

# Ahmed S. Emara

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## Education

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- **McGill University**, Montreal, Quebec, Canada  
Ph.D. in Electrical and Computer Engineering, September 2016 – November 2021  
Thesis Title: Design of Calibration DACs using Periodic Sequences from Sigma-Delta Modulators  
Advisor: Gordon W. Roberts
- **The American University in Cairo (AUC)**, Cairo, Egypt  
M.Sc. in Electronics and Communications Engineering, September 2014 – June 2016  
Thesis Title: On the Production Testing of Analog and Digital Circuits  
Advisor: Hassanein H. Amer
- **The American University in Cairo (AUC)**, Cairo, Egypt  
B.Sc. in Electronics and Communications Engineering, September 2009 – June 2014  
Graduation Project: Testing of Current Mode Logic (CML) Circuits

## Industrial Experience

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Staff Analog and Mixed-Signal Circuit Design Engineer, **Synopsys Incorporation**, Mississauga, ON, Canada (February 2024 – Present)

- Contributed to the design and verification of clock distribution and DCC blocks in  $T_X$  of SERDES
- Involved in the lab debug of resistor matching (internal vs external) post silicon results
- Performed DFM simulations for different building blocks in the  $T_X$  of SERDES

Senior Analog and Mixed-Signal Circuit Design Engineer, **Synopsys Incorporation**, Mississauga, ON, Canada (July 2021 – January 2024)

- Contributed to the design and verification of 4-phase generator, static interpolator and phase mixing circuits in  $T_X$  of SERDES
- Involved in the lab debug of high EOJ post silicon results
- Performed DFM simulations for different building blocks in the  $T_X$  of SERDES

Research Assistant, Department of Analog Design, **Ciena Corporation**, Ottawa, ON, Canada (Sept 2017 - April 2021)

- Conducted literature review on high-resolution DC-DACs used for testing applications
- Designed, taped-out, and tested two segmented 16-bits DAC ICs using TSMC 65 nm
- Compiled and analyzed research results to write US patents, journals, and conference papers

## Teaching Experience

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Graduate Teaching Assistant, **Electrical and Computer Engineering Dept, McGill University**, Montreal, QC, Canada

- **Mixed-Signal Test Techniques** (ECSE 435): Winter 2020 and Winter 2018
- **Microelectronics** (ECSE 335): Fall 2019
- **Analog Microelectronics** (ECSE 534): Fall 2019
- **Introduction to Electronics** (ECSE 331): Fall 2017

Graduate Teaching Assistant, **Electronics and Communications Engineering Dept, AUC**, Cairo, Egypt

- **Testing of Digital Circuits** (ECNG 413/4103): Spring 2016
- **Digital Logic Design** (ECNG 210/2101): Fall 2014, Spring 2015 and Fall 2015

## U.S. Patent Publication

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1- Sadok Aouini, **Ahmed S. Emara**, Gordon W. Roberts, Mahdi Parvizi and Naim Ben-Hamida, "Extremely-Fine Resolution Sub-Ranging Current Mode Digital-Analog-Converter using Sigma-Delta Modulators," U.S. Patent 10,425,099, Filed: November 29, 2018, Granted: September 24, 2019.

## Book Chapter Publication

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2- S. H. Amer, A. H. Madian, H. Elsayed and **Ahmed S. Emara**, "Theory, Modeling and Design of Memristor-Based Min-Max Circuits," *Advances in Memristors, Memristive Devices and Systems*, Springer, 2017, 187-205.

## Journal Publications

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3- **Ahmed S. Emara**, Denis Romanov, Gordon W. Roberts, Sadok Aouini, Mahdi Parvizi and Naim Ben-Hamida, "An Area-Efficient High-Resolution Segmented  $\Sigma\Delta$ -DAC for Built-In Self-Test Applications," *IEEE Transactions on Very Large Scale Integration (TVLSI) Systems*, vol. 29, no. 11, pp. 1861-1874, November 2021.

4- **Ahmed S. Emara**, Denis Romanov, Gordon W. Roberts, Sadok Aouini, Mahdi Parvizi and Naim Ben-Hamida, "Optimized Periodic  $\Sigma\Delta$  Bitstreams for DC Signal Generation used in Dynamic Calibration Applications," *IEEE Open Journal of Circuits and Systems (OJ-CAS)*, Vol. 1, Issue. 1, pp. 3-12, March 2020.

5- **Ahmed S. Emara**, A. H. Madian, H. H. Amer, S. H. Amer and M. B. Abdelhalim, "On the Production Testing of Memristor Ratioed Logic (MRL) Gates," *Circuits and Systems*, Scientific Research Publishing, Vol. 7, August 2016, pp. 3016-3025.

## Conference Publications

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6- Fekry Y. Mohamed, **Ahmed S. Emara**, Hassanein H. Amer, "Detection of Catastrophic Faults in 6-bit R-2R Ladder DAC," proceedings of International Conference on Electrical, Electronics, and Information Engineering (ICEEIE), Malang, Indonesia, September 2023, pp. 1-5.

