

Institution of Engineering and Technology

# IET Irish Signals and Systems Conference 2008

IET Conference Publications 539

June 18-19, 2008  
Galway, Ireland

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[www.proceedings.com](http://www.proceedings.com)

ISBN: 978-1-60560-691-0

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2008) by the Institution of Engineering and Technology.  
All rights reserved.

For permission requests, please contact the Institution of Engineering and Technology  
at the address below.

Institution of Engineering and Technology  
P.O. Box 96  
Stevenage, U.K.  
SG1 2SD

# TABLE OF CONTENTS

<b>Adaptivity and Reliability in Future Chips: Multi-core and Reconfigurable Architectures in the Nano Era</b> .....	1
<i>J. Becker</i>	
<b>Side Channel Analysis of an Automotive Microprocessor</b> .....	2
<i>M.D. Hamilton, M. Tunstall, E.M. Popovici, W.P. Marnane</i>	
<b>Fault Injection Platform for Block Ciphers</b> .....	8
<i>B. Baldwin, E.M. Popovici, M. Tunstall, W.P. Marnane</i>	
<b>Structural Division Procedure for Efficient IC Analysis</b> .....	14
<i>M. Brutscheck, S. Berger, M. Franke, A.T. Schwarzbacher, S. Becker</i>	
<b>State Estimation for the VASIMR Plasma Engine</b> .....	20
<i>S. Lynn, J. Ringwood, J.I. Del Valle Gamboa</i>	
<b>An Investigation of Sub-band FM Feature Extraction in Speaker Recognition</b> .....	26
<i>T. Thiruvaran, J. Epps, E. Ambikairajah, E. Jones</i>	
<b>Objective Assessment of Audio Quality</b> .....	31
<i>D. Palomar, R. Skehill, I. Rice, D. Picovici, S. McGrath</i>	
<b>Pitch Tracking and Voiced/unvoiced Detection in Noisy Environment Using Optimal Sequence Estimation</b> .....	37
<i>M. Wasserblat, M. Gainza, D. Dorran, Y. Domb</i>	
<b>The Relevance of the CLP Measure of a VoIP System with Regard to QoV</b> .....	43
<i>D. Riordan , P. Doody</i>	
<b>Identifying Skin Electrical Properties Using a Standard Neuromuscular Electrical Stimulation Voltage Pulse</b> .....	49
<i>S.I. Birlea, N.M. Birlea, P.P. Breen, G. OLaighin</i>	
<b>Classification of Suspicious Regions Within Ultrawideband Radar Images of the Breast</b> .....	54
<i>R.C. Conceicao, D. Byrne, M. O'Halloran, M. Glavin, E. Jones</i>	
<b>Nonlinear Analysis of the 2nd Order Digital Phase Locked</b> .....	60
<i>B. Daniels , R. Farrell</i>	
<b>Project-based Learning in Control Engineering</b> .....	66
<i>T. O'Mahony</i>	
<b>Control of a Highly Non-linear Multi-variable Thermal Processing Furnace</b> .....	72
<i>K.O. Donoghue , A.M. Holohan</i>	
<b>Slewing Control of Flexible Space Structures: a Wave-based Approach</b> .....	78
<i>W.J. O'Connor , A. Fumagalli</i>	
<b>Application of the Discrete-time Structured Singular Value for DC-DC Converters</b> .....	84
<i>M. Halton, M. Scharrer, T. Scanlan</i>	
<b>Gait Patterns Classification Using Spectral Features</b> .....	90
<i>R.K. Ibrahim, E. Ambikairajah, B. Celler, N.H. Lovell, L. Kilmartin</i>	
<b>Motion Compensated Complementary Coding for Medical Ultrasound</b> .....	95
<i>C. Cannon, J. Hannah, S. McLaughlin</i>	
<b>Accelerometer and Footswitch Evaluation of Movement in Three Elderly Patient Groups</b> .....	101
<i>A.P. Barrett, K.M. Culhane, A.M. Finucane, G. OLaighin, D. Lyons</i>	

