

2015 IEEE 21st International On-Line Testing Symposium (IOLTS 2015)

**Halkidiki, Greece
6-8 July 2015**



**IEEE Catalog Number: CFP15OLT-POD
ISBN: 978-1-4673-7906-9**

Technical Papers

Session 1	Reliability Evaluation
Date/Time	Monday July 6, 2015 / 10:35 – 11:35
Moderator	S.Hellebrand, <i>U Paderborn</i>

-  **Efficient Multilevel Formal Analysis and Estimation of Design Vulnerability to Single Event Transients....1**
G. B. Hamad, O. A. Mohamed and Y. Savaria
-  **Bayesian Network Early Reliability Evaluation Analysis for both permanent and transient faults....7**
A. Vallero, A. Savino, S. Tselonis, N. Foutris, M. Kaliorakis, G. Politano, D. Gizopoulos, S. Di Carlo
-  **Laser Fault Injection into SRAM cells: Picosecond versus Nanosecond pulses....13**
M. Lacruche, N. Borrel, C. Champeix, C. Roscian, A. Sarafianos, Jean-B. Rigaud, Jean-M. Dutertre and E. Kussener

Session 2	Posters
Date/Time	Monday July 6, 2015 / 11:35 – 13:00

-  **A Call for Cross-Layer and Cross-Domain Reliability Analysis and Management....19**
D. Alexandrescu, A. Evans, E. Costenaro and M. Glorieux
-  **An Accurate Soft Error Propagation Analysis Technique Considering Temporal Masking Disablement....23**
Y. Kimi, G. Matsukawa, S. Yoshida, S. Izumi, H. Kawaguchi and M. Yoshimoto
-  **An Hybrid Architecture for Consolidating Mixed Criticality Applications on Multicore Systems....26**
S. Avramenko, S. Esposito, M. Violante, M. Sozzi, M. Traversone, M. Binello and M. Terrone
-  **Fault Modeling and Testing of Through Silicon Via Interconnections....30**
V. Gerakis, L. Katselas and A. Hatzopoulos
-  **Identifying Aging-Aware Representative Paths in Processors....32**
C. Sandionigi and O. Heron
-  **On the Maximization of the Sustained Switching Activity in a Processor....34**
R. Cantoro, M. Sonza Reorda, A. Rohani and H. G. Kerkhoff
-  **Optimization of SEU Emulation on SRAM FPGAs Based on Sensitiveness Analysis....36**
A. Souari, C. Thibeault, Y. Blaqui re and R. Velazco
-  **Power Analysis Attacks on ARX: An Application to Salsa20....40**
B. Mazumdar, S. Subidh Ali and O. Sinanoglu
-  **Simplification of Fully Delay Testable Combinational Circuits....44**
A. Matrosova, E. Mitrofanov and T. Shah
-  **Soft Error Immune Latch Under SEU Related Double-Node Charge Collection....46**
K. Katsarou and Y. Tsiatouhas
-  **Towards Trojan Circuit Detection with Maximum State Transition Exploration....50**
J. Lenox and S. Tragoudas

Session 3	Reliable Filters and Sensors
Date/Time	Monday July 6, 2015 / 14:00 – 15:00
Moderator	Z. Stamenkovic, <i>IHP</i>

-  **Concurrent Error Detection in Nonlinear Digital Filters Using Checksum Linearization and Residue Prediction....53**
S. Banerjee, Md I. Momtaz and A. Chatterjee

 **Adaptive Healing Procedure for Lifetime Improvement in Wireless Sensor Networks....59**
D. T. Tchakonte, E. Simeu and M. Tchuente

 **Fault-Tolerant System for Catastrophic Faults in AMR Sensors....65**
A. Zambrano and H. G. Kerkhoff

Session 4	Fault Tolerant On-Chip Networks
Date/Time	Monday July 6, 2015 / 15:20 – 16:20
Moderator	A. Grasset, <i>Thales</i>

 **MUGEN: A High-Performance Fault-Tolerant Routing Algorithm for Unreliable Networks-on-Chip....71**
A. Charif, N.-E. Zergainoh and M. Nicolaidis

 **Timing-Resilient Network-on-Chip Architectures....77**
A. Panteloukas, A. Psarras, C. Nicopoulos and G. Dimitrakopoulos

 **Defect Diagnosis Algorithms for a Field Programmable Interconnect Network Embedded in a Very Large Area Integrated Circuit....83**
G. Sion, Y. Blaqui re and Y. Savaria

Session 5	Fault Tolerance
Date/Time	Monday July 6, 2015 / 16:50 – 17:50
Moderator	G. Georgakos, <i>Infineon</i>

 **Design Space Exploration and Optimization of a Hybrid Fault-Tolerant Architecture....89**
I. Wali, A. Virazel, A. Bosio, P. Girard and M. Sonza Reorda

 **Efficient On-Line Fault-Tolerance for the Preconditioned Conjugate Gradient Method....95**
A. Sch  ll, C. Braun, M. A. Kochte and H.-J. Wunderlich

