Curriculum Vitae: Gordon W. Roberts

Academic Record

Ph. D. - University of Toronto, Dept. of Electrical and Computer Engineering, Electronics Group, 1989.

- M.A.Sc. - University of Toronto, Dept. of Electrical and Computer Engineering, Electronics Group, 1986.
- B.A.Sc. - University of Waterloo, Electrical Engineering, 1983.

UNIVERSITY APPOINTMENTS

- Full Professor, January 2001 - present.
- Associate Professor, June 1995 - December 2000.
- Assistant Professor, September 1989 - May 1995.

AWARDS

Research

- James McGill Professor of Electrical and Computer Engineering, Chaired Position, McGill University (equivalent to a Canadian Research Chair tier 1 award):
  - 2nd Renewal 2015-2022.
  - 1st Renewal 2008-2014.
  - Original Appointment 2000-2007.
- 2007 Engineering Council Outstanding Performance Award, National Semiconductor Corporation.
- Elected as a Fellow Of The IEEE, 2004
  "for contributions to the design and test of analog and mixed-signal integrated circuits, and education."
- Distinguished lecturer for the IEEE Computer Society, 2001-2003.
- 2000 Best Tutorial Award, Test Technology Technical Council of the IEEE Computer Society.
- Best Paper Award with M. Hafed and N. Abaskharoun, IEEE International Test Conference for the paper entitled: A Stand-Alone Integrated Test Core For Time And Frequency Domain Measurements, 2000.
- Distinguished lecturer for the IEEE Circuits and Systems Society, 1998-2001.
- Honorable Mention Award for Best Paper with A. Lu, IEEE International Test Conference, for the paper entitled: An Analog Multi-Tone Signal Generator For Built-In Self-Test Applications, 1994.
- Honorable Mention Award for Best Paper with M. Toner, IEEE International Test Conference, for the paper entitled: A BIST Scheme for an SNR Test of a Sigma-Delta ADC, 1993.

Student Awards (Supervised and co-authored by Prof. Roberts):

- A. Chowdhury, Recipient of the Best Student Paper Award for paper entitled: “Performance Investigation Of A 1-Bit Periodic Sigma-Delta Phase-Signal Generator For Mixed-Signal Embedded Test,” Proceedings of the International Conference on Electronic Measurement & Instruments, Chengdu, China, August 2011.

- C. Taillefer, Recipient of the 2nd Place Best Student Paper Award, for the paper “Delta-Sigma Analog-to-Digital Conversion via Time-Mode Signal Processing,” IEEE 2007 International Symposium on Circuits and Systems, New Orleans, USA, May 2007.
- 2006 M. Safi-Harb, Recipient of the Best Student Paper Award, for the paper entitled: "Embedded narrow pulse measurement in digital CMOS,” IEEE 2006 Instrumentation and Measurement Technology Conference.
- 2006 M. Safi-Harb, second place in the Operational Chip Design Category of the 2006 IEEE DAC/ISSCC Student Design Contest for the paper entitled: "Increasing the Time Dynamic Range of Pulse Measurement Techniques in Digital CMOS,' by M. Safi-Harb and G. W. Roberts (International Award).
- 2004 M. Hafed, Recipient of the Inaugural 2004 Network of Centers of Excellence (NCE) Young Innovator Award.
- M. Shafi-Harb, Recipient of the 2003 Annual Micronet Workshop Best Paper Award for the paper entitled: "Low power ADCS for ADSL Applications in 0.18 micron CMOS Technology".
- M. Hafed, Recipient of the D. W. Ambridge Prize (awarded to an outstanding Ph.D. candidate in any field of Science and Engineering at McGill University) for the thesis entitled: Analog and Mixed-Signal Test Methods Using On-Chip Embedded Test Cores, Ph.D. Thesis, McGill University, November 2002.
- Best Paper Award, M. Hafed, MICRONET 10th Anniversary Workshop, for the paper entitled: A Complete Mixed-Signal Test Core. (Micronet is a Canadian Network of Centres of Excellence on Microelectronic Devices, Circuits and Systems, 2000.

Teaching

- Education Award, bourse d’enseignment en genie, Ministére do l’Éducation, du Loisir et du Sport, Quebec Government, 2009-2015.
- Principal's Prize for Excellence in Teaching, University-Wide Teaching Award, McGill University, 2001.
- Departmental Teacher Award, Department of Electrical Engineering, McGill University, 1994/95.
- Outstanding Departmental Teacher Award, Department of Electrical Engineering, McGill University, 1993/94.
- Engineering Class of 51' Award for Outstanding Teaching, Faculty of Engineering, McGill University, 1992/93.
- Overall Best Teacher Award, Department of Electrical Engineering, McGill University, 1992/93.
- Teaching Assistant Award, Department of Electrical Engineering, University of Toronto, 1988/89.

Leadership Awards Or Recognition

- Outstanding Contribution Award, IEEE Philadelphia Section, 2015.
- Meritorious Service Award, IEEE International Test Conference, 2014
- Meritorious Service Award, IEEE Computer Society, 2010
- Continuing Service Award, IEEE Computer Society, 2006
- Certificate of Appreciation, IEEE Computer Society, 2005.
- Outstanding Contribution Award, IEEE Computer Society, 2004.
- Golden Core Member, IEEE Computer Society, 2004.

- Certificate of Appreciation, Area Editor, IEEE Design & Test Magazine, 2002.
- Certificate of Appreciation, IEEE Computer Society, 2001.
- Certificate of Appreciation, Associate Editor, IEEE Circuits and Circuits Society, 1997.
- Certificate of Appreciation, Board Member, IEEE Circuits and Circuits Society, 1996.

PROFESSIONAL APPOINTMENTS

- Board of Directors, The Canadian MicroSystems Corporation, 2005-2007.
- Chief technical Officer of DFT MicroSystems Canada, Inc., 2004-2005.
- President and Chief Executive Officer of DFT MicroSystems Canada, Inc., 2002-2004.
- Distinguished Lecturer, IEEE Circuits and Systems Society, 2000-2002.
- Member of the Technical Board of Advantest America, 2002-present.
- Board of Directors, The Canadian Microelectronic Corporation, 1999-2005.
- Distinguished Lecturer,, IEEE Computer Society, 1996-1999.
- Director, Microelectronics and Computer System Laboratory, McGill University, 1993/1996, 1997/2003.
- Member, Association of Professional Engineers of Ontario, 1995-present
- Editor, IEEE, Design & Test of Computers, July/96 - July/01.
- Chairman, Analog Signal Processing Committee of the IEEE Circuits and Systems Society, 1995/96.
- Associate Editor, IEEE Transactions on Circuits and Systems, Part II, 1996/97.
- Associate Member, Graduate Faculty of the Department of Electrical Engineering, University of Toronto, 1990/96.
- Member, Board of Governors of the IEEE Circuits and Systems Society, 1993/95.

Publication Record

Books

[1] G. W. Roberts, F. Taenzler and M. Burns, An Introduction to Mixed-Signal IC Test and Measurement,Second Edition. Oxford University Press, New York, USA 2011, October 2011. (900 pages).

[2] M. Burns and G. W. Roberts, An Introduction to Mixed-Signal IC Test and Measurement, Oxford University Press, New York, USA 2000 (720 pages).

[3] B. Dufort and G. W. Roberts, Analog Test Signal Generation Using Periodic Sigma-Delta-Encoded Data Streams, Kluwer Academic Publishers, Norwell, MA, USA, 2000 (200 pages).

[4] G. W. Roberts and V. W. Leung, Design and Analysis of Log-Domain Filter Circuits, Kluwer Academic Publishers, Norwell, MA, USA, 1999 (260 pages).

[5] G. W. Roberts and A.S. Sedra, SPICE, 2/e, Oxford University Press, NewYork, USA, 1996 (450 pages).

[6] G. W. Roberts and A.K. Lu, Analog Signal Generation For Built-In Self-Test Of Mixed-Signal Integrated Circuits, Kluwer Academic Publishers, Norwell, MA, USA, 1994 (120 pages).

