

## Conference Program

### Day 1 : Wed 18th Nov.

**Registration and Nibbles at St Margarets College, 12:00 - 13:00**

**Opening Address by Gary Bold, 13:00**

#### **Oral Session 1 (13:20): General Electronics, Chair: Tim Molteno**

- 1 The Comparison of Analogue and Digital One- Cycle Control Feedback Methods around the Output Stage in a Digital Audio Power Amplifier  
*C.D. Benton, D.A. Carnegie and P. Gaynor*
- 7 A Model Predictive Control toolbox intended for rapid prototyping  
*J. Currie, and D.I. Wilson*
- 13 Fast Counters using a Modified Fibonacci Number System  
*R.Ward, and T.C.A. Molteno*
- 19 Differential Evolution and its Application to Intelligent Spectral Design  
*S. Soltic and A.N. Chalmers*

#### **Poster Session (18:30), Chair: Colin Fox**

- 25 Design of an Improved Fuzzy Logic Controller Micro-Chip for Washing Machine  
*P. Lohani, and S.M.R. Hasan*
- 31 Speedometer Calibration Unit  
*S. Nalli*
- 37 Power Characterisation of IEEE 802.15.4 and Zigbee Wireless Networks  
*A. Prince-Pike, and J.D. Collins*
- 43 Low-Cost Temperature Sensor on a Modern Submicron CMOS Process  
*R.P. Fisk and S.M.R. Hasan*
- 49 A toy example of electrical impedance imaging using computational inference  
*E. Ma and C. Fox*
- 55 Low-cost contour and groundwater mapping  
*C. Fox*
- 61 Precise and Highly Selective Tonal Frequency Tracking  
*A. Opie, M Hayes, and J. Cavers*
- 67 OGRE Compute Client Architectures  
*P. Suggate, and T. C. A. Molteno*
- 71 Dynamic linear scaling in genetic algorithm for antenna design  
*P.J. Williams, and T.C.A. Molteno*

### Day 2 : Thu 19th Nov.

#### **Oral Session 2 (09:00): FPGA, Imaging & Inference, Chair: Slava Kitaev**

- 75 Design of a FPGA-based multi-channel front-end for synthetic aperture sonar  
*B.C. Bonnett and M.P. Hayes*

- 81 Digital Receiver for Transient Radio Emission Array Detector Prototype (TREAD-P)  
*V. Kitaev, A. Perera, and G. Soudlenkov*
- 87 Minimum Hamming Weight Representations for Irregular Symbol Alphabets  
*W. Kamp, A. Bainbridge-Smith, and M. Hayes*
- 95 Advantages of 3D Time-of-Flight Range Imaging Cameras in Machine Vision Applications  
*A.A. Dorrington, C.D.B. Kelly, S.H. McClure, A.D. Payne, and M.J. Cree*
- 101 Circular Polarised Patch Antenna for Medical Microwave Holography  
*O. Sergieiev, and V. Kitaev*

**Oral Session 3 (13:00): Radio Astronomy & Instrumentation, Chair: Melanie Johnston-Hollitt**

- 107 Current New Zealand Activities in Radio Astronomy: Building Capacity in Engineering & Science for the Square Kilometre Array  
*M. Johnston-Hollitt, V. Kitaev, C.P. Hollitt, N. Jones, and T.C.A. Molteno*
- 113 Automatic Detection of Supernova Remnants using the Circle Hough Transform  
*C. Hollitt, and M. Johnston-Hollitt*
- 119 A comparative study of ‘inversion’, ‘optimization’, and ‘inference’ as frameworks for imaging  
*C. Fox and N. Dudley Ward*
- 125 WaterLogged, an assistive device for Waka Ama  
*V.A. Fletcher and D.A. Carnegie*
- 131 Comparison of Optimized Low-Power LNA topologies for 866 MHz UHF RFID  
*J Li and S.M.R Hasan*
- 137 A Digital CMOS Sequential Circuit Model for Bio-Cellular Adaptive Immune Response Pathway Using Phagolysosomal Digestion: A Digital Phagocytosis Engine  
*S.M.R. Hasan*
- 143 Channel Sounding with Software Defined Radio  
*H.W.H. Jones, P.A. Dmochowski, and P.D. Teal*
- 149 Design of a Low-power Narrow Band amplifier for HF Radio Applications using CMOS FETs  
*M Khurramand, and R Hasan*

**Day 3 : Fri 20th Nov.**

**Oral Session 4 (09:00): Robotics, Mechatronics & Wireless Sensing, Chair: Dale Carnegie**

- 153 Life Sign Detection on a Disposable Robotic Platform as Part of a Three-Tier System for Urban Search and Rescue Operations  
*B.M.M. Drayton, and D.A. Carnegie*
- 159 The design and implementation of a reliable robotic pipe inspection system  
*S.J. Winch, and D.A. Carnegie*
- 165 Environmental Monitoring with Wireless Sensor Networks  
*A. Ghobakhlou, T.A.S.A. Perera, P. Sallis, O. Diegel and S. Zandi*
- 171 Wireless Soil Moisture Sensor for Vineyard Soil Monitoring  
*T.A.S.A Perera, and J.D. Collins*
- 177 The Slot Car Stig: Performance and Consistency of a Slot Car Driven by a Heuristic Algorithm in an Embedded Microcontroller  
*S. Kane, and J. Scott*
- 181 **Index of Authors**