPC) has yielded processors with greater performance, but at the expense of much greater design complexity. The costs of higher complexity are many-fold, including increased verification time, higher power dissipation, and reduced scalability with process shrinks/variability. The goal of this workshop is to provide a forum for microarchitects, circuit designers, performance modelers, compiler developers, verification experts, and system designers to discuss and explore hardware/software techniques and tools for creating future designs that are more complexity-effective (CE). For more information, see <http://www.ece.rochester.edu/~albonesi/wced01>

## **W3: EASY: Evaluating and Architecting Systems for Dependability (1 day)**

Sunday 9:00 AM – 5:00 PM

### **Organizers:**

*Kimberly Keaton (Hewlett Packard Lab.) and Steven Lumetta (University of Illinois, Urbana-Champaign)*

Although the end customers of systems care about performance, mounting evidence suggests that they care even more about system availability, manageability, reliability, scalability, and security. Despite the importance of these characteristics, benchmarking organizations like SPEC, TPC and SPC do not currently have strategies for evaluating them. The goal of this workshop is to bring together researchers from the computer architecture and dependable systems communities to start a dialog on techniques for evaluating computer system dependability. For more information, see <http://www.crhc.uiuc.edu/EASY/>

# DSN-2001 Fast Abstracts

Fast Abstracts are lightly screened presentations of work in progress or opinion pieces, outrageous or otherwise. They can cover any and all facets of dependable systems and networks. Participants in this Track will present a short talk and publish a concise two-page abstract in the Supplement of the 2001 International Conference on Dependable Systems and Networks. Contributions from academia and industry are welcomed. We especially encourage participation by those who might otherwise not actively participate. Because they are brief and not formally refereed, Fast Abstracts allow their authors to:

- Report on current work that may or may not be complete
- Introduce new ideas to the community
- State positions on controversial issues or open problems

Submissions for Fast Abstracts are currently being accepted via the world wide web at: <http://www.dsn.org>

The submission deadline for Fast Abstracts is April 30, 2001.

Questions about the Fast Abstracts Track should be directed to the Fast Abstracts

### **Program Chair:**

*Mohamed Kaâniche*  
LAAS-CNRS  
kaaniche@laas.fr

### **Fast Abstracts Program Committee:**

*David Bakken, Washington State University (USA)*  
*Michel Cukier, University of Illinois at Urbana-Champaign (USA)*  
*Inhwan Lee, Hanyang University (Seoul, Korea)*  
*Mladen Vouk, North Carolina State University (USA)*

# About the Keynote Speaker

Title: *The New Software*

*Dr. Greg Papadopoulos*  
Sr. Vice President  
Chief Technology Officer  
Sun Microsystems, Inc.

As Chief Technology Officer of Sun Microsystems, Inc., Dr. Greg Papadopoulos is responsible for assessing Sun's technological investments, as well as directing the activities of Sun Laboratories and associated advanced development programs.

At Sun, Greg has held senior positions as Vice President of Technology and Advanced Development for SMCC, and Chief Scientist for Server Systems Engineering and then the Enterprise Servers and Storage business unit within SMCC.

Greg joined Sun in the fall of 1994 from Thinking Machines where he was Senior Architect and Director of Product Strategy and also an Associate Professor at MIT. At MIT, he conducted research in scalable systems and fault-tolerant computing. He was a development engineer at Hewlett-Packard and Honeywell and cofounded three companies: PictureTel, Ergo and Exa Corporation. Greg received a BA in systems science from UCSD and his MS and Ph.D. in electrical engineering and computer science from MIT.

Monday, July 2, 2001



Photographer: Niclas Mauvoix

## Welcome Reception Hosted by the City of Göteborg

Lord Mayor of Göteborg would like to welcome all the delegates at a reception in the City Hall – Börsen, Gustav Adolfs Torg, No. 5.

Gustav Adolfs Torg is situated right in the heart of Göteborg. Around this square, you will find Göteborg's administrative and political center that includes the old and new City Halls, the Town Hall, and the former Exchange. A statue of Gustav II Adolf, the founder of the city, stands in the middle of the square.