[7] G. W. Roberts and A.S. Sedra, Spice For Microelectronic Circuits, Saunders College Publishing, Philadelphia, USA,1992 (630 pages).

Chapters In Books

[8] M. Abdelfattah and G. W. Roberts, “Time-Mode Circuit Concepts And Their Transition To All-Digital Synthesizable Circuits,” in CMOS Time-Mode Circuits and Systems: Principles and Application, Ed. F. Yuan, CRC Press, 2015.

[9] S. Ziabakhsh, G. Gagnon and G. W. Roberts, “Time-Mode Delta-Sigma Converters,” in CMOS Time-Mode Circuits and Systems: Principles and Application, Ed. F. Yuan, CRC Press, 2015.

[10] M. Safi-Harb and G. W. Roberts, "DFT and BIST Techniques for Analogue and Mixed-Signal Test" In Test and Diagnosis of Analogue and Mixed-Signal Integrated Circuits: The System on Chip Approach, Y. Sun (Editor), pp. 141-178, IEE Press, UK, 2008.

[11] P. Levine and G. W. Roberts, " High-Resolution Flash Time-to-Digital Conversion and Calibration for System-on-Chip Testing," In Embedded Microelectronic Systems: Status and Trends, IEE Press, Stevenage, UK, Ed. Bashir M. Al-Hashimi, pp. 821-854, IEE Press, UK, 2006.

[12] M. Hafed and G. W. Roberts, "Testing of RF, Analog, and Mixed-Signal Circuits for Communications" in Wireless Communications Circuits and Systems, IEE Press, Stevenage, UK, Ed. Yichuang Sun, IEE Press, May 2003.

[13] N. Chandra and G. W. Roberts, "Top-Down Design Methodology for Analog Circuits using MATLAB and Simulink," in Trade-Offs In Analog Circuit Design; A Designer's Handbook, Kluwer Academic Publishers, Norwell, MA, USA, 2002 (1200 pages).

[14] M. Toner and G. W. Roberts, "Distortion Measurement," in Measurement, Instrument and Sensors Handbook, J. G. Webster (Editor), CRC & IEEE Press, pp. 53-1 - 53-12,1999.

[15] B. Veillette and G. W. Roberts, "Spectral-Based Built-In Self-Test Methods for Mixed-Signal Integrated Circuits," in Analog and Mixed-Signal Test, B. Vinnakota (editor), Prentice-Hall Inc., pp 153-184, 1998 .

[16] G. W. Roberts, "DFT Techniques for Mixed-Signal Integrated Circuits," in Circuits And Systems In The Information Age, IEEE Press, pp. 251-271, June 1997.

[17] G. W. Roberts, " Switched-Current Data Converters," in Circuits and Systems Tutorials: ISCAS'94, IEEE Press, pp. 514-536, 1994.

[18] A. S. Sedra and G. W. Roberts, " Sampled-Data Analog Filters, "in ANALOG VLSI: Signal and Information Processing, M. Ismail and T. Feiz (Editors), McGraw-Hill Inc., New York, New York, pp. 414-466, 1994.

[19] G. W. Roberts and A.S. Sedra, "A Switched-Capacitor To Switched-Current Conversion Method," in Switched-Current Techniques For Analogue VLSI, C. Toumazou, J. B. Hughes and N. Battersby (Editors), Peter Peregrinus Limited, London, England, pp. 232-251, 1993.

[20] G. W. Roberts and P. J. Crawley, " Building Blocks For Switched-Current Sigma Delta Modulators," in Switched-Current Techniques For Analogue VLSI, C. Toumazou, J. B. Hughes and N. Battersby (Editors), Peter Peregrinus Limited, London, England, pp. 350-380, 1993.

[21] G. W. Roberts and P. J. Crawley, "Nonlinear Behavior of Switched-Current Memory Circuits," in Switched-Current Techniques For Analogue VLSI, C. Toumazou, J. B. Hughes and N. Battersby (Editors), Peter Peregrinus Limited, London, England, pp. 528-547, 1993.

[22] A.S. Sedra and G.W. Roberts, " Current Conveyor Theory and Practice," in Advances in Analog Integrated Circuit Design, C. Toumazou, F.J. Lidgey and D.G. Haigh (Editors), Peter Peregrinus Limited, London, England, pp. 93-126, 1990.

Journal Papers

[23] M. Yang and G. W. Roberts, “Synthesis of Ultra-High Gain Operational Transconductance Amplifiers Using A State-Space Controller-Based Compensation Method,“ IEEE Transactions on Circuits and Systems, August 2016 (in press).

[24] Y. Li, S. Bielby, A. Chowdhury and G. W. Roberts, “A Jitter Injection Signal Generation and Extraction System for Embedded Test of High-Speed Data I/O,”Journal of Electronic Testing: Theory and Applications, August 2016.

[25] O. Abdelfattah, G. Gal, G. W. Roberts I. Shih and Y-C. Shih, “A top-down design methodology encompassing component variations due to wide rang operation in Frequency Synthesizer PLLs,” IEEE Transactions on VLSI Systems, vol. 1, issue 99, pp. 1 – 12, Jan. 2016.

[26] O. Abdelfattah, G. W. Roberts I. Shih and Y-C. Shih, “An ultra-low-voltage CMOS process-insensitive self-biased OTA with rail-to-rail input range,” IEEE Trans. on Circuits and Systems 1: Regular Papers, vol. 62, issue 10, pp. 2380-2390, Oct. 2015.

[27] R. Parekhji, K. Butler and G. W. Roberts, “Introduction: Speeding up Analog Integration and Test for Mixed-Signal SOCs,” Guest Editors, IEEE Design & Test of Computers, Vol. 32, No. 1, pp. 6-8, Feb. 2015.

[28] M. Ali-Bakhshian and G. W. Roberts, “A Tunable Low-Power Semi-Digital Interface Circuit for Capacitive Sensors with Calibration Procedure,” Frontiers in Sensors, Aug. 2013.

