

2010 Fifth IEEE International Symposium on Electronic Design, Test & Applications

(DELTA 2010)

**Ho Chi Minh City, Vietnam
13 – 15 January 2010**



**IEEE Catalog Number: CFP10286-PRT
ISBN: 978-1-4244-6025-0**

2010 Fifth IEEE International Symposium on Electronic Design, Test & Applications

DELTA 2010

Table of Contents

Message from the General Chairs	xi
Message from the Technical Program Chairs	xii
Organizing Committee and Reviewers	xiii

Session 1A: DfT and BIST

Test and Repair Scheduling for Built-In Self-Repair RAMs in SOCs	3
<i>Chih-Sheng Hou, Jin-Fu Li, and Che-Wei Chou</i>	
(Some) Open Problems to Incorporate BIST in Complex Heterogeneous	
Integrated Systems	8
<i>Manuel J. Barragán, Gloria Huertas, Adoración Rueda, and José L. Huertas</i>	
Fast Fault Simulation for Extended Class of Faults in Scan Path Circuits	14
<i>Raimund Ubar, Sergei Devadze, Jaan Raik, and Artur Jutman</i>	
Enabling False Path Identification from RTL for Reducing Design and Test	
Futileness	20
<i>Hiroshi Iwata, Satoshi Ohtake, and Hideo Fujiwara</i>	

Session 1B: Signal and Image Processing

Least-squares Optimal Interpolation for Fast Image Super-resolution	29
<i>Andrew Gilman, Donald Bailey, and Stephen Marsland</i>	
Design, Fabrication and Characterization of Asymmetric Fabry-Perot	
Modulator for Large Size Optical Shutter	35
<i>Byung Hoon Na, Kwang Mo Park, Sooraj R., Bong Kyu Jeong, Young Min Song, Yong Tak Lee, and Chang Soo Park</i>	
A Hybrid CMOS DPS with Conditional Data Readout Scheme	44
<i>Ka Lai Lau, Sylvain Léomant, and Amine Bermak</i>	

Session 2A: Low Power

A 75dB-gain Low-power, Low-noise Amplifier for Low-frequency Bio-signal Recording	51
<i>Dalila Salhi and Balwant Godara</i>	
A Low-Power Associative Processor with the R-th Nearest-Match Hamming-Distance Search Engine Employing Time-Domain Techniques	54
<i>Trong Tu Bui and Tadashi Shibata</i>	
Energy-aware Filter Cache Architecture for Multicore Processors	58
<i>Young Jin Park, Hong Jun Choi, Cheol Hong Kim, and Jong-Myon Kim</i>	

Session 2B: Digital Design and Applications

Independent Component Analysis Applied to Watermark Extraction and its Implemented Model on FPGAs	71
<i>Thuong Le-Tien, Dien Vo-Ngoc, Lan Ngo-Hoang, and Sung Young Lee</i>	
Algorithm Transformation for FPGA Implementation	77
<i>Donald G. Bailey and Christopher T. Johnston</i>	
Designing a Hardware Accelerator for Face Recognition Using Vector Quantization and Principal Component Analysis as a Component of SoPC	82
<i>Diem Tran, Thi To, Thuan Huynh, and Phuong Nguyen</i>	
Aggressive Register Unsharing Based on SSA Transformation for Clock Enhancement in High-Level Synthesis	87
<i>Toshinobu Matsuba, Yuko Hara, Hiroyuki Tomiyama, Shinya Honda, and Hiroaki Takada</i>	

Poster Session 1

16-QAM Transmitter and Receiver Design Based on FPGA	95
<i>Xuan-Thang Vu, Nguyen Anh Duc, and Trinh Anh Vu</i>	
A More Precise Model of Noise Based PCMOS Errors	99
<i>Arun Bhanu, Mark S.K. Lau, Keck-Voon Ling, Vincent J. Mooney III, and Anshul Singh</i>	
A Smart CMOS Image Sensor with On-chip Hot Pixel Correcting Readout Circuit for Biomedical Applications	103
<i>Yuan Cao, Fang Tang, Amine Bermak, and Thinh Le</i>	
CPU Testability in Embedded Systems	108
<i>Janusz Sosnowski and Lukasz Tupaj</i>	

