# **2020 IEEE 14th Dallas Circuits** and Systems Conference (DCAS 2020)

Dallas, Texas, USA 15 – 16 November 2020



IEEE Catalog Number: CFP20505-POD **ISBN:** 

978-1-7281-8511-8

## Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

*Copyright and Reprint Permissions*: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP20505-POD
ISBN (Print-On-Demand):	978-1-7281-8511-8
ISBN (Online):	978-1-7281-8510-1

#### Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



### Technical Papers Published with IEEE Xplore (organized by sessions)

#### 1. Analog IC Design, Modeling and Testing

## **1-1** 1.37A,2A Current Regulating High Side Driver With 0.4µJ Energy Limitation During Unpowered State.......1

Sri Navaneeth Easwaran (Texas Instruments Inc), Robert Weigel (University of Erlangen-Nuremberg)

### **1-2** Advanced Non-linear Control Technique for Current-Fed Full-Bridge DC-DC Converter.......5

Sameer Arora (University of Texas at Dallas), Poras Balsara (University of Texas at Dallas), Dinesh Bhatia (University of Texas at Dallas)

#### 

Armin Abadifard (University of Tabriz), Pedram Ghavidel (University of Tabriz), Nima Taherkhani (University of Texas at Dallas), Mehran Sabahi (University of Tabriz)

### **1-4** Ternary Limited-Weight Codes and Quaternary Transition-Signaling for Low-Power Bus Encoding........16

Maryam Sadat Hosseini Omshi (North Tehran Branch, Islamic Azad University), Reza Faghih Mirzaee (Shahr-e-Qods Branch, Islamic Azad University)

#### 2-1 Neural Network-Based Mitigation of Nonlinear In-band Distortion in Coded OFDM System.......22

Nima Taherkhani (University of Texas at Dallas), Kamran Kiasaleh (UT Dallas)

## **2-2** Clipping Noise Mitigation by Adaptive Nulling and Nondata-Aided Compensation in Coded OFDM.......28

Nima Taherkhani (University of Texas at Dallas), Kamran Kiasaleh (UT Dallas)

### 2-3 Data Flow Mapping onto DNN Accelerator Considering Hardware Cost...........34

Baharealsadat Parchamdar (Islamic Azad University of Science and Research Branch ), Midia Reshadi (Islamic Azad University of Science and Research Branch)

#### 

Michael Maslakowski (Pennsylvania State University), Sheikh Ilham (Pennsylvania State University), Timothy Hall (University of Michigan), Thyagarajan Subramanian (Pennsylvania State University), Mehdi Kiani (Penn State University), Mohamed Almekkawy (Pennsylvania State University)

## **3-1** Formal Verification of Non-Functional Strategies of System-Level Power Management Architecture in Modern Processors........45

Reza Sharafinejad (University of Tehran), Bijan Alizadeh (University of Tehran), Tooraj Nikoubin (University of Texas at Dallas)

#### 

Mahdieh Grailoo (University of Tehran), Bijan Alizadeh (University of Tehran), Tooraj Nikoubin (University of Texas at Dallas)

### 3-3 Custom Real-Time-Kinematics Positioning System Testbed for Mobile Robot Localization........57

Theodore Stangebye (Baylor University), Timothy Mohr (Grove City College), Scott Koziol (Baylor University); Anna Valenti (Grove City College), Matthew Grauff (Grove City College)

### **3-4** A Framework for Modeling, Optimizing, and Implementing DNNs on FPGA Using HLS......61

Masoud Shahshahani (university of texas at dallas), Bahareh Khabazan (Iran University of Technology), Mohammad Sabri (Iran University of Technology), Dinesh Bhatia (University of Texas at Dallas)

## **4-1** Study the Effects of Misalignments in the Printed Spiral Inductive Coils for the Passive Wearable Sensors........67

Babak Noroozi (FAMU-FSU College of Engineering), Bashir Morshed (University of Memphis)

## **4-2** A Miniaturized High-efficient Headstage Based WPT System for Optogenetic Stimulation of Freely Moving Animal.......71

Dipon Biswas (University of North Texas), Ishani Kaul (Frisco Independent School District), Arnav Kaul (Frisco Independent School District), Ifana Mahbub (University of North Texas)

### 4-3 Study on impact of process on Bitcell design in FinFets......75

Mohammad Anees (Xilinx ), Kumar Rahul (XILINX), Sourabh Swarnkar (Xilinx, Inc.), Santosh Yachareni (Xilinx, Inc.)