[29] M. Ali-Bakhshian and G. W. Roberts, “A Digital Implementation of a Dual-Path Time-to-Time Integrator, IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, pp. 2578 - 2591, Feb. 2012.
[30] S. Aouini, K. Chuai and G. W. Roberts, “Anti-Imaging Time-Mode Filter Design Using A PLL Structure With Transfer Function DFT,” IEEE Transactions on Circuits and Systems – I, pp. 66-79, Jan 2012.
[31] T. Tsai, S. Aouini and G. W. Roberts, “High Speed On-Chip Signal Generation for Debug and Diagnosis,” Journal of Electronic Testing: Theory and Applications, Special Issue on Analog, Mixed-Signal, RF and MEMS Testing, Oct. 2011.
[32] M. Guttman and G. W. Roberts, “Sampled-Data IIR Filtering Via Time-Mode Signal Processing,” Analog Signal Processing Journal, pp. 1-12, Sept. 2011
[33] M. Ali-Bakhshian and G. W. Roberts, "Digital Storage, Addition and Subtraction of Time-Mode Variables," Electronic Letters, Vol. 47, Issue 16, pp. 910-911, August 2011.
[34] S. Aouini and G.W. Roberts, "Frequency Synthesis using Digital-to-Frequency Conversion and Filtering," Electronic Letters Vol. 46, Issue 14, pp. 979-980, July 8, 2010.
[35] G. W. Roberts and M. Ali-Bakhshian, "A Brief Introduction To Time-to-Digital and Digital-to-Time Converters," IEEE Transactions on Circuits and Systems – II, Vol. 57, No. 3, pp. 153-157, Jan. 2010.
[36] G. W. Roberts and S. Aouini, "An Overview of Mixed-Signal Production Test: Past, Present and Future," IEEE Design & Test of Computers, Vol. 26, No. 5, pp. 48-62, Sept./Oct. 2009.
[37] C. Taillefer and G. W. Roberts, "Delta-Sigma Analog-to-Digital Conversion via Time-Mode Signal Processing," IEEE Transactions on Circuits and Systems – I, vol. 56, No. 9, pp. 1908-1920, September 2009.
[38] M. Safi-Harb and G. W. Roberts, "Embedded Measurement of GHz Digital Signals with Time Amplification in CMOS," IEEE Trans. on Circuits and Systems-I: Analog and Digital Signal Processing, vol. 33, No. 7, pp. 1884-1896, August 2008.
[39] M. Safi-Harb and G. W. Roberts, "70-GHz Effective Sampling Time-Base On-Chip Oscilloscope in CMOS," IEEE Journal of Solid-State Circuits, vol. 42, No. 8, pp. 1743-1757, August 2007. (Invited submission for the special JSSC issue on CICC 2006).
[40] C. J.-B. Fayomi, G. W. Roberts, And M. Sawan, "Low-Voltage Analog Switch in Deep Submicron: Design Technique and Experimental Measurement," IEICE Fundamentals, Vol. E89-A, pp. 1070-1087, April 2006.
[41] M. Safi-Harb and G. W. Roberts, "A 19 mW, 2.1 MS/s Single-Bit ΔΣ ADC for ADSL Applications with 12.5 b Dynamic Range in 0.18 mm Digital CMOS Process using an Efficient Top-Down Design Methodology," IEEE Trans. on Circuits and Systems I: Regular Papers, Vol. 52, No. 10, pp. 2075-2089, October. 2005.
[42] D. R. Rolston, D. M. Gross, G.W. Roberts and D. V. Plant, "A Distributed Synchronized Clocking Method," IEEE Trans. on Circuits and Systems-I: Regular Papers, Vol. 52, No. 8, pp. 1597-1607, August 2005.
[43] C. Taillefer, and G. W. Roberts, "Reducing Measurement Uncertainty in a DSP-Based Mixed-Signal Test Environment without Increasing Test Time," IEEE Transactions on Very Large Scale Integration Systems, Vol. 13, No. 7, pp. 852-860, July 2005
[44] M. Oulmane and G. W. Roberts, "CMOS Digital Time Amplifiers for High Resolution Timing Measurement," Analog Signal Processing Journal, Kluwer Academic Publishers, Volume 43, Number 3, pp. 269-280, June 2005.
[45] P. Levine and G. W. Roberts, "High-resolution flash time-to-digital conversion and calibration for system-on-chip testing," IEE Transactions on Computers and Digital Techniques, Vol. 152, Issue 03, pp. 415-426, May. 2005.
[46] C. J.-B. Fayomi, M. Sawan and G. W. Roberts, "Reliable Circuit Techniques For Low-Voltage Analog Design in Deep Submicron Standard CMOS: A Survey," Analog Signal Processing Journal, Kluwer Academic Publishers. Vol. 38, Issue 1, pp. 21-38, April 2004.
[47] C. Tam and G. W. Roberts, “A Robust Technique for On-Chip DC Current Measurements,” IEE Transactions on Circuits and Systems (Part G), Vol. 151, Issue 04, pp. 371-381, Aug. 2004.
[48] A. Chan and G. W. Roberts, "Time and Frequency Characterization of Jitter Using A Component-Invariant Vernier Delay Line," IEEE Transactions on Very Large Scale Integration Systems, pp. 79-95, January 2004.

[49] M. Hafed, and G. W. Roberts, "Techniques for High-Frequency Integrated Test and Measurement," IEEE Trans. on Instrumentation and Measurement, Vol. 52, No. 6, pp. 1780-1786, December 2003.
[50] M. El-Gamal and G.W. Roberts, "A New 1.2 V NPN-Only Log-Domain Integrator," IEEE Trans. on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 49, No. 4, pp. 257-265, April 2002.
[51] M. Hafed, N. Abaskharoun and G. W. Roberts, "A 4 GHz Effective Sample-Rate Integrated Test Core for Analog and Mixed-Signal Circuits," IEEE Journal of Solid-State Circuits, Vol. 37, No. 4, pp. 499-514, April 2002.
[52] V. Leung and G.W. Roberts, "Effects Of Transistor Non-Idealities On High-Order Log-Domain Ladder Filter Frequency Response," IEEE Trans. on Circuits and Systems-II: Analog and Digital Signal Processing, pp. 373-387, May 2000.
[53] B. Dufort and G.W. Roberts, "Increasing the Performance of Arbitrary Function Generators using Sigma-Delta Coding Techniques," IEEE Trans. on Instrumentation and Measurement, Vol. 49, No. 1, Feb. 2000, pp. 188-199.
[54] V. Leung and G.W. Roberts, "Analysis and Compensation of Log-Domain Biquadratic Filter Response Deviations due to transistor Nonidealities ," Analog Signal Processing Journal, Kluwer Academic Publishers, pp. 147-162, Feb. 2000.
[55] G.W. Roberts and B. Dufort, "Making Complex Mixed-Signal Telecommunication Integrated Circuits Testable," The IEEE Communications Magazine, June 1999, pp. 90-96.
[56] L. Louis, J. Abcarius, and G. W. Roberts, "An Eighth-Order Bandpass Delta-Sigma Modulator for A/D Conversion in Digital Radio," Journal of Solid-State Circuits, April 1999.
[57] B. Dufort and G.W. Roberts, "On-Chip Analog Signal Generation for Mixed-Signal Built-In Self-Test," Journal of Solid-State Circuits, Vol. 34, No. 3, March 1999, pp. 318-330.
[58] E. M. Hawrysh and G.W. Roberts, "An Integration Of Memory-Based Analog Signal Generation Into Current DFT Architectures," IEEE Trans. on Instrumentation and Measurement, Vol. 47, No. 3, June 1998, pp. 748-759.
[59] X. Haurie and G. W. Roberts, "Arbitrary-Precision Signal Generation for Mixed-Signal Built-In Self-Test," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 45, No. 11, November 1998, pp. 1425-1432.
[60] M. El-Gamal and G.W. Roberts, "Log-Domain Bandpass Filters for Very High Frequency Applications," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 45, No. 9, September 1998, pp. 1188-1198.
[61] A. K. Lu and G.W. Roberts, "An Oversampling-Based Analog Multi-Tone Signal Generator," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 45, No. 3, pp. 391-394, March 1998.
[62] B.R. Veillette and G.W. Roberts, " On-Chip Measurement of the Jitter Transfer Function of Charge-Pump Phase-Locked Loops," IEEE Journal of Solid-State Circuits, vol. 33, no. 3, pp. 483-491, March 1998.
[63] B.R. Veillette and G.W. Roberts, " Delta-sigma oscillators: versatile building blocks," International Journal of Circuit Theory and Applications, vol. 25, pp. 407-418, 1997.
[64] R. Wodnicki, G. W. Roberts and M. Levine, "Design and Evaluation of a Log-Polar Image Sensor Fabricated using a Standard 1.2 um ASIC CMOS Process," IEEE Journal of Solid-State Circuits, Vol. 32, No. 8, pp. 1274-1277, August 1997.
[65] C. H. Leong and G. W. Roberts "High-Order Bandpass Sigma-Delta Modulators for High Speed D/A Applications", IEE Electronics Letters, vol.33, No.6, pp. 454-455, March 1997.
[66] D. Perry and G.W. Roberts, "The Design of Log-Domain Filters Based on the Operational Simulation of LC Ladders," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 43, No. 11, pp. 763-774, Nov. 1996.
[67] M. F. Toner and G.W. Roberts, " A Frequency Response, Harmonic Distortion and Intermodulation Distortion Test for BIST of a Sigma-Delta ADC," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 43, No. 8, pp. 608-613, August 1996.
[68] M. F. Toner and G.W. Roberts, "A BIST Scheme for an SNR, Gain Tracking, and Frequency Response Test of a Sigma-Delta ADC," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 41, No. 12, pp. 1-15, Jan. 1995.