Buses will pick you up outside the Congress Center/Hotel Gothia Towers and will take you to Gustav Adolfs Torg (approx. 10 minutes ride).

When the reception is finished, we suggest that you walk back to the hotel along the Kungsportsavenyn to Götaplatsen. The Avenue is Göteborg's most fashionable street linking the Kungsportsbron Bridge and Götaplatsen. Restaurants, cafés, pubs and night-clubs abound along the Avenue.

You can also take a tram (no. 4 or 5) that brings you back to the hotel. The tram station (Korsvägen) is opposite to the hotel. If anyone needs additional transport information back to the hotel, please contact the Secretariat Desk at the Conference Center.

### Price/person

Free of charge for both participants and accompanying persons - please indicate your participation on the registration form for planning purposes.

Tuesday, July, 2001



Photographer: Göran Assner

## Banquet – Viking Dinner Party

Boat tour in the Göteborg's archipelago continuing to a Viking Dinner Party at the Carlstens Fortress in Marstrand.

Buses will pick you up at the Conference Center/Hotel Gothia Towers in the afternoon and take you to the Lilla Bommen marina. The boat trip to the picturesque Marstrand Island takes approximately 2.5 hours. The boat trip will offer a fantastic view of the beautiful archipelago in sheltered waters. You will not get bored – apart from drinks and snacks that will be served, there will be entertainment onboard as well!!

The Marstrand is a classic seaside resort dating back to the 12th century, and is perhaps best known for the sailing regattas held there annually such as the World Match Racing Championships.

Marstrand harbour nestles under the walls of one of the best-preserved stone fortresses in northern Europe – the majestic Carlsten. Soldiers will meet us at the quay and bring you up to the impressive Carlsten Fortress (the highest point of the island) built in the 17th century with a fantastic panorama view of the ocean. The fortress was built to protect the Swedes from the Danes.

A traditional style Viking Dinner will be served at the Carlsten Fortress, along with the traditional sacrifice.

### Price/person

- Free of charge for ISCA/DSN participants.
- USD 60 (incl. 25% VAT) for accompanying persons

For both participants and accompanying persons - please indicate your participation in the event on the registration form for logistical planning.

# General Information

## Venue

Svenska Mässan (The Swedish Exhibition & Congress Centre)  
Mässans gata 8, SE-412 94 Göteborg, Sweden

## Advance registration

Please submit your registration at [www.ce.chalmers.se/conf2001](http://www.ce.chalmers.se/conf2001) or use the enclosed registration form when registering for the DSN and/or ISCA conferences, as well as for the social events.

## Registration - Technical Sessions

The common DSN & ISCA conference registration fee allows attendees to participate in all DSN and ISCA technical sessions & DSN workshops (Monday through Wednesday only), reception, refreshment breaks, and banquet. Lunches are included Monday to Wednesday for DSN-participants and Monday and Tuesday for ISCA-participants.

## Registration - Workshops and Tutorials

Refreshment breaks are included in the workshops and tutorial fees. Lunches are included in the one- and two-day workshop and tutorial fees. For the workshops and tutorials, copies of transparencies and/or proceedings will usually be distributed and are included in the fee.

## Registration fee (USD)

Member IEEE/ACM	Pre-registration <i>Paid before May 25</i>	Late/On-site registration <i>Paid after May 25</i>
Conference fee	370	463
2-day workshop	150	170
1-day workshop	80	100
Full-day tutorial(s)	260	325
1/2-day tutorial	185	231

(All prices are in USD and excl. VAT)

Non- Member	Pre-registration <i>Paid before May 25</i>	Late/On-site registration <i>Paid after May 25</i>
Conference fee	470	587
2-day workshop	170	190
1-day workshop	100	120
Full-day tutorial(s)	320	400
1/2-day tutorial	230	288

(All prices are in USD and excl. VAT)

Student	Pre-registration <i>Paid before May 25</i>	Late/On-site registration <i>Paid after May 25</i>
Conference fee	120	150
2-day workshop	80	100
1-day workshop	40	50
Full-day tutorial(s)	100	125
1/2-day tutorial	45	70

(All prices are in USD and excl. VAT)

## Registration fee – VAT conditions

Swedish tax legislation requires participants to pay their registration fee either **including or excluding Swedish VAT**, depending on which country they are from. Therefore, please identify your category below and choose the appropriate alternative on the registration form.