- 7- Beatrice Shokry, Hassanein Amer, Ramez Daoud, Mahmoud Rumman and **Ahmed S. Emara**, “Error Detection and Masking Circuit with High Diagnosability for Redundant Sensors,” proceedings of Mediterranean Embedded Computing Resources (MECO), June 2023, pp. 1-5.
- 8- **Ahmed S. Emara**, Gordon W. Roberts, Sadok Aouini, Mahdi Parvizi, and Naim Ben-Hamida, “Using Optimized Butterworth-Based  $\Sigma\Delta$  Bitstreams for the Testing of High-Resolution Data Converters,” proceedings of New Circuits and Systems (NEWCAS), June 2020, pp. 299-302.
- 9- **Ahmed S. Emara**, Gordon W. Roberts, Sadok Aouini, Mahdi Parvizi and N. Ben-Hamida, “Selecting the Fastest Settling-Time Filter in PDM-based DACs used for Dynamic Calibration Applications,” proceedings of Midwest Symposium on Circuits and Systems (MWSCAS), August 2019, pp. 900-903.
- 10- **Ahmed S. Emara**, Gordon W. Roberts, Sadok Aouini, Mahdi Parvizi and N. Ben-Hamida, “On the Design of DACs for Dynamic Calibration Applications using Periodic Sequences from  $\Sigma\Delta$  Modulators,” proceedings of the Circuits, Devices and Systems Symposium of the IEEE Canadian Conference on Electrical and Computer Engineering (CCECE), May 2019, pp. 1-4.
- 11- **Ahmed S. Emara**, A. H. Madian, H. H. Amer, S. H. Amer, and M. B. Abdelhalim, “Testing of memristor ratioed logic (MRL) XOR gate,” proceedings of the International Conference on Microelectronics (ICM), December 2016, pp. 181–184.
- 12- M. N. Shaker, A. H. Madian, M. B. Abdelhalim, S. H. Amer, **Ahmed S. Emara** and H. H. Amer, “Effect of open faults in FPGA switch matrices on fault detection mechanisms,” proceedings of the International Conference on Microelectronics (ICM), December 2016, pp. 233–236.
- 13- A. Abdulslam, S. H. Amer, **Ahmed S. Emara**, and Y. Ismail, “Evaluation of multi-level buck converters for low-power applications,” in proceedings of the International Symposium on Circuits and Systems (ISCAS), May 2016, pp. 794–797.
- 14- S. H. Amer, A. H. Madian, H. Elsayed and **Ahmed S. Emara**, “Effect of the memristor threshold current on memristor-based Min-Max circuits,” proceedings of the International Modern Circuits and Systems Technologies (MOCAS), May 2016, pp. 1-4.
- 15- **Ahmed S. Emara**, A. H. Madian, H. H. Amer and S. H. Amer, “High Coverage Test for the Second Generation Current Conveyor,” proceedings of the International Conference on Electronics, Circuits, and Systems (ICECS), December 2015, pp. 429-432.
- 16- S. H. Amer, A. H. Madian and **Ahmed S. Emara**, “Design and Analysis of Memristor-based min-max circuit,” proceedings of the International Conference on Electronics, Circuits, and Systems (ICECS), December 2015, pp. 187-190.
- 17- S. H. Amer, A. H. Madian and **Ahmed S. Emara**, “Memristor-based Center-Of-Gravity (COG) defuzzifier circuit,” proceedings of the European Conference on Circuit Theory and Design (ECCTD), August 2015, pp. 1-4.
- 18- R. Mohie Eldin, **Ahmed S. Emara**, S. H. Amer, M. M. Fouad, A. H. Madian, H. H. Amer, M. B. Abdelhalim and H. H. Draz, “Effect of the Resistance of Open and Short Faults on the Production Testing of MCML Gates,” proceedings of the Biennial Baltic Electronics Conference (BEC), October 2014, pp. 81-84.

19- S. H. Amer, **Ahmed S. Emara**, R. Mohie-Eldin, M. M. Fouad, A. H. Madian, H. H. Amer, M. B. Abdelhalim and H. H. Draz, "Testing current mode two-input logic gates," proceedings of the Circuits, Devices and Systems Symposium of the IEEE Canadian Conference on Electrical and Computer Engineering (CCECE), May 2014, pp. 1-6.

### **Professional Society Membership**

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- **Member**, Institute of Electrical and Electronics Engineers (IEEE) Member

### **Journal and Conference Activities**

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- **Technical Program Committee (TPC) Member**, The 35<sup>th</sup> International Conference on Microelectronics (ICM), Abu Dhabi, United Arab of Emirates, December 2023.
- **Reviewer**, IEEE Transactions on Circuits and Systems: Express Briefs
- **Technical Program Committee (TPC) Member**, The 32<sup>nd</sup> International Conference on Microelectronics (ICM), Aqaba, Jordan, December 2020.
- **Review Committee Member (RCM)**, The 18<sup>th</sup> IEEE International NEWCAS Conference, Montreal, Quebec, Canada, June 2020.
- **Technical Program Committee (TPC) Member**, The 31<sup>st</sup> International Conference on Microelectronics (ICM), Cairo, Egypt, December 2019.

### **HONORS AND AWARDS**

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- **MEDA Award**, McGill University, September 2016-present
- **Grad Excellence Award**, McGill University, September 2016-present
- **SR Telecom Award**, McGill University, September 2016-April 2017
- School of Sciences and Engineering, AUC, **Honors Assembly**, GPA>3.4, 2012-2014