[69] A. K. Lu, G.W. Roberts and D. Johns, "A high-quality analog oscillator using oversampling D/A conversion techniques," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 41, No. 7, pp. 437-444, July 1994.
[70] P. J. Crawley and G.W. Roberts, " Predicting harmonic distortion in switched-current memory circuits," IEEE Trans. on Circuits and Systems -- II: Analog and Digital Signal Processing, Vol. 41, No. 2, pp. 73-86, Feb. 1994.
[71] G. W. Roberts and A.S. Sedra, "A generalization of intermediate transfer function analysis applied to arbitrary networks," Analog Integrated Circuits And Signal Processing, pp. 83-96, Sept. 1993.
[72] G. W. Roberts and A.S. Sedra, " A general class of current amplifier-based biquadratic filter circuits," IEEE Trans. on Circuits and Systems -- I: Fundamental Theory and Applications, vol. CAS-39, No. 4, pp. 257-263, April 1992.
[73] P. J. Crawley and G.W. Roberts, "High-swing MOS current mirror with arbitrarily high output resistance," Electronics Letters, Vol. 28, No. 4, pp. 361-363, February 1992.
[74] G. W. Roberts and A.S. Sedra, " Synthesizing switched-current filters by transposing the SFG of switched-capacitor filter circuits," IEEE Trans. on Circuits and Systems, vol. CAS-38, pp. 337-340, March 1991.
[75] A.S. Sedra, G. W. Roberts and F. Gohh, " The current conveyor: history, progress and new results," Proceedings IEE (Part G), Vol. 137, Pt. G, No. 2, pp. 78-87, April 1990.
[76] G. W. Roberts and A.S. Sedra, "All current-mode frequency selective circuits," Electronics Letters, Vol. 25, No. 12, pp. 759-761, June 1989.
[77] G. W. Roberts, W.M. Snelgrove and A.S. Sedra, "Switched-capacitor realization of Nth order transfer function using a single multiplexed op-amp," IEEE Trans. on Circuits and Systems, vol. CAS-34, pp. 140-148, Feb. 1987.
[78] G. W. Roberts, D.G. Nairn and A.S. Sedra, "On the implementation of fully-differential switched-capacitor ladder filters," IEEE Trans. on Circuits and Systems, vol. CAS-33, pp. 452-455, April 1986.

Conference Papers

[79] G. W. Roberts, “Mixed-Signal ATE Technology and its Impact on Today’s Electronic System Platform” Accepted for presentation at the 2016 IEEE International Test Conference, Fort Worth, TX, Nov. 2016.
[80] M. Abdelfattah and G. W. Roberts, “Experimental Operation of Time-Mode Building Blocks Using A Time-Mode Switched-Delay Unit,” Accepted for presentation at the IEEE 59th Midwest Symposium on Circuits and Systems, Abu Dhabi, United Arab Emirates, Oct., 2016.
[81] M. Yang and G. W. Roberts, “A Digitally Programmable 50-150dB DC Gain Operational Transconductance Amplifier in 130 nm CMOS,” IEEE 14th International NEWCAS Conference, Vancouver, Canada, June, 2016.
[82] A. Shoukry and G. W. Roberts, “Top-Down Design and Synthesis of Inherently-Stable Integrator-Based High-Order Amplifiers,” IEEE 14th International NEWCAS Conference, Vancouver, Canada, June, 2016.
[83] A. Gordon, C. Fayomi and G. W. Roberts, “Low-Cost Trimmable Manufacturing Methods for Printable Electronics,” 2016 IEEE International Circuits and Systems Conference, Montreal, Canada, May 2016.
[84] Y. Li and G. W. Roberts, “Design of High-Order Type-II Delay-Locked Loops Using A Gaussian Transfer Function Approach,” 2016 IEEE International Circuits and Systems Conference, Montreal, Canada, May 2016.
[85] G. W. Roberts, “Quick and Easy CMOS Amplifier Design And Optimization,” Proceedings of the 22nd IEEE European Conference on Circuit Theory and Design, Trondheim, Norway, August 2015.
[86] G. W. Roberts, “Two Decades of Mixed-Signal Test – looking back and one decade ahead,” Invited keynote presentation at the IEEE International Mixed-Signal Test Workshop, Paris, France, 24th June 2015.
[87] Y. Li, S. Bielby, A. Chowdhury and G. W. Roberts, “Edge Placement Signal Generation Techniques For Time-Based Signaling,” Proceedings of the IEEE International Mixed-Signal Test Workshop, Paris, France, June 2015.

[88] M. Mahani and G. W. Roberts, “A Sub-THz Folded Substrate Integrated Waveguide in IBM 130nm CMOS Process,” Proceedings of the IEEE 8th Global Symposium on Millimeter-Waves (GSMM), Montreal, Canada, May 25-27, 2015.

[89] O. Abdelfattah, G. W. Roberts I. Shih and Y-C. Shih, “A 0.6 V-Supply Bandgap Reference in 65 nm CMOS,” Proceedings of the 2015 IEEE 13th International NEWCAS Conference, Grenoble, France, June 2015.

[90] S. Ziabakhsh, G. Gagnon and G. W. Roberts, “Wide-range linear voltage-controlled delay for time-mode signal processing,” Proceedings of the IEEE International Circuits and Systems Conference, Lisbon, Portugal, May 2015.

[91] S. Bielby and G. W. Roberts, “An Embedded Probabilistic Extraction Unit For On-Chip Jitter Measurements,” Proceedings of the IEEE International Circuits and Systems Conference, Lisbon, Portugal, May 2015.

[92] O. Abdelfattah, G. W. Roberts I. Shih and Y-C. Shih, “A 0.35-V Bulk-Driven Self-Biased OTA with Rail-to-Rail Input Range in 65 nm CMOS,” Proceedings of the IEEE International Circuits and Systems Conference, Lisbon, Portugal, May 2015.

[93] S. Ziabakhsh, G. Gagnon and G. W. Roberts, “New Time-Mode Signal Processing Circuits for Low-Voltage CMOS,” Proceedings of the Microsystems Strategic Alliance of Quebec (ReSMiQ) Annual Review Workshop, Montreal, May 2015.

[94] M. S. Hai, M. M. P. Fard , D. An, F. Gambini, S. Faralli, G. B. Preve, G. W. Roberts and O. Liboiron-Ladouceur, “Automated Characterization of SiP MZI-based Switches,” Proceedings of the IEEE Photonics Society Optical Interconnects Conference, San Diego, California, April 2015.

[95] A. Gordon, G. W. Roberts and C. Fayomi, “NRC OFET Print Technology As Seen From A Circuit Designer’s Perspective, ” Presented at the 2015 Canadian Printable Electronics Symposium (CPES2015), Montreal, Canada, April 21-22, 2015.

[96] O. Abdelfattah, G. W. Roberts I. Shih and Y-C. Shih, “A 0.55-V 1-GHz Frequency Synthesizer PLL for Ultra-Low-Voltage Ultra-Low-Power Applications,” Proceedings of the 6th IEEE Latin American Symposium on Circuits and Systems (LASCAS), Montevideo, Uruguay, February 2015.

[97] G. W. Roberts, “Reducing The Analog-Digital Productivity Gap Using Time-Mode Signal Processing,” Proceedings of the IEEE International Circuits and Systems Conference, Melbourne, Australia, June 2014.

[98] M. Abdelfattah, V. P. Chodavarapu and G. W. Roberts, “All-Digital Time-Mode Elliptic Filters Based On The Operational Simulation Of LC Ladders,” Proceedings of the IEEE International Circuits and Systems Conference, Melbourne, Australia, June 2014.

[99] S. Lin and G. W. Roberts, “Towards A General Purpose Mixed-Signal Instrumentation Layer In The Die Stack Of A 3D-IC,” Proceedings of the IEEE European Test Symposium, Paderborn, Germany, May 2014.

[100] S. Bielby and G. W. Roberts, “Sub-Gate-Delay Edge-Control of a Clock Signal Using DLLs and Sigma-Delta Modulation Techniques,” Proceedings of the Circuits, Devices and Systems Symposium of the IEEE Canadian Conference on Electrical and Computer Engineering, Toronto, Ont., May 2014.

[101] O. Abdelfattah, I. Shih and G. W. Roberts and Y. Shih, “Optimization of LC-VCO Tuning Range under Different Inductor/Varactor Losses Limitations,” Proceedings of the Circuits, Devices and Systems Symposium of the IEEE Canadian Conference on Electrical and Computer Engineering, Toronto, Ont., May 2014.