Session 3A: Analogue and Mixed-Signal Design

Wide Band Linear Voltage-to-Current Converter Design	115
<i>Chun Wei Lin, Sheng Feng Lin, and Chi Fu Wang</i>	
DVCC-Based Voltage-Mode Biquadratic Filter with High-Input Impedance	121
<i>Wei-Yuan Chiu, Jiun-Wei Horng, Hung Lee, and Chen-Chuan Huang</i>	

Session 3B: Communication and MIMO Implementations

Channel Auto-Correlation and Doppler Spectrum of MIMO Systems Using Circular Array	135
<i>Huu Phu Bui, Le Khoa Dang, and Anh Vinh Nguyen</i>	
FPGA Implementation of a Real Time Maximum Likelihood Space-Time Decoder on a MIMO Software Radio Test Platform	139
<i>Peter J. Green and Desmond P. Taylor</i>	
Inverse Neural MIMO NARX Model Identification of Nonlinear System Optimized with PSO	144
<i>Ho Pham Huy Anh and Nguyen Huu Phuc</i>	

Session 4A: Algorithms in Design

An Adaptive Huffman Decoding Algorithm for MP3 Decoder	153
<i>Hoang-Anh Pham, Van-Hieu Bui, and Anh-Vu Dinh-Duc</i>	
An Event-Assisted Sequencer to Accelerate Matrix Algorithms	158
<i>Adam Burdeniuk, Kiet N. To, Cheng Chew Lim, and Mike J. Liebelt</i>	
An Exact and Efficient Critical Path Tracing Algorithm	164
<i>Alberto Bosio, Patrick Girard, Serge Pravossoudovitch, Paolo Bernardi, and Matteo Sonza Reorda</i>	
Development of Quantum Device Simulator, NEMO-VN2	170
<i>Dinh Sy Hien</i>	

Session 4B: Advanced Communication Design

A Four-Stage Design Approach Towards Securing a Vehicular Ad Hoc Networks Architecture	177
<i>Raghu Sunnadkal, Ben Soh, and Hien Phan</i>	
An Efficient Hardware Implementation for a Reciprocal Unit	183
<i>Andreas Habegger, Andreas Stahel, Josef Goette, and Marcel Jacomet</i>	
Project-Based Learning in Robotics and Electronics in Undergraduate Engineering Program Setting	188
<i>A. Price, R. Rimington, M.T. Chew, and S. Demidenko</i>	

Session 5A: Parallel and Serial Design Techniques

Modeling of Probabilistic Ripple-Carry Adders	201
<i>Mark S.K. Lau, Keck Voon Ling, Yun Chung Chu, and Arun Bhanu</i>	
A High-speed 32-bit Signed/Unsigned Pipelined Multiplier	207
<i>Qingzheng Li, Guixuan Liang, and Amine Bermak</i>	
Notations for Multiphase Pipelines	212
<i>Christopher T. Johnston, Donald G. Bailey, and Paul Lyons</i>	
Massively Parallel Cuckoo Pattern Matching Applied for NIDS/NIPS	217
<i>Tran Ngoc Thinh and Surin Kittitornkun</i>	

Session 5B: Special Session on Biomedical Devices

An ECG-on-Chip for Wearable Cardiac Monitoring Devices	225
<i>Chacko John Deepu, Xiaoyuan Xu, Xiaodan Zou, Libin Yao, and Yong Lian</i>	
Nanomanipulation of Living Cells on a Chip Using Electric Field: General Concepts and Microdevices	229
<i>Julien Villemajane, Guillaume Mottet, Olivier Francois, Bruno Le Pioufle, Jean-Pierre Lefèvre, Marion Woytasik, Elisabeth Dufour-Gergam, and Lluis M. Mir</i>	
Detection of Electrical Activity of Pancreatic Beta-cells Using Micro-electrode Arrays	233
<i>Yannick Bornat, Matthieu Raoux, Youssef Boudaib, Fabrice Morin, Gilles Charpentier, Jochen Lang, and Sylvie Renaud</i>	
Integrated Multiplexer for Nerve Electrodes	237
<i>Zeng Lertmanorat and Dominique M. Durand</i>	

