



37th Annual IEEE/IFIP International Conference on Dependable Systems and Networks

June 25-28, 2007 — Edinburgh, Scotland, UK

Workshop on Dependable and Secure Nanocomputing

Organizers:

Jean Arlat
LAAS-CNRS

Ravishankar K. Iyer
UIUC

Michael Nicolaidis
TIMA

Thursday June 28, 2007

Nanometric Hardware Technologies



Increased Performance & New Applications

but...

Challenges wrt Dependability and Security

Transient Faults in Operation

[SEUs, power disturbances,...]

Chips with Massively Defective Devices

[low fabrication yield, unpredictability,...]

Hardware Vulnerabilities and Security Threats

[side channel attacks,...]

Motivation and Aims of the Workshop

- ◆ **Special Focus on Hardware Issues**
 - Analyze the current status
 - Report on recent advances
 - Forecast the trends

- ◆ **Solutions at stake feature many facets**
 - Semiconductor technology
 - Device and chip architecting
 - Basic software
 - High speed communication and networking protocols
 - Resilience techniques
 - Verification and testing
 - Risk assessment
 - ...

SRAM FPGA Technology and Automotive Systems \diamond

\diamond Basic Assumptions

- Location: Denver, CO, USA \approx 5,000 feet
- Technology: 22 μ m SRAM-based FPGA 1M-gates
- Prediction (SpaceRad 4.5): **1.05 x 10⁻⁴ upsets* / day**

\diamond A fleet of **500,000** vehicles, each featuring an airbag control system using this technology

—> Continuous operation \approx **52.5 upsets / day**

Thus an upset every 27.4 minutes!

—> Assuming 1 h use per day \approx **2 upsets / day**

* These are firm errors that will persist until the SRAM FPGA is reloaded (normally by power cycling or forcing reconfiguration)

\diamond Martin Mason, Actel Corporation — *Automotive DesignLine Newsletter*, May 31, 2006

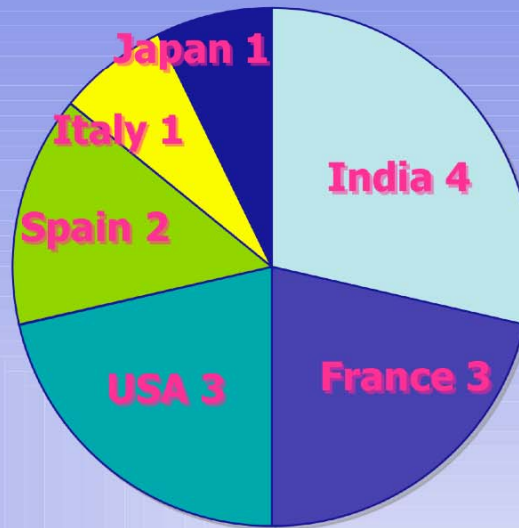
Program Committee

| | |
|--------------------------------|---------------------------------------|
| Jacob A. Abraham | University of Texas, Austin, USA |
| Jacques Collet | LAAS-CNRS, Toulouse, France |
| Jiri Gaisler | Gaisler Research, Gothenburg, Sweden |
| Christian Landrault | LIRMM, Montpellier, France |
| Régis Leveugle | TIMA, Grenoble, France |
| Subhasish Mitra | Stanford University, CA, USA |
| Shubhendu S. Mukherjee | Intel, Hudson, MA, USA |
| Nithin M. Nakka | Motorola, Urbana, IL, USA |
| Takashi Nanya | University of Tokyo, Japan |
| Rubin A. Parekhji | Texas Instruments, Bangalore, India |
| Michel Pignol, CNES | Toulouse, France |
| Jean-Jacques Quisquater | UCL, Louvain, Belgium |
| Pia Sanda, IBM | Poughkeepsie, NY, USA |
| Shiuhpyng W. Shieh | Nat. Chiao Tung Univ. Hsinchu, Taiwan |
| Matteo Sonza Reorda | Politecnico di Torino, Italy |
| Alex Yakovlev, | University of Newcastle upon Tyne, UK |
| Vivian Zhu | Texas Instruments, Dallas, TX, USA |

Program Set-up

◆ 14 submissions

- Academia: 7
- Industry: 7



◆ Selection of contributions by the PC

- Short presentations
- Poster presentations

◆ Invited talks

◆ Panel

Program-at-a-glance

9h20-10h30 — Invited Talks

Sudhakar Reddy

Emerging Accidental Faults and Malicious Threats

- **Janak Patel, Jean-Jacques Quisquater**

11h-13h — Paper Presentations

Lorena Anghel

From Transient Faults to Architectural Design Issues

- **Environmental and Power-Induced Disturbances**
- **On-Line Testing and Chip-level Configurability**

14h-15h30 — Panel

Johan Karlsson

**Emerging Hardware Technologies
and Related Dependability & Security Challenges**

- **Jacob Abraham, Helena Handschuh, Takashi Nanya, Alex Orailoglu**

***Coffee Breaks* — Poster Presentations**

Program-at-a-glance (Revised)

9h15-11h

Sudhakar Reddy

Emerging Accidental Faults and Malicious Threats

- Invited Talk: **Janak Patel**
- Paper presentation (1): **Cristian Constantinescu,**

11h-13h — Paper Presentations (7)

Lorena Anghel

- **Palkesh Jain (Rubin Parekhji), Makoto Kimura, Jaume Abella, Rubin Parekhji, Jacques Collet, Peter Klemperer, Giorgio Di Natale**

14h-15h30 — Panel

Johan Karlsson

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Coffee Breaks — Poster Presentations