[102] O. Abdelfattah, I. Shih and G. W. Roberts, “Analytical Comparison Between Passive Loop Filter Topologies for Frequency Synthesizer PLLs “Proceedings of the 2013 IEEE 11th International NEWCAS Conference, Paris, France, June 2013.

[103] O. Abdelfattah, I. Shih and G. W. Roberts “A Simple Analog CMOS Design Tool Using Transistor Dimension-Independent Parameters “Proceedings of the IEEE International Symposium on Circuits and Systems, Beijing, China, May 2013.

[104] G. Gal, O. Abdelfattah and G. W. Roberts, “A 30-40 GHz Fractional-N Frequency Synthesizer Development Using A Verilog-A High-Level Design Methodology,” Proceedings of the IEEE 55th Midwest Symposium on Circuits and Systems, Boise, Idaho, Aug., 2012. Invited Paper.

[105] A. Chowdhury and G. W. Roberts, “A Probabilistic Test Instrument using a Sigma-Delta-Encoded Amplitude/Phase-Signal Generation Technique,“ Proceedings of the IEEE International Symposium on Circuits and Systems, Seoul, Korea, May 2012.

[106] M. Macedo, G. W. Roberts and I. Shih, “Track and Hold for Giga-Sample ADC Applications using CMOS Technology,“ Proceedings of the IEEE International Symposium on Circuits and Systems, Seoul, Korea, May 2012.
[107] T. Tsai and G. W. Roberts, "Programmable Phase/Frequency Generator for System Debug and Diagnosis Using The IEEE 1149.1 Test Bus," Proceedings of the IEEE Custom Integrated Circuit Conference, San Jose, CA, September 2011.
[108] A. Chowdhury and G. W. Roberts, "Performance Investigation Of A 1-Bit Periodic Sigma-Delta Phase-Signal Generator For Mixed-Signal Embedded Test," Proceedings of the International Conference on Electronic Measurement & Instruments, Chengdu, China, August 2011. This paper was awarded the Best Student Presentation Award.
[109] A. Ameri and G. W. Roberts "Time-Mode Reconstruction IIR Filters for ∑Δ Phase Modulation Applications," Proceedings of the 21st IEEE/ACM Great Lakes Symposium on VLSI, Lausanne, Switzerland, May 2-4, 2011 (4 pages).
[110] S. Aouini, K. Chuai and G. W. Roberts, "Jitter Generation and Capture Using Phase-Domain Sigma-Delta Encoding," Proceedings of the 2010 IEEE Asia Pacific Circuit and Systems Conference, Dec 2010 (4 pages).
[111] S. Aouini, K. Chuai and G. W. Roberts, "A Low-Cost ATE Phase Signal Generation Technique for Test Applications," Proceedings of the 2010 IEEE International Test Conference, Austin, TX, Nov. 2010.
[112] E. Yoo and G. W. Roberts, "Optimizing CMOS Amplifier Design Directly In SPICE Without The Need For Additional Mathematical Models," IEEE International Symposium on Circuits and Systems, Seattle, Taipei, Taiwan, May 2009.
[113] M. Ali-Bakhshian and G. W. Roberts, "A Semi-Digital Interface for Capacitive Sensors," IEEE International Symposium on Circuits and Systems, Seattle, Taipei, Taiwan, May 2009.
[114] M. Guttman and G. W. Roberts, "Sampled-Data IIR Filtering Using Time-Mode Signal Processing Circuits," IEEE International Symposium on Circuits and Systems, Seattle, Taipei, Taiwan, May 2009.
[115] G. W. Roberts, "A Brief Overview of Mixed-Signal Production Test For The Beginner," invited presentation at the 2008 IEEE International Test Conference, San Jose, CA, Nov. 2008.
[116] S. Aouini and G. W. Roberts, "A Practical Low-Cost High-Frequency Signal Generation Method Suitable for NPR/ACPR Test," 2008 IEEE International Test Conference, San Jose, CA, pp. 1-9, Oct. 2008.
[117] G. W. Roberts, "Test Methods for Sigma-Delta Data Converters and Related Devices" invited presentation at the IEEE CASS/ACM/SBC/SBMicro 21st Symposium on Integrated Circuits and Systems Design, Gramado, RS, Brazil, Sept., 2008.
[118] G. W. Roberts "Time-Domain Signal Processing Techniques," invited presentation at the IEEE CASS/ACM/SBC/SBMicro 21st Symposium on Integrated Circuits and Systems Design, Gramado, RS, Brazil, Sept., 2008.
[119] G. W. Roberts, "The Problem With Analog/Mixed-Signal Test – Not Enough Feedback," Keynote presentation, Texas Instruments Internal Test Symposium, Aug. 2008.
[120] D. An and G. W. Roberts, "A Metastability-Independent Time-to-Voltage Converter," IEEE International Symposium on Circuits and Systems, Seattle, Washington, USA, May 2008.
[121] G. W. Roberts, "DFT Techniques Using Sigma-Delta Encoding Methods," Invited Presentation, 2008 IEEE European Test Symposium, Milan, Italy, May 2008.
[122] S. Aouini and G.W. Roberts "A Multi-Tone Signal Generation Technique for Production Test," 2008 IEEE European Test Symposium, Milan, Italy, May 2008.
[123] G. Roberts, Panel Discussion, "Making Analog & Mixed Signal Testing As Robust As Digital," VLSI Test Symposium, Berkeley California, May 2007.
[124] C. Taillefer and G. W. Roberts, "Delta-Sigma Analog-to-Digital Conversion via Time-Mode Signal Processing,", IEEE International Symposium on Circuits and Systems, New Orleans, USA, pp. 13-16, May 2007. Second place winner of the Student Best Paper Contest.
[125] M. Safi-Harb and G. W. Roberts, "A 70-GHz Effective Sampling Rate On-Chip Oscilloscope with Time-Domain Digitization," IEEE Custom Integrated Circuit Conference, pp. 61-64, September 2006.

[126] S. Aouini and G.W. Roberts, "A Predictable Robust Fully Programmable Analog Gaussian Noise Source for Mixed-Signal/Digital ATE," IEEE International Test Conference, San Jose, CA, USA, pp. 28.1-28.10, Oct. 2006.
[127] C.S. Taillefer and G.W. Roberts, "Process-Insensitive Modulated-Clock Voltage Comparator," IEEE International Symposium on Circuits and Systems, Kos, Greece, pp. 3910-3913, May 2006.
[128] M. Safi-Harb and G. W. Roberts, "A CMOS Circuit for Embedded GHz Measurements of Digital Signal Rise Time Degradation," IEEE International Symposium on Circuits and Systems, Island of Kos, Greece, May 21-24, 2006.
[129] M. Safi-Harb and G. W. Roberts, "Embedded Narrow Pulse Measurement in Digital CMOS," IEEE Instrumentation and Measurement Technology Conference, Sorrento, Italy, pp. 1195-1200, April 24-27, 2006. First place winner of the Student Best Paper Contest.
[130] M. Oulmane and G. W. Roberts, "Digital Domain Time Amplification in CMOS Process," the proceedings of the 7th IEEE International Conference on Solid-State and Integrated-Circuit Technology, Beijing, China, Oct. 2004
[131] P. Levine and G. W. Roberts, "A High-Resolution Flash Time-To-Digital Converter For High-Frequency Clock Jitter And Skew Measurement," IEEE International Test Conference, pp. 1148-1157, Oct. 2004.
[132] M. M. Hafed, A. H. Chan, G. Duerden, B. Pishdad, C. Tam, S. Laberge, G. W. Roberts, "A high-throughput 5 GBPS timing and jitter test module featuring localized processing," IEEE International Test Conference, pp. 728-738, Oct. 2004
[133] C. Taillefer, and G. W. Roberts, "Reducing Measurement Uncertainty in a DSP-Based Mixed-Signal Test Environment without Increasing Test Time," IEEE International Test Conference, pp. 953-962, Oct. 2004.
[134] C. Taillefer and G. W. Roberts "Time-Interleaved Mixed Signal Test Core Digitizers," Proceedings of the IEEE International Conference On Circuits and Systems for Communications, St. Petersburg, Russia, June 2004.
[135] M. Safi-Harb, G. W. Roberts "A 36mW 13b 2.1MS/s Multi Bit Sigma-Delta ADC in 0.18 micrometers Digital CMOS using an Efficient Top-Down Design Methodology," Proceedings of the IEEE International Conference On Circuits and Systems for Communications, St. Petersburg, Russia, pp. 201-204, June 2004.
[136] M. Safi-Harb, G. W. Roberts "A 19mW 12.5b 2.1MS/s Single Bit Sigma-Delta ADC in 0.18 micrometers Digital CMOS Process," Proceedings of the IEEE International Conference On Circuits and Systems for Communications, St. Petersburg, Russia, pp. 205-208, June 2004.
[137] P. Levine and G. W. Roberts, "A Calibration Technique For A High-Resolution Flash Time-To-Digital Converter," Proceedings of the IEEE International Symposium on Circuits and Systems, Vancouver, Canada, May 23-26, 2004.
[138] M. Oulmane and G. W. Roberts, "A CMOS Time Amplifier For Femto-Second Resolution Timing Measurement," Proceedings of the IEEE International Symposium on Circuits and Systems, Vancouver, Canada, May 23-26, 2004.

