

49<sup>th</sup> IEEE International Symposium on Multiple-Valued Logic

# ISMVL 2019

May 21 – 23, 2019 Fredericton, New Brunswick, Canada

## Final Program



Sponsored by:



TC on MVL

May 20, Monday	
13:30	<b>Workshop on Post-Binary ULSI Systems</b> (Workshop Chair: <i>M. Natsui</i> )
18:00	<b>ISMVL Registration &amp; Welcome Reception</b> (Beaverbrook Art Gallery)
May 21, Tuesday	
08:00	<b>ISMVL Registration</b>
08:30	<b>Opening</b> (Symposium Chair: <i>G. Dueck</i> and Program Chair: <i>M. Soeken</i> )
09:00	<b>[Keynote Address I]</b> Chair: <i>G. Dueck</i> <b>Stochastic Logic: Mathematical Underpinnings and Practical Applications</b> <i>Marc Riedel (University of Minnesota, USA)</i>
10:00	<b>Coffee Break</b>
	<b>[Session 1A]</b> Chair: <i>M. Miller</i>
	<b>[Session 1B]</b> Chair: <i>N. Homma</i>
10:30	<b>One Additional Qubit is Enough: Encoded Embeddings for Boolean Components in Quantum Circuits</b> <i>A. Zulehner, P. Niemann, R. Drechsler, and R. Wille</i>
	<b>Waveform Shaping Transmitter Combining Digital and Analog Circuits for Multi-Valued Signaling</b> <i>Y. Iijima and Y. Yuminaka</i>
11:00	<b>CNOT Gate Mappings to Clifford+T Circuits in IBM Architectures</b> <i>A. A. A. de Almeida, G. W. Dueck, and A. C. R. da Silva</i>
	<b>Demonstration of Ternary Devices and Circuits Using Dual Channel Graphene Barristors</b> <i>S.-Y. Kim, S. Heo, K. Kim, M. Son, S.-M. Kim, H.-I. Lee, Y. Lee, H. J. Hwang, M.-H. Ham, and B. Hun Lee</i>
11:30	<b>Scaling-up ESOP Synthesis for Quantum Compilation</b> <i>B. Schmitt, M. Soeken, G. De Micheli, and A. Mishchenko</i>
12:00	<b>Lunch (Symposium Subcommittee Meeting)</b>
13:30	<b>[Dedication Talk to the Memory of Ivo Rosenberg]</b> Chair: <i>L. Haddad</i>
	<b>[Session 2A]</b> Chair: <i>L. Haddad</i> <b>- Special Session -</b>
	<b>[Session 2B]</b> Chair: <i>T. Sasao</i>
14:00	<b>The Inclusion Structure of Boolean Weak Bases</b> <i>B. Roy and V. Lagerkvist</i>
	<b>A Ternary Fuzzy Extractor for Efficient Cryptographic Key Generation</b> <i>K. Kazumori, R. Ueno, and N. Homma</i>
14:30	<b>Design of Quad-Edge-Triggered Sequential Logic Circuits for Ternary Logic</b> <i>S. Kim, S.-Y. Lee, S. Park, and S. Kang</i>
	<b>Threshold Physical Unclonable Functions</b> <i>F. Marrassello, Y. Yu, and E. Dubrova</i>
15:00	<b>The Mathematics of Ivo Rosenberg</b> <i>L. Haddad, M. Couceiro, and M. Pouzet</i>
	<b>The Four-Valued Logic in UML/OCL Models: A "Playground" for the MVL Community (Tutorial)</b> <i>N. Przigoda, J. Przigoda, and R. Wille</i>
15:30	<b>Coffee Break</b>
	<b>[Session 3A]</b> Chair: <i>M. Lukac</i>
	<b>[Session 3B]</b> Chair: <i>Y. Yuminaka</i>
16:00	<b>Spectral Invariant Operations in the p-Valued Spectral Domain</b> <i>C. Moraga, M. Stankovic, and R. Stankovic</i>
	<b>A Noise Convolutional Neural Network and FPGA Implementation</b> <i>A. Munakata, H. Nakahara, and S. Sato</i>
16:30	<b>The Invariance of Spectral-Kolmogorov-Type Statistics for Estimating Genomic Similarity</b> <i>M. Thornton</i>
	<b>Design of a Current-Mode Linear-Sum-Based Bitcounting Circuit with an MTJ-Based Compensator for Binarized Neural Networks</b> <i>T. Chiba, M. Natsui, and T. Hanyu</i>
17:00	<b>Remarks on Similarities Among Ternary Bent Functions</b> <i>R. Stankovic, M. Stankovic, J. T. Astola, and C. Moraga</i>
	<b>A Novel Machine Learning Algorithm to Reduce Prediction Error and Accelerate Learning Curve for Very Large Datasets</b> <i>W. Hou and M. Perkowski</i>