<b>Dual MAC Processor for Adaptive Control of Multiple High Switching Frequency DC-DC Converters</b> .....	107
<i>J. Mooney, A.E. Mahdi, A. Kelly, K. Rinne</i>	
<b>Towards Automatic Management of Reconfigurable Accelerators</b> .....	113
<i>K. Kosciuszkiewicz, F. Morgan, K. Kepa, N.T. Murphy</i>	
<b>Architecture of Efficient RNS-based Digital Signal Processor with Very Low-level Pipelining</b> .....	118
<i>S.J. Piestrak, K.S. Berezowski</i>	
<b>Curvature Correction Method for a Bandgap Voltage Reference</b> .....	124
<i>S. Marinca, T. O'Dwyer</i>	
<b>An FPGA-based Cognitive Radio Framework</b> .....	128
<i>J. Lotze, S.A. Fahmy, J. Noguera, L. Doyle, R. Esser</i>	
<b>Algorithm for Adjustment of DDR Write Interface Timing</b> .....	134
<i>P. Fleming, P. Ostropolski</i>	
<b>Ultra Fast Locking, Low Jitter, Auto-ranging Phase-locked Loop</b> .....	139
<i>E. O'Sullivan, I. Kennedy, D. McSweeney, B. O'Regan, P.K. Chrasekar, Z. Zhang, S. Foley</i>	
<b>A Combined Approach to Feature Extraction for Mouth Characterization and Tracking</b> .....	145
<i>I. Bacivarov, M.C. Ionita, P. Corcoran</i>	
<b>Review of Geometric Distortion Compensation in Fish-eye Cameras</b> .....	151
<i>C. Hughes, M. Glavin, E. Jones, P. Denny</i>	
<b>A Review of Automotive Infrared Pedestrian Detection Techniques</b> .....	157
<i>R. O'Malley, M. Glavin, E. Jones</i>	
<b>Optical Safety Assessment of a Near-infrared Brain-computer Interface</b> .....	163
<i>C.J. Soraghan, T.E. Ward, F. Matthews, C. Markham</i>	
<b>Optimisation of Optical Signal Delay in Slow-light Systems Based on Stimulated Brillouin Scattering</b> .....	169
<i>R. Henker, T. Schneider, A. Wiatrek, K.-U. Lauterbach, M. Junker, M.J. Ammann, A.T. Schwarzbacher</i>	
<b>Automatic ASCII Art Conversion of Binary Images Using Non-negative Constraints</b> .....	175
<i>P.D. O'Grady, S. Rickard</i>	
<b>FPGA Based Adaptive Optics Control System</b> .....	181
<i>S. Lynch, D. Coburn, F. Morgan, C. Dainty</i>	
<b>IEEE 1500 Wrapper Control Using an IEEE 1149.1 Test Access Port</b> .....	187
<i>M. Higgins, C. MacNamee, B. Mullane</i>	
<b>An Optimal IEEE 1500 Core Wrapper Design for Improved Test Access and Reduced Test Time</b> .....	193
<i>B. Mullane, M. Higgins, C. MacNamee</i>	
<b>A Proactive Maintenance Scheme for Hardware Fault Diagnosis in Wireless Systems</b> .....	199
<i>B. Walsh, R. Farrell</i>	
<b>Performance Optimization Algorithm for DDR Interface</b> .....	205
<i>P. Ostropolski, P. Fleming</i>	
<b>Wave-based Control of Flexible Mechanical Systems</b> .....	209
<i>W.J. O'Connor</i>	