[139] M. Hafed and G. W. Roberts, "A 5-Channel, Variable Resolution, 10-Ghz Sampling Rate Coherent tester/Oscilloscope IC and Associated Test Vehicles," Proceedings of the IEEE Custom Integrated Circuits Conference, San Jose CA, pp. 621-624, September 2003.
[140] M. Hafed and G. W. Roberts, "An 8-Channel, 12-Bit, 20 MHz Fully Differential Tester IC for Analog and Mixed-Signal Circuits," The IEEE European Solid-State Circuits Conference, Estoril, Portugal, pp. 193-196, September 2003.
[141] M. Hafed and G. W. Roberts, "Test and Evaluation of Multiple Mixed-Signal Test Cores," Proceedings of the IEEE International Test Conference, pp. 1022-1030, Oct. 2002
[142] A. Chan and G. W. Roberts, "A Deep Sub-Micron Timing Measurement Circuit Using A Single-Stage Vernier Delay Line," Proceedings of the IEEE Custom Integrated Circuits Conference, Orlando Fl, pp. 77-80, May 2002
[143] A. Chan and G. W. Roberts, "A Synthesizable, Fast And High-Resolution Timing Measurement Device Using A Component-Invariant Venier Delay Line," Proceedings of the IEEE International Test Conference, pp. 858-867, Oct. 2001.

[144] N. Abaskharoun and G. W. Roberts, "Circuits for On-Chip Sub-Nanosecond Signal Capture and Characterization," Proceedings of the IEEE Custom Integrated Circuits Conference, San Deigo, CA, pp. 251-254, May 2001.
[145] N. Abaskharoun, M. Hafed, and G. W. Roberts, "Strategies for On-Chip Sub-Nanosecond Signal Capture and Timing Measurements," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp. 174-177, May 2001.
[146] N. Chandra and G. W. Roberts, "Top-Down Analog Design Methodology Using Matlab and Simulink," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia. pp. 319-322, May 2001.
[147] A. Aga and G. W. Roberts, "A CMOS Digitally Programmable Current Steering Semidigital FIR Reconstruction Filter," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp. 168-171, May 2001.
[148] C. Tam and G. W. Roberts, "A Robust Dc Current Generation And Measurement Technique For Deep Submicron Circuits," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp. 719-722, May 2001.
[149] G. Duerden, G. W. Roberts and M. J. Deen, "The Development Of Bipolar Log Domain Filters In A Standard CMOS Process," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp. 145-148, May 2001.
[150] C. Fayomi, M. Sawan, and G. W. Roberts, "A Design Strategy for a 1-V Rail-to-Rail Input / Output CMOS Opamp," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp. 639-642, May 2001.
[151] C. Fayomi, G. W. Roberts, and M. Sawan, "A 1-V, 10-bit Rail-to-Rail Successive Approximation Analog-to-Digital Converter in Standard 0.18um CMOS Technology," Proceedings of the IEEE International Symposium on Circuits and Systems, Sidney, Australia, pp.460-463, May 2001.
[152] M. Hafed and G. W. Roberts, "Sigma-Delta Techniques for Integrated Test and Measurement," Proceedings of the IEEE Instrumentation and Test Conference, Budapest, Hungry, pp. 1571-1576, June 2001.
[153] M. Hafed, N. Abaskharoun, and G. W. Roberts, "A Stand-Alone Integrated Test Core For Time And Frequency Domain Measurements," Proc. IEEE International Test Conference, Atlantic City, NJ, pp. 1031-1040, October 2000. This paper was awarded the 2000 Best Paper Award.
[154] C. Fayomi, G. W. Roberts, and M. Sawan, "Low-Voltage CMOS Analog Switch For High Precision Sample-and-Hold Circuit," Proceedings of the IEEE Midwest Symposium on Circuits and Systems, MI, August 2000.
[155] M. Hafed and G. W. Roberts, "A Stand-alone Integrated Excitation/Extraction System for Analog Built-in Self-test Applications," Proceedings of the IEEE Custom Integrated Circuits Conference, Orlando, Fl, pp. 83-86, May 2000.
[156] M. Hafed, N. Abaskharoun and G. W. Roberts,"Strategies for on-chip sub-nanosecond signal capture and timing measurments," Proceedings of the IEEE International Symposium on Circuits and Systems, Geneva, Switzerland, Vol. V, pp. 174 -177, May 2000.
[157] C. Fayomi, G. W. Roberts and M. Sawan, "A Low-Power Low-Voltage High-Speed CMOS Differential Track and Latch Comparator," Proceedings of the IEEE International Symposium on Circuits and Systems, Geneva, Switzerland, Vol. V, pp. 653-656, May 2000.
[158] M. Hafed, S. Laberge and G. W. Roberts, "A Robust Deep Submicron Programmable DC Voltage Generator," Proceedings of the IEEE International Symposium on Circuits and Systems, Genva, Switzerland, Vol. IV, pp. 5-8, May 2000.
[159] M. El-Gamal and G. W. Roberts, "A New 1.2 V NPN-Only Log-Domain Integrator," Proceedings of the IEEE International Symposium on Circuits and Systems, Orlando, Florida, Vol. II, pp. 681-684, May 1999.
[160] B. Dufort and G.W. Roberts, "Increasing the Performance of Arbitrary Function Generators using Sigma-Delta Coding Techniques," Proc. IEEE International Test Conference, Washington D.C., pp. 241-248, October 1998.
[161] B.R. Veillette and G.W. Roberts, " Stimulus generation for built-in self-test of charge-pump phase-locked loops," Proc. IEEE International Test Conference, Washington D.C., pp. 698-707, October 1998.