### Excluding 25% VAT

Registration fee paid from countries outside the European Union. Registration fee paid by companies and other taxable entities within the European Union.

### Including 25% VAT

Registration fee paid by non-taxable entities (institutions/organizations etc.) and private persons within the European Union. Applies to all Swedish participants.

## Payment

The total amount due, as calculated on the registration form, must be submitted when the registration form is mailed. The registration of application will only be accepted when full payment has been received. Payment can be made by: remittance to account No 5001-1037822 with SEB, SE-405 04 Göteborg, Sweden (please state your name and address), or credit card as listed on the registration form. All expenses in connection with transferring registration fees must be paid by the delegate. All payments must be in USD. The equivalent in Swedish Krona (SEK), at the time of registration, will be charged.

A letter of confirmation will be sent to you as soon as your registration form and payment have been received.

## Cancellation

All cancellations must be made in writing and sent to CONGREX, DSN & ISCA 2001, Box 5078, SE-402 22 Göteborg, Sweden. All fees will be refunded for cancellations received before May 25, 2001 less a cancellation charge of USD 55.

No refund can be made for cancellation received after May 25, 2001.

## Registration secretariat

Congrex Göteborg AB is handling the registration formalities for this event.

Any questions related to registration matter please contact

Congrex Göteborg AB, DSN & ISCA 2001,  
P.O. Box 5078, SE-402 22 Göteborg, Sweden

Fax: +46 (0)31 81 82 26

E-mail: [dsn01@gbg.congrex.se](mailto:dsn01@gbg.congrex.se) or [isca01@gbg.congrex.se](mailto:isca01@gbg.congrex.se)

### Conference Secretariat

The Conference Secretariat desk will be located in the entrance of the Svenska Mässan Congress and will be open during the congress hours. Conference documents, tickets and other material will be issued to the delegates upon presentation of the registration confirmation papers.

### Accompanying person

The Welcome Reception is free of charge for accompanying persons. Please indicate your participation on the registration form for planning purposes. Tickets for the Viking Dinner Party at Carlstens Fortress, Marstrand can be booked on the registration form to a price of USD 60 including VAT (*USD 48 excl. 25% VAT*). On-site availability is not guaranteed.

### Accommodation

Rooms have been pre-reserved in HOTEL GOTHIA TOWERS. Please find information about the conference hotel and student's accommodation at page 28. Please use the enclosed accommodation form.

### Language

The official language of the DSN & ISCA 2001 is English.

### Information

For latest information regarding the conference arrangements:  
[www.ce.chalmers.se/conf2001](http://www.ce.chalmers.se/conf2001)

### Tourist information:

[www.goteborg.com/en/](http://www.goteborg.com/en/)

### Transportation - Official Airline

SAS has been appointed Official Airline for the DSN & ISCA conferences. Please note that SAS offers a special conference rate. Those of you, who would like to make use of this offer, please contact SAS on one of the telephone numbers stated in the SAS announcement and quote **Reference No. SE0112**.

### Local transportation

Göteborg has tram and bus services. The Exhibition and Congress Centre is located in the down town area. The following trams/buses stop at Korsvägen (the nearest tram/bus stop): Trams 4 and 5 and the airport bus. The fee for the airport bus from Landvetter Airport to Göteborg is SEK 50 and a taxi ride costs approximately SEK 270.

### Currency

Svenska kronor (SEK). The exchange rate is:  
1 USD=9.50 (January 2001)

### Climate & Dress

The weather in June and July is often nice, with a midday temperature of 22-25°C, (72-77° F). Bring light clothes and a woolen sweater as well. You may also need a light raincoat.