<b>Wearable Ultra-wideband Channel Sounder for MIMO Antenna Systems .....</b>	<b>210</b>
<i>P.A. Catherwood , W.G. Scanlon</i>	
<b>A Preliminary Analysis of HIV Infection Dynamics .....</b>	<b>216</b>
<i>J. Ferreira , R. Middleton</i>	
<b>Experimental Characterisation and Analysis of Wireless Network Control Systems .....</b>	<b>222</b>
<i>J. Chen, A. McKernan, G.W. Irwin, W.G. Scanlon</i>	
<b>Biogas Plant Optimization Using Genetic Algorithms and Particle Swarm Optimization .....</b>	<b>228</b>
<i>C. Wolf, S. McLoone, M. Bongards</i>	
<b>Advanced Methods for Control of Neural Prostheses .....</b>	<b>234</b>
<i>D.B. Popovic</i>	
<b>Experimental Evaluation of a Single Access Point Bluetooth Localisation System .....</b>	<b>235</b>
<i>D. Kelly, S. McLoone, T. Dishongh</i>	
<b>Distributed Power Control Technique for 802.15.4 Wireless Sensor Networks, Based Quantitative Feedback Theory .....</b>	<b>241</b>
<i>S.M.M. Alavi, M. Walsh, M. Hayes</i>	
<b>A Modified Bumpless Transfer Technique for Seamless Handoff in Mobile Ad-hoc 802.15.4 Wireless Sensor Networks .....</b>	<b>249</b>
<i>M. Walsh, S.M.M. Alavi, M. Hayes</i>	
<b>Automatic Detection of Optimal Azimuth Widths for Sound Source Separation Using Adress .....</b>	<b>255</b>
<i>D. FitzGerald, D. Barry, M. Cranitch, E. Coyle</i>	
<b>Violin Sound Quality Detection .....</b>	<b>261</b>
<i>J.A. Charles, D. Fitzgerald, E. Coyle</i>	
<b>Single Channel Sound Source Separation Combining Delay Estimation and the ADRESS Algorithm .....</b>	<b>267</b>
<i>M. Leddy, D. Barry, D. Dorran, E. Coyle</i>	
<b>A True Random Binary Sequence Generator Based on Chaotic Circuit.....</b>	<b>272</b>
<i>M. Blaszczyk, R.A. Guinee</i>	
<b>Evaluating Mobility in a RF Isolation Testbed .....</b>	<b>278</b>
<i>P. Scully, R. Skehill, S. McGrath</i>	
<b>Design and Test of a Long-term Fall Detection System Incorporated Into a Custom Vest for the Elderly .....</b>	<b>285</b>
<i>A.K. Bourke, P. van de Ven, A. Chaya, G. OLaighin, J. Nelson</i>	
<b>A Preliminary Investigation of Monitoring ADLs Using Wireless Kinematic Sensors .....</b>	<b>291</b>
<i>A.F. Dalton, F. Morgan, G. OLaighin</i>	
<b>A Wireless Platform for Fall and Mobility Monitoring .....</b>	<b>297</b>
<i>P. van de Ven, A.K. Bourke, J. Nelson, G.O. Laighin</i>	
<b>The Development of Advanced Verification Environments Using System Verilog .....</b>	<b>303</b>
<i>M. Keaveney, A. McMahon, N. O'Keeffe, K. Keane, J. O'Reilly</i>	
<b>Lifting Scheme Discrete Wavelet Transform Using Vertical and Crosswise Multipliers .....</b>	<b>309</b>
<i>A. O'Brien , R. Conway</i>	

<b>A Hardware Implementation of a Run Length Encoding Compression Algorithm with Parallel Inputs .....</b>	<b>315</b>
<i>J. Trein, A.T. Schwarzbacher, B. Hoppe, K.-H. Noffz</i>	
<b>Intelligent Assessment Tool .....</b>	<b>321</b>
<i>R. Ciora, P. Corcoran, B. McDaniel, M. Leyden</i>	
<b>A Novel Transmission Line Test and Fault Location Methodology Using Pseudorandom Binary Sequences.....</b>	<b>326</b>
<i>R.A. Guinee</i>	
<b>32 GHz Carrier Generation and 200 Mbit/s Error Free Data Transmission in a Radio Over Fibre System .....</b>	<b>332</b>
<i>M. Junker, T. Schneider, M.J. Ammann, A.T. Schwarzbacher, K.-U. Lauterbach, R. Henker, S. Neidhardt</i>	
<b>Non-line of Sight Mitigation Using a Range and Location Filtering Algorithm .....</b>	<b>337</b>
<i>J.R. Gonzalez , C.J. Bleakley</i>	
<b>Proposed Architecture of Configurable, Adaptable SoC.....</b>	<b>343</b>
<i>J. Kadlec, M. Danek, L. Kohout</i>	
<b>Programmable Architectures for Large-scale Implementations of Spiking Neural Networks .....</b>	<b>349</b>
<i>J. Harkin, L. McDaid, S. Hall, T. Dowrick, F. Morgan</i>	
<b>Design of Residue Multipliers-accumulators Using Periodicity .....</b>	<b>355</b>
<i>S.J. Piestrak , K.S. Berezowski</i>	
<b>The Enumeration of Costas Arrays of Order 27 .....</b>	<b>361</b>
<i>K. Drakakis, S. Rickard, R. Caballero, F. Ioriol, G. O'Brien, J. Walsh</i>	
<b>Logarithmic Tools for In-camera Image Processing .....</b>	<b>367</b>
<i>C. Florea, F. Albu, C. Vertan, A. Drimbarcan</i>	

**Author Index**