[162] A. Hajjar and G.W. Roberts, " A High Speed and Area Efficient On-Chip Analog Waveform Extractor," Proc. IEEE International Test Conference, Washington D.C., pp. 688-697, October 1998.
[163] L. Louis and G.W. Roberts, "A Single-path Multi-bit DAC for Delta-Sigma A/D Converters," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[164] C.H. Leong and G.W. Roberts, " A Sixth-Order UHF Band Pass Filter using Silicon Bipolar Active Inductor," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[165] A. Hajjar and G.W. Roberts, " Multi-Pass A/D Conversion Technique For Extracting On-Chip Analog Signals," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[166] B. Dufort and G.W. Roberts, "Arbitrary Band-Limited Pulse Generation for Built-In Self-Test Applications," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[167] A. Hematy and G.W. Roberts, "A Fully-Programmable Analog Log-Domain Filter Circuit," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[168] B. Veillette and G.W. Roberts, "Reliable Analog Bandpass Signal Generation," Proceedings of the IEEE International Symposium on Circuits and Systems, Monterey, CA, pp. , June 1998.
[169] B. Dufort and G.W. Roberts, "On-Chip Analog Signal Generator for Mixed-Signal Built-In Self-Test," Proceedings of the IEEE Custom Integrated Circuits Conference, Santa Clara, CA, pp. 549-552, May 1998.
[170] B. Veillette and G.W. Roberts, "On-Chip Measurement of the Jitter Transfer Function of Charge-Pump Phase-Locked Loops," Proc. IEEE International Test Conference, Washington D.C., pp. 776-785, November 1997.
[171] B. Dufort and G.W. Roberts, "Signal Generation Using Periodic Single and Multi Bit Sigma-Delta Modulated Streams," Proc. IEEE International Test Conference, Washington D.C., pp. 396-405, November 1997.
[172] B. Dufort and G.W. Roberts, "Optimized Periodic Sigma-Delta Bitstreams for Analog Signal Generation," Proceedings of the IEEE Midwest Symposium on Circuits and Systems, CA, August 1997.
[173] J. Abcarius, L. Louis and G. W. Roberts, "The Design of High-Order Delta-Sigma Modulators for A/D Conversion," Proceedings of the IEEE Midwest Symposium on Circuits and Systems, CA, August 1997.
[174] M. El-Gamal, V. Leung, and G. W. Roberts, "Balanced Log-Domain Filters for VHF Applications," Proceedings of the IEEE International Symposium on Circuits and Systems, Hong Kong, pp. 493-496, June 1997.
[175] V. W. Leung and M. El-Gamal and G.W. Roberts, "Effects of Transistor Nonidealities on Log-Domain Filters," Proceedings of the IEEE International Symposium on Circuits and Systems, Hong Kong, pp. 109-112, June 1997.
[176] C. H. Leong and G. W. Roberts "An Effective Implementation of High-Order Bandpass Sigma-Delta Modulators for High Speed D/A Applications," Proceedings of the IEEE International Symposium on Circuits and Systems, Hong Kong, pp. 49-53, June 1997.
[177] M. El-Gamal and G.W. Roberts, "LC Ladder-Based Synthesis of Log-Domain Bandpass Filters," Proceedings of the IEEE International Symposium on Circuits and Systems, Hong Kong, pp. 105-108, June 1997.
[178] B.R. Veillette and G.W. Roberts, "Amplitude modulated signal generation using a third-order delta-sigma oscillator," Proceedings of the IEEE International Symposium on Circuits and Systems, Hong Kong, pp. 397-400, June 1997.
[179] G.W. Roberts, "Improving the Testability of Mixed-Signal Integrated Circuits," Proceedings of the IEEE Custom Integrated Circuits Conference, Santa Clara, California, pp. 214-221, May 1997.
[180] B.R. Veillette and G.W. Roberts, Self-Calibration of Digital Phase-Locked Loops, Proceedings of the IEEE Custom Integrated Circuits Conference, Santa Clara, California, pp. 49-52, May 1997.

[181] G. W. Roberts, "Metrics, Techniques and Recent Developments in Mixed-Signal Testing," Proceedings of the IEEE/ACM International Conference on Computer Aided Design, San Jose, California, pp. 514-521, Nov. 1996.
[182] E. M. Hawrysh and G. W. Roberts, "An Integration of Memory-Based Analog Signal Generation into Current DFT Architectures," IEEE International Test Conference, Washington, pp. 528-537, Oct. 1996.
[183] B. R. Veillette and G. W. Roberts, "FM Signal Generation Using Delta-Sigma Oscillators," Proc. IEEE International Symposium on Circuits and Systems, pp. 1-4, Atlanta, Georgia, May 1996.
[184] X. Haurie and G. W. Roberts, "A Design, Simulation and Synthesis Tool For Delta-Sigma-Modulator-Based Signal Sources," Proceedings of the IEEE International Symposium on Circuits and Systems, Atlanta, Georgia, pp. 715-718, May 1996.
[185] G. W. Roberts, "Re-Examining the Needs of the Mixed-Signal Test Community, " Proceedings of the IEEE International Test Conference, Washington, pp. 298-298, Oct. 1995.
[186] X. Haurie and G. W. Roberts, "Arbitrary-Precision Signal Generation for Bandlimited Mixed-Signal Testing," Proceedings of the IEEE International Test Conference, Washington, pp. 78-86, Oct. 1995.
[187] B. R. Veillette and G. W. Roberts, "A Built-In Self-Test Strategy for Wireless Communication Systems," Proceedings of the IEEE International Test Conference, Washington, pp. 930-939, Oct. 1995.
[188] X. Haurie and G. W. Roberts, "A Multiplier-Free Structure for 1-Bit High-Order Digital Delta-Sigma Modulators," Proceedings of the IEEE Midwest Symposium on Circuits and Systems, Brazil, pp. 889-892, Aug. 1995.
[189] B. R. Veillete and G. W. Roberts, "Evaluating DSP Systems in Real-Time using an FPGA-Based Test Station," FPD '95, The Third Canadian Workshop on Field-Programmable Devices: Technology, Tools and Applications, Montreal, Quebec, pp. 207-211, May, 1995.
[190] R. Wodnicki, G. W. Roberts and M. D. Levine, "A foveated image sensor in standard CMOS technology," IEEE Custom Integrated Circuits Conference, Santa Clara, Califorina, pp. 357-361, May 1995.
[191] M. F. Toner and G. W. Roberts, "On the practical implementation of mixed analog-digital BIST," IEEE Custom Integrated Circuits Conference, Santa Clara, Califorina, pp. 525-528, May 1995.
[192] G. W. Roberts, "Calculating distortion levels in sampled-data circuits using SPICE," IEEE International Symposium on Circuits and Systems, Seattle, Washington, Vol. 3, pp. 2059-2062, May 1995.
[193] D. Perry and G. W. Roberts, "Log-Domain Filters based on LC Ladder Synthesis," IEEE International Symposium on Circuits and Systems, Seattle, Washington, Vol. 1, pp. 311-314, May 1995.
[194] B.R. Veillette and G.W. Roberts, "High-Frequency Signal Generation Using Delta-Sigma Modulation Techniques," Proceedings of the 1995 IEEE International Symposium on Circuits And Systems, Vol. 1, pp. 637-640, May 1995.
[195] A. K. Lu and G. W. Roberts, "An analog multi-tone signal generator for built-in self-test applications," IEEE International Test Conference, Washington, pp. 650-659, Oct. 1994. This paper was awarded the 1994 Honourable Mention Best Paper Award.
[196] M. F. Toner and G. W. Roberts, "A BIST Technique for a Frequency Response and Intermodulation Distortion Test of a Sigma-Delta ADC," IEEE VLSI Test Symposium, Cherry Hill, NJ., pp. 60-65, April, 1994.

[197] M. Malowany, G. W. Roberts and V.K. Agarwal, " VAMP: A hierarchical framework for design for manufacturability of analog VLSI systems," IEEE International Symposium on Circuits and Systems, London, UK, pp. 1.141- 1.144, June 1994.
[198] P. M. Sinn and G. W. Roberts, "A comparison of first and second generation switched-current structures for analog sampled-data signal processing," IEEE International Symposium on Circuits and Systems, London, UK, pp. 5.301-5.304, June 1994.
[199] M. F. Toner and G. W. Roberts, "A BIST Scheme for an SNR Test of a Sigma-Delta ADC," IEEE International Test Conference, Baltimore, Maryland, pp. 805-814, Oct. 1993. This paper was awarded the 1993 Honourable Mention Best Paper Award.