### Messages and correspondence

Messages and correspondence to participants may be addressed to:

Before the conference:

DSN & ISCA2001  
c/o Chalmers University of Technology  
Dept. of Computer Engineering  
SE-412 96 Göteborg, Sweden  
Tel: +46 31 772 1692, Fax: +46 31 772 3663  
E-mail: [dsn01@ce.chalmers.se](mailto:dsn01@ce.chalmers.se) or [isca01@ce.chalmers.se](mailto:isca01@ce.chalmers.se)

During the conference:

DSN & ISCA2001  
c/o Svenska Mässan Congress  
Mässans gata 8, SE-412 94 Göteborg, Sweden  
Tel: +46 31 708 80 00  
Fax: +46 31 708 84 53  
E-mail: [dsn01@ce.chalmers.se](mailto:dsn01@ce.chalmers.se) or [isca01@ce.chalmers.se](mailto:isca01@ce.chalmers.se)



**SAS is the official airline for the International Conference on Dependable Systems and Networks DSN 2001 and the 28th International Symposium on Computer Architecture ISCA 2001, a responsibility we do not take lightly. It is our aim to offer you the very best airline service for your trip to Scandinavia.**

**We've made it easy to get there.** The Scandinavian capitals form a triangle of hubs at the center of our worldwide network. We therefore offer you convenient connections to, from and within Scandinavia/Finland, as well as the Baltic region. With the other member airlines of Star Alliance™, we can practically guarantee you seamless travel wherever your point of departure.

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**We offer you an attractive fare.** We offer you a special conference fare in connection with this event, valid for travel on SAS. To obtain this fare please quote your reference number SE0112.

**Just give us a call.** You are welcome to call us for assistance with your travel arrangements at one of the numbers below.

[www.scandinavian.net](http://www.scandinavian.net)

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## DSN-2001 Student Forum

(Maximum 3 pages)

Due 30 April 2001. This track will provide the opportunity for students working in the area of dependable computing to present their research and to interact in various ways. The track will include sessions featuring On-Going Student Research papers and a Poster session. Both papers and posters should be singly authored by students, and describe preliminary results and/or future directions of on-going research that is expected to continue over the next one or two years. These papers will be reviewed by a committee led by the Student Forum Chair.

### On-Going Student-Paper Submissions

All papers should be written in English and typed using the standard (double column) IEEE format. The maximum length of a paper should be 3 pages, and it should be submitted in its final form, ready to be printed. Submissions must be done electronically.

### Student Poster Submissions

A brief description of the poster should be submitted electronically. Students from the On-Going Student Paper track can also submit posters. Display supplies (e.g., easel, poster boards, etc.) will be provided at the conference.

### Deadlines:

Submit by 30 April 2001

Notification by 15 May 2001

For more information about submitting a Student-Forum paper or poster, about On-Going Student-Paper submissions, about electronic submission procedures, or regarding student travel scholarships, please contact the Student Forum Chair.

### Student Forum Chair:

Dr. Christof Fetzer  
christof@research.att.com

### Student Forum Program Committee:

Peter Chen, University of Michigan (USA)  
Nuno Fuentecilla Neves, University of Lisboa (Portugal)  
Shivakant Mishra, University of Colorado, Boulder (USA)  
Sampath Rangarajan, Bell Labs (USA)  
Ulrich Schmid, Technical University of Vienna (Austria)

## Student Travel Grants

### DSN

The IEEE Computer Society Technical Committee on Fault-Tolerant Computing is soliciting applications for travel scholarships to partially offset the cost of students planning to attend DSN-2001 in Göteborg. To be eligible, the applicant must be enrolled in a degree program at the time of DSN-2001. Authors of accepted papers, students currently submitting papers to the Student Forum, and others are all welcome to apply. Participation, such as presenting a regular paper or a paper in the Student Forum will be used as one criterion in awarding the scholarships, however. The Technical Committee anticipates awarding scholarships in the range of \$500-\$1000, with the actual award size being determined by the distance involved and anticipated expenses. The exact number awarded will depend on the amounts awarded for each.