Session 6A: Advanced Design Solutions

An Innovative 6T Hybrid SRAM Cell in sub-32 nm Double-Gate MOS Technology	241
<i>Amara Amara, Bastien Giraud, and Olivier Thomas</i>	
Run-time Control of Subthreshold Current using Double-Gate Device Technology	245
<i>Paul Beckett and Heiko Rudolph</i>	
A Novel Design Framework for Business Process Modelling in Automotive Industry	250
<i>Zwikamu Dubani, Ben Soh, and Chris Seeling</i>	
Evaluation of Resistance to Differential Power Analysis: Execution Time Optimizations for Designers	256
<i>G. Di Natale, M.-L. Flottes, and B. Rouzeyre</i>	

Session 6B: Defects and Dependability

Impact of Resistive-Bridging Defects in SRAM Core-Cell	265
<i>Renan Alves Fonseca, Luigi Dilillo, Alberto Bosio, Patrick Girard, Serge Pravossoudovitch, Arnaud Virazel, and Nabil Badereddine</i>	
Design of an Infrastructural IP Dependability Manager for a Dependable Reconfigurable Many-Core Processor	270
<i>Hans G. Kerkhoff and Xiao Zhang</i>	
Fast and Accurate Automatic Defect Cluster Extraction for Semiconductor Wafers	276
<i>Melanie Po-Leen Ooi, Chris Chan, Wey Jean Tee, Ye Chow Kuang, Lindsay Kleeman, and Serge Demidenko</i>	
Estimating Error-probability and its Application for Optimizing Roll-back Recovery with Checkpointing	281
<i>Dimitar Nikolov, Urban Ingesson, Virendra Singh, and Erik Larsson</i>	

Poster Session 2

Hazard-free Muller Gates for Implementing Asynchronous Circuits on Xilinx FPGA	289
<i>Cuong Pham-Quoc and Anh-Vu Dinh-Duc</i>	
A Pseudo-Boolean Technique for Generating Compact Transition Tests with All-Output-Propagation Properties	293
<i>Tsuyoshi Iwagaki and Mineo Kaneko</i>	
Routing and Tracking System for Mobile Vehicles in Large Area	297
<i>Thuong Le-Tien and Vu Phung-The</i>	

Session 7: Invited Talks

Digital Logic Implementation in Memristor-Based Crossbars - A Tutorial	303
<i>Tezaswi Raja and Samiha Mourad</i>	
Virtual Instrumentation Based IC Parametric Tester for Engineering Education	310
<i>Loren Nolan, Moi-Tin Chew, Serge Demidenko, and Melanie Ooi</i>	

Session 8A: Sensor Devices and Systems

Very High Q, NEMS Inductor for 12GHz Wireless Sensor Applications	319
<i>N. Khalid, J. Singh, H.P. Le, K. Shah, J. Devlin, and Z. Sauli</i>	
Reconfigurable multivariable MEMS sensor array	325
<i>Stephen Paul van der Velden and Jugdutt Singh</i>	
Read-out Circuit Analysis for High-speed Low-noise VCO Based APS CMOS Image Sensor	330
<i>Fang Tang and Amine Bermak</i>	

Session 8B: Advanced Testing Techniques

A Fast Threshold Test Generation Algorithm Based on 5-Valued Logic	345
<i>Tomoo Inoue, Nobukazu Izumi, Yuki Yoshikawa, and Hideyuki Ichihara</i>	
Low Frequency Test for RF MEMS Switches	350
<i>Gustavo P. Rehder, Salvador Mir, Libor Rufer, Emmanuel Simeu, and Hoang N. Nguyen</i>	
The Discrimination of Metallic Coins Using a Scan Type Magnetic Camera	355
<i>Jongwoo Jun, Jinyi Lee, and Jaesun Lee</i>	
Evaluating the Performance of Different Classification Algorithms for Fabricated Semiconductor Wafers	360
<i>Jian Wei Cheng, Melanie Po-Leen Ooi, Chris Chan, Ye Chow Kuang, and Serge Demidenko</i>	
Author Index	367