[200] P. J. Crawley and G. W. Roberts, "Designing operational transconductance amplifiers for low voltage operation," IEEE International Symposium on Circuits and Systems, Chicago, Illinois, pp. 1455-1458, May, 1993.
[201] P. J. Crawley and G. W. Roberts, " Predicting harmonic distortion in switched-current memory circuits," IEEE International Symposium on Circuits and Systems, Chicago, Illinois, pp. 1243-1246, May, 1993.
[202] M. F. Toner and G. W. Roberts, "Towards Built-In-Self-Test for SNR testing of a mixed-signal IC," IEEE International Symposium on Circuits and Systems, Chicago, Illinois, pp. 1599-1602, May, 1993.
[203] A. K. Lu, G. W. Roberts and D. Johns, "A high-quality analog oscillator using oversampling D/A conversion techniques ," IEEE International Symposium on Circuits and Systems, Chicago, Illinois, pp. 1298-1301, May, 1993.
[204] I. Song and G. W. Roberts, " A 5th order bilinear switched-current Chebyshev filter," IEEE International Symposium on Circuits and Systems, Chicago, Illinois, pp. 1097-1100, May, 1993.
[205] M. F. Toner and G. W. Roberts, "Histogram-Based Testing Of A Sigma-Delta ADC," Proceedings of the 32nd Midwest Symposium on Circuits and Systems, Washington, pp. 760-763, Aug. 1992.
[206] P. Racz, G. W. Roberts, and M. Blostein, "BiCMOS Current Mode Analog Nyquist Filter At Video Rates," IEEE International Symposium on Circuits and Systems, San Diego, California, pp. 2344-47, May, 1992.
[207] A. Bishop, G. W. Roberts, and M. Blostein, "Adaptive Phase Locked Loop For Video Signal Sampling," IEEE International Symposium on Circuits and Systems, San Diego, California, pp. 1664-1667, May, 1992.
[208] P. J. Crawley and G. W. Roberts, " Switched-Current Sigma-Delta Modulation For A/D Conversion," IEEE International Symposium on Circuits and Systems, San Diego, California, pp. 1320-1323, May, 1992.
[209] P. J. Crawley and G. W. Roberts, " A Component Invariant Second-Order Switched-Current Sigma-Delta Modulator," IEEE International Symposium on Circuits and Systems, San Diego, California, pp. 1324-1327, May, 1992.
[210] M. Malowany, G. W. Roberts and V.K. Agarwal, " Parametric Variation Effects in Neural-Type Computations: A Functional Error Approach," 2nd IEEE International Conference on Microelectronics of Neural Networks, Munich, Germany, Oct., 1991.
[211] G. W. Roberts and A.S. Sedra, "A General Class Of Current Amplifier-Based Biquadratic Filter Circuits," Proceedings of the IEEE International Symposium on Circuits and Systems, pp. 1821-1824, Singapore, June, 1991.
[212] G. W. Roberts and A.S. Sedra, "Adjoint networks revisited," Proceedings of the IEEE International Symposium on Circuits and Systems, New Orleans, Louisiana, pp. 358-362, May, 1990.
[213] G. W. Roberts and A.S. Sedra, "On the formulation of transmission zeros in operational simulation circuits," Proceedings of the European Conference on Circuit Theory and Design, Brighton, England, September, 1989.
[214] G. W. Roberts and A. S. Sedra, " A generalization of intermediate transfer function analysis applied to arbitrary networks," Proceedings of the IEEE International Symposium on Circuits and Systems, Portland, Oregon, pp. 1059-1062, May, 1989.
[215] G. W. Roberts and A.S. Sedra, "Switched-capacitor filter networks derived from general parameter bandpass LC ladder networks," Proceedings of the IEEE International Symposium on Circuits and Systems, Helsinki, Finland, pp. 1005-1008, June, 1988.
[216] G. W. Roberts, W.M. Snelgrove and A.S. Sedra, "SC circuit simulations of state-space formulations derived from LC ladder network prototypes," Proceedings of the IEEE International Symposium on Circuits and Systems, Philadelphia, Pennsylvania, pp. 722-725, May, 1987.
[217] G. W. Roberts, W.M. Snelgrove and A.S. Sedra, "Switched-capacitor state-space filters using intermediate-function synthesis," Proceedings of the IEEE International Symposium on Circuits and Systems, San Jose, California, pp. 614-617, May, 1986.
[218] G. W. Roberts, W.M. Snelgrove and A.S. Sedra, "Switched-Capacitor realization of N-th order transfer function using a single multiplexed op amp," Proceedings of the IEEE 28th Midwest Symposium on Circuits and Systems, Louisville, Kentucky, pp. 621-624, Aug., 1985.

Patents

Granted Patents

[1] G. W. Roberts and C. Tam, Method and Device For Use In DC Parametric Tests, US Patent #6,727,834, McGill University, Filed: May 1, 2003, Granted: April 27, 2004.

[2] G. W. Roberts and A. Chan, Timing Measurement Device Using A Component-Invariant Vernier Delay Line," US Patent #6,850,051, McGill University, Filed: March 26, 2002, Granted: Feb. 1, 2005.

[3] G. W. Roberts, and M. Hafed, Integrated Excitation/Extraction System for Analog Test and Measurement, US Patent 6,931,579, McGill University, Filed: April 28, 2000, Granted: Aug. 16, 2005.

[4] G. W. Roberts, S. Laberge, M. Hafed, Programmable DC Voltage Generator, US Patent 6,914,548, McGill University, Filed: April 28, 2000, Granted: July 5, 2005.

[5] D. Rolston, D. V. Plant and G. W. Roberts, Method and Apparatus for Distributing Synchronous Clocking, US Patent #7,035,269, McGill University, Filed: March 14, 2002, Granted: April 25, 2006.

[6] G. W. Roberts, A. Chan, G. Duerden, M. Hafed, S. Laberge, B. Pishdad and C. Tam, "System and Method for Testing Integrated Circuits, US patent #7,242,209, DFT Microsystems, Inc., Filed: May 3, 2004, Granted: Jul 10, 2007.

[7] M. Hafed, G. Duerden, G. W. Roberts, "System Method For Generating A Jittered Test Signal," US Patent #7,315,574, DFT Microsystems, Inc., Filed: April 26, 2005, Granted: Jan. 1, 2008.

[8] G. W. Roberts, M. Safi-Harb and M. Oulmane, "A Novel Technique for Characterizing Rise/Fall Times for High Speed Digital Circuits and Analog Slew Rates." US Patent #7,474,974, Filed: Jan. 31, 2007, Granted: Jan 6, 2009.

[9] R. Abhari, G. W. Roberts, N. Smith and A. Suntives, "A high speed band pass serial data link," US Patent #8,258,892, Filed: Feb 19, 2008, Granted: Sep. 4, 2012.

[10] G. W. Roberts and S. Aouini, "A Predictable Robust Fully Programmable Analog Gaussian Noise Generator" US Patent #8,849,882, Filed: Oct. 30, 2008, Granted: Sept. 30, 2014.

[11] G. W. Roberts and S. Aouini, "Method and Device for Frequency Synthesis Using Sigma Delta Modulation Techniques" US Patent #8,855,215, Filed: May 9, 2011, Granted: Oct. 7, 2014.

[12] G. W. Roberts and M. Ali Bakhshian, "Digital Storage, Addition and Subtraction of Time-Mode Variables," US Patent #8,933,742 Filed: on May 10, 2011, Granted: Jan. 13, 2015.

[13] J. Saari, N. Quitoriano, J. Forbes and G. Roberts, "Sensor Systems And Methods For Analyte Detection," US Patent No. #20160084705 Filed: on September 22, 2014, Granted: Mar 24, 2016

[14] P. Kambhampati, J. Saari, N. Quitoriano, J. Forbes and G. Roberts, "Systems For Detecting Target Chemicals And Methods For Their Preparation And Use," US Patent No. # 20160084810 Filed: on September 22, 2014, Granted: Mar 24, 2016.

Patents Pending

[15] G. W. Roberts and M. Ali Bakhshian, "A Method And Device For Sensor Interface," US Provisional Patent #61,346,055 Filed: May 19, 2010 entitled For ROI 10105.

[16] O. Abdelfattah, G. Roberts and I. Shih "Biasing technique to enhance common-mode and power-supply rejection in multi-stage amplifiers," Dec 2, 2014 for ROI 15089.

[17] O. Abdelfattah, G. Roberts and I. Shih, US Provisional Patent No. 62/165394 file on May 22, 2015 entitled "Method and Systems for Enhancing Circuits."

[18] G. Roberts and M. Yang, McGill University report of Invention filed on June 19, 2015 No. 16024 entitled "A Method to Realize Ultra-High Gain Voltage Amplifiers for General Purpose Analog Signal Processing."