*Student Travel Awards: Sponsored in part by Avaya Labs & Chalmers*

### Application Procedure

To apply, submit a write-up not exceeding 500 words summarizing your current research related to dependable computing and describing how it is relevant to DSN-2001, what you hope to learn by attending the conference, and how you expect it to affect your future research directions. Also include your name, postal address, electronic mail address, telephone number, and fax number. Applications must be received no later than Monday, April 30, 2001 and should be submitted to the chair of the student forum:

Dr. Christof Fetzer  
AT&T Labs Research  
Bldg 103 ; RM D281  
180 Park Ave  
Florham-Park, NJ  
E-mail: christof@research.att.com  
FAX: (973) 360-8077

The preferred submission format is an ASCII file by e-mail. The awards will be announced May 15, 2001. Questions can be directed to Dr. Fetzer using the e-mail address above.

### ISCA

SIGARCH is providing funds for a limited number of travel grants for student members of SIGARCH to attend ISCA 2001. Grants can cover transportation, symposium registration, and lodging, but not meals. The application deadline is APRIL 20, 2001 and recipients will be notified approximately one week later.

The size of grants may be limited due to budgetary constraints. In particular there may be upper bounds on specific items, and we may set different upper bounds based upon the level of involvement (symposium speaker, vs. workshop speaker, vs. coauthor for example). Grants will be paid on submission of original travel receipts and a brief trip report. Grant application forms are available at <http://www.ee.princeton.edu/~isca2001>. To apply for a grant, email or snail mail a completed application form to:

Allan Gottlieb  
NEC Research Institute  
4 Independence Way  
Princeton NJ 08540  
E-mail: gottlieb@nyu.edu

# Accommodation

## Hotel Information

The conference hotel is HOTEL GOTHIA TOWERS, adjacent to the Swedish Exhibition & Congress Centre (Svenska Mässan) in Göteborg. This completely new 23-storey hotel tower makes - together with the existing 18-storey twin tower - the largest hotel in Scandinavia with more than 700 rooms.

Blocks of rooms are available at the conference rate of  
SEK 880 per single room  
SEK 980 per double room  
The rate includes breakfast buffet, all service charges and VAT.

Please make your booking as early as possible but latest before the May 29 cut off date, as room availability is limited. Mention DSN or ISCA conference to obtain the conference rate. Fill in the accommodation form and forward it to Hotel Gothia Towers.

Phone: +46 (0)31 750 88 00  
Fax: +46 (0)31 750 88 80  
E-mail: [hotelbok@gothiatowers.com](mailto:hotelbok@gothiatowers.com)

## How to get to Hotel Gothia Towers

Göteborg/Landvetter Airport is situated 25 kilometers (20 minutes by car/bus) from the conference hotel and congress center. The airport shuttle bus stops right outside the buildings and the fee for the ride from the airport to Göteborg is SEK 50. An airport taxi costs approximately SEK 270.

More details on [www.ce.chalmers.se/conf2001](http://www.ce.chalmers.se/conf2001) or [www.gothiatowers.com](http://www.gothiatowers.com)

# Student Accommodation

In addition to the conference hotel, we have reserved a block of rooms at SGS Apartments (Youth Hostel) intended primarily for student attendees. This housing is situated close to the Congress Centre. All the rooms are fully furnished and have private bathroom. The prices include linen, towels and cleaning upon departure. No breakfast is provided though a kitchen is available.

SEK 340 per night for single room  
SEK 460 per night for double room  
The rates include service and VAT

Please make your booking as early as possible, since room availability is limited. Mention reference no. 10317501. Please fill in the accommodation form and forward it directly to SGS Apartments, not later than May 29.