## **4-4** Implementation of an active-filtering circuit for electroencephalographic signal acquisition using an 8-bit microcontroller.......80

Jose Perez Galindo (Universidad de Ingeniería y Tecnología - UTEC), Jimmy Fernando Tarrillo Olano (Universidad de Ingeniería y Tecnología - UTEC)

## **5-1** Noise Reduction via Chopper Stabilization of Fully Differential Temperature Sensors for Hardware Security Applications........85

Haoran Wei (Northeastern University), Mengting Yan (Northeastern University), Marvin Onabajo (Northeastern University)

## **5-2** 28 GHz Front End with Duplexer in 40 nm CMOS Technology for 5G Beam-steering Transceivers......N/A

Panagiotis Gkoutis (University of Patras), Georgios Konidas (University of Patras), Grigorios Kalivas (Nil)

**5-3** A Low-Power Front-End with Compressive Sensing Circuit for Neural Signal Acquisition designed in 180 nm CMOS process.......90

Karthik Kakaraparty (university of north texas), Ifana Mahbub (University of North Texas), Nishat Tarannum Tasneem (University of North Texas)

#### 5-4 A Broadband Class AB Power Amplifier with Second Harmonic Injection.......95

Pouria Pazhouhesh (Arizona State University), Jennifer Kitchen (Arizona State University)

## **6-1** Linearity Enhancement Using a Common-Drain Topology for Envelope Tracking CMOS Power Amplifiers.......100

SUMIT BHARDWAJ (ARIZONA STATE UNIVERSITY), Soroush Moallemi (Alphacore Inc.), Jennifer Kitchen (Arizona State University)

### 6-2 ExTru: A Lightweight, Fast, and Secure Expirable Trust for the Internet of Things......106

Hadi Mardani Kamali (George Mason university), Kimia Zamiri Azar (George Mason University), Shervin Roshanisefat (George Mason University), Ashkan Vakil (George Mason University), Houman Homayoun (University of California Davis); Avesta Sasan (George Mason University)

### **6-3** Highly Efficient Rectifier And DC-DC Converter Designed in 180 nm CMOS Process for Ultra-Low Frequency Energy Harvesting Applications.......112

Avinash Gunti (University of North Texas), Dipon Biswas (University of North Texas), Pashupati Adhikari (University of North Texas), Russel Reid (Dixie State university), Ifana Mahbub (University of North Texas)

## **6-4** Design of an Enhanced Reconfigurable Chaotic Oscillator using G4FET-NDR Based Discrete Map......117

Partha Sarathi Paul (University of Mississippi), Maisha Sadia (University of Mississippi), Md Sakib Hasan (University of Mississippi)

### 7-1 Magneto-electric Transistor Devices and Circuits with Steering Logic......122

Andrew Marshall (University of Texas at Dallas), Peter Dowben (University of Nebraska at Lincoln)

### **7-2** Robust Implementation of Memristive Reservoir Computing with Crossbar Based Readout Layer.......126

Sagarvarma Sayyaparaju (The University of Tennessee, Knoxville), Mst Shamim Ara Shawkat (The University of Tennessee, Knoxville), Garrrett Rose (University of Tennesseee)

## **7-3** Low Power Fully Differential CMOS First-Order All-Pass Filter with 0.2- 4.8Hz Variable Pole Frequency.......130

Venkata Deepa Kota (University of North Texas), Nishat Tarannum Tasneem (University of North Texas), Ifana Mahbub (University of North Texas), Nishat Tarannum Tasneem (University of North Texas)

#### 

Md Sakib Hasan (University of Mississippi), Aysha Shanta (University of Tennesseee), Partha Sarathi Paul (University of Mississippi), Maisha Sadia (University of Mississippi), Md Badruddoja Majumder (University of Tennesseee), Garrrett Rose (University