 **Mitigation Of Fail-Stop Failures In Integer Matrix Products Via Numerical Packing....101**
I. Anarado and Y. Andreopoulos

Special Session 1	The Future of Fault Tolerant Computing
Date/Time	Monday July 6, 2015 / 18:00 – 19:30
Organizers/Moderators	D. Gizopoulos, <i>U Athens</i> and D. Alexandrescu, <i>iRoC</i>

 **The Future of Fault Tolerant Computing....108**
J. Abraham, R. Iyer, D. Gizopoulos, D. Alexandrescu and Y. Zorian

Session 6	Error Tolerance and Prediction
Date/Time	Tuesday July 7, 2015 / 09:00 – 10:00
Moderator	A. Paschalis, <i>U Athens</i>

 **Toward Efficient Check-Pointing and Rollback Under On-Demand SBST in Chip Multi-Processors....110**
M. A. Skitsas, C. A. Nicopoulos, M. K. Michael

 **Workload Characterization and Prediction: A Pathway to Reliable Multi-core Systems....116**
M. Zaman, A. A. and Y. Makris

 **Failure Mitigation in Linear, Sesquilinear and Bijective Operations On Integer Data Streams Via Numerical Entanglement....122**
M. A. Anam and Y. Andreopoulos

Special Session 2	Self-Awareness for Resilient System Design
Date/Time	Tuesday July 7, 2015 / 10:30 – 11:30
Organizer/Moderator	M. Tahoori, <i>U Karlsruhe</i>

- S2 Self-Awareness and Self-Learning for Resiliency in Real-Time Systems....128**
M. B. Tahoori, A. Chatterjee, K. Chakrabarty, A. Koneru, A. Vijayan and D. Banerjee

Session 7	Application-Specific Dependability
Date/Time	Tuesday July 7, 2015 / 12:00 – 13:00
Moderator	M. Maniatakos, <i>NYUAD</i>

-  **Filtering-Based Error-Tolerability Evaluation of Image Processing Circuits....132**
Tong-Y. Hsieh and Yi-H. Peng
-  **A Single Chip Dependable and Adaptable Payload Data Processing Unit....138**
N. Kranitis, A. Tsigkanos, G. Theodorou, I. Sideris and A. Paschalis
-  **Characterizing Fault Propagation in Safety-Critical Processor Designs....144**
J. Espinosa, C. Hernandez and J. Abella

Session 8	Secure and Reliable Design
Date/Time	Wednesday July 8, 2015 / 09:00 – 10:00
Moderator	C. Lopez Ongil, <i>U Carlos III de Madrid</i>

-  **Experimental Validation of a Bulk Built-In Current Sensor for Detecting Laser-Induced Currents....150**
C. Champeix, N. Borrel, Jean-M. Dutertre, B. Robisson, M. Lisart and A. Sarafianos
-  **OPUF: Obfuscation Logic Based Physical Unclonable Function....156**
J. Ye, Y. Hu and X. Li
-  **Flip-Flop SEU Reduction through Minimization of the Temporal Vulnerability Factor (TVF)....162**
A. Evans, E. Costenaro and A. Bramnik

Special Session 3	DFx Techniques
Date/Time	Monday July 6, 2015 / 10:30 – 11:30
Organizer/Moderator	M. Nicolaidis, <i>TIMA</i>

-  **An Effective Embedded Test & Diagnosis Solution for External Memories....168**
G. Harutyunyan and Y. Zorian
-  **Low-Power Memory Repair for High Defect Densities....171**
P. Papavramidou and M. Nicolaidis
-  **Reliability/Yield Trade-Off in Mitigating "No Trouble Found" Field Returns....174**
A. Haggag, N. Sumikawa and A. Shaukat

Session 9	Failure Prediction and Diagnosis
Date/Time	Wednesday July 8, 2015 / 12:00 – 13:00
Moderator	E. Ibe, <i>Hitachi</i>

-  **Efficient Observation Point Selection for Aging Monitoring....176**
C. Liu, M. A. Kochte and H.-J. Wunderlich
-  **Mining Simulation Metrics for Failure Triage in Regression Testing....182**
Z. Poulos and A. Veneris
-  **Real-Time On-Chip Supply Voltage Sensor and Its Application to Trace-Based Timing Error Localization....188**
M. Ueno, M. Hashimoto and T. Onoye

Session 10	Memory Reliability
Date/Time	Wednesday July 8, 2015 / 14:00 – 15:00
Moderator	R.Canal, <i>UPC</i>

-  **BTI and Leakage Aware Dynamic Voltage Scaling for Reliable Low Power Cache Memories....194**
D. Rossi, V. Tenentes, S. Khurshed and B. M. Al-Hashimi
-  **New Byte Error Correcting Codes with Simple Decoding for Reliable Cache Design....200**
L. Bu, M. Karpovsky and Z. Wang
-  **Low Leakage Radiation Tolerant CAM/TCAM Cell....206**
N. Eftaxiopoulos, N. Axelos and K. Pekmestzi