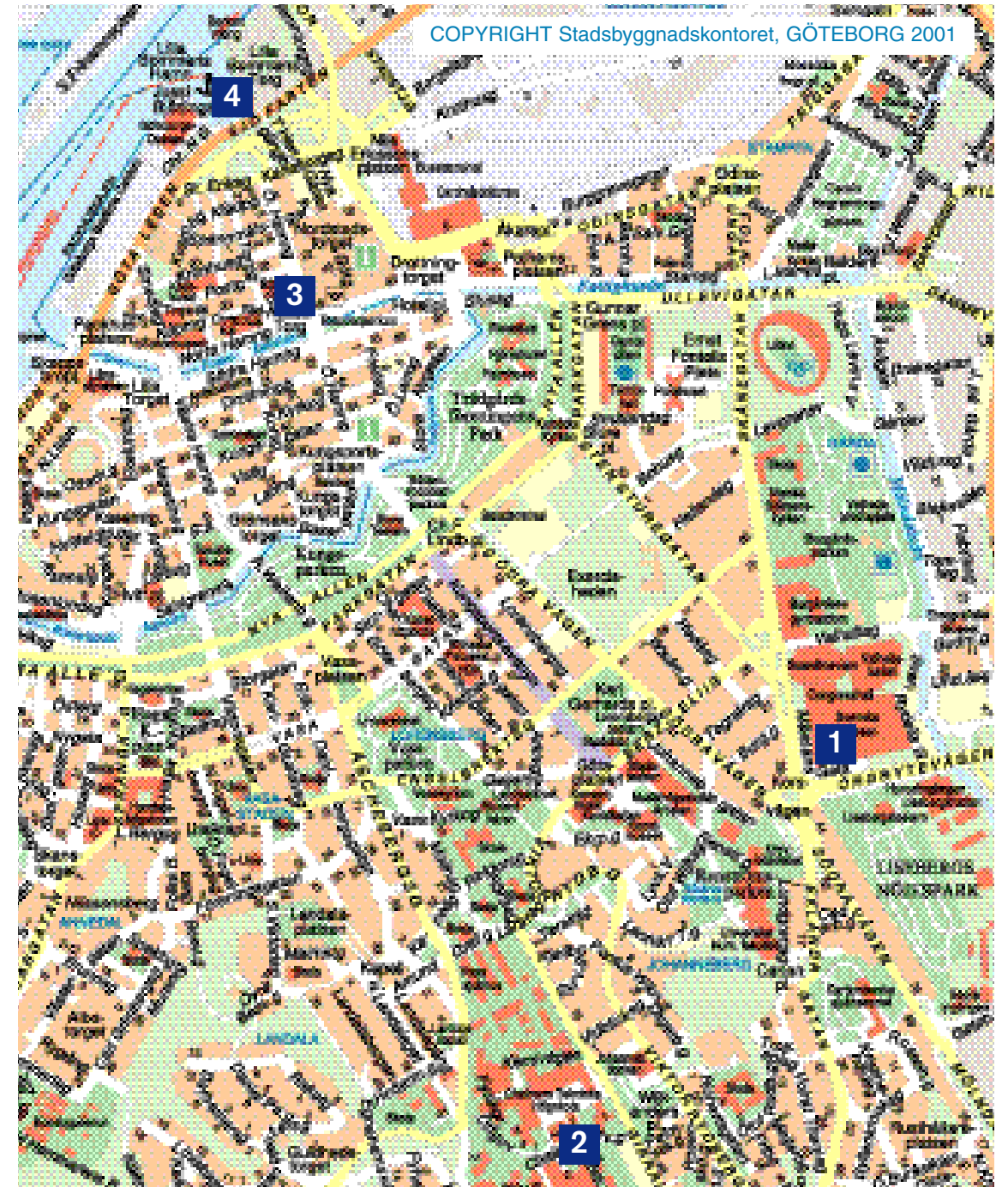
Phone: +46 (0)31 708 13 30  
Fax: +46 (0)31 81 24 97  
E-mail: [vb@sgsbostader.com](mailto:vb@sgsbostader.com)

## How to get to SGS Apartments

SGS Apartments is situated only 1000 meters from the Swedish Exhibition & Congress Centre in central Göteborg. Walking distance around 15-20 minutes.

More details on [www.ce.chalmers.se/conf2001](http://www.ce.chalmers.se/conf2001) or [www.vb.sgsbostader.com](http://www.vb.sgsbostader.com)

# Göteborg



- |   |                              |
|---|------------------------------|
| <b>1</b> Svenska Mässan (Congress Centre)   | <b>2</b> Chalmers Campus     |
| <b>3</b> The City Hall - Gustav Adolfs torg | <b>4</b> Lilla Bommen marina |

*The Organizing Committee accepts no liability for injuries/losses of whatever nature incurred by participants and/or accompanying persons, nor loss of, or damage to, their luggage and/or personal belongings.*