May 22, Wednesday	
09:00	<b>[Keynote Address II]</b> Chair: <i>S. Nagayama</i> <b>Approximate Boolean and Max-plus Matrix Factorizations in Algorithmic Data Analysis</b> <i>Pauli Miettinen (University of Eastern Finland, Finland)</i>
10:00	<b>Coffee Break</b>
	<b>[Session 4A]</b> Chair: <i>R. Wille</i>
	<b>[Session 4B]</b> Chair: <i>F. Manyà</i>
10:30	<b>Reversible Pebble Games For Reducing Qubits In Hierarchical Quantum Circuit Synthesis</b> <i>D. Bhattacharjee, M. Soeken, S. Dutta, A. Chattopadhyay, and G. De Micheli</i>
	<b>Finite Model Property for Modal Ideal Paraconsistent Four-Valued Logic</b> <i>N. Kamide and Y. Zohar</i>
11:00	<b>T-Depth Optimization for Fault-Tolerant Quantum Circuits</b> <i>P. Niemann, A. Gupta, and R. Drechsler</i>
	<b>Task Value Calculus: Multi-objective Trade off Analysis Using Multiple-Valued Decision Diagrams</b> <i>T. Giallanza, E. Gabrielsen, M. A. Taylor, E. C. Larson, and M. A. Thornton</i>
11:30	<b>Entanglement in Higher-Radix Quantum Systems</b> <i>K. Smith and M. Thornton</i>
	<b>Clausal Form Transformation in MaxSAT</b> <i>C.-M. Li, F. Manyà, and J. R. Soler</i>
12:00	<b>Lunch</b>
14:00	<b>Excursion</b>
18:30	<b>Banquet</b>

May 23, Thursday	
09:00	<b>[Keynote Address III]</b> Chair: <i>M. Soeken</i> <b>Quantum Computing with Noisy Intermediate-scale Devices</b> <i>Andrew Cross (IBM, USA)</i>
10:00	<b>Coffee Break</b>
	<b>[Session 5A]</b> Chair: <i>P. Niemann</i>
	<b>[Session 5B]</b> Chair: <i>H. Machida</i> <b>- Special Session -</b>
10:30	<b>Realizing All Index Generation Functions By the Row-Shift Method</b> <i>J. Butler and T. Sasao</i>
	<b>Ternary Logic Synthesis with Modified Quine-McCluskey Algorithm</b> <i>S.-Y. Lee, S. Kim, and S. Kang</i>
11:00	<b>A Dynamic Programming Based Method for Optimum Linear Decomposition of Index Generation Functions</b> <i>S. Nagayama, T. Sasao, and J. Butler</i>
	<b>An Approach Toward Classification of Minimal Groupoids on a Finite Set</b> <i>M. Behrisch and H. Machida</i>
11:30	<b>Quasi-Postan Logic Hazard of Postan Signals</b> <i>M. Rudziecki</i>
	<b>Fine-Grained Complexity of Constraint Satisfaction Problems through Partial Polymorphisms: A Survey</b> <i>M. Couceiro, L. Haddad, and V. Lagerkvist</i>
12:00	<b>Lunch (Technical Committee Meeting)</b>

May 23, Thursday (continued)		
	<b>[Session 6A]</b> Chair: <i>V. Lagerkvist</i>	<b>[Session 6B]</b> Chair: <i>M. Thornton</i>
14:00	<b>First-order Nelsonian Paraconsistent Quantum Logic</b> <i>N. Kamide</i>	<b>Comparative Analysis of Full Adder Custom Design Circuit using Two Regular Structures in Quantum-Dot Cellular Automata (QCA)</b> <i>R. Singhal and M. Perkowski</i>
14:30	<b>On a Minimization of Variables to Represent Sparse Multi-Valued Input Decision Functions</b> <i>T. Sasao</i>	<b>Synthesis of Nondeterministic Behavior in Recombinase-Based Genetic Circuits</b> <i>Z.-J. Lin, W.-C. Huang, and J.-H. Jiang</i>
15:00	<b>Maximally Asymmetric Multiple-Valued Functions</b> <i>J. Butler and T. Sasao</i>	<b>Non-Binary Approaches for Classification of Amyloid Brain PET</b> <i>K. Zukotynski, V. Gaudet, P. Kuo, S. Adamo, M. Goubran, C. Bocti, M. Borrie, H. Chertkow, R. Frayne, R. Hsiung, R. Jr. Laforce, M. Noseworthy, F. Prato, D. Sahlas, C. Scott, E. Smith, V. Sossi, A. Thiel, J.-P. Soucy, J.-C. Tardif, and S. Black</i>
15:30	<b>Coffee Break</b>	
16:00	<b>Plenary Session &amp; Closing</b>	

May 24, Friday	
9:00 – 16:00	<b>Reed-Muller Workshop</b> (Workshop Chair: <i>M. Thornton</i> ) @Room 122, Gillin Hall, <b>University of New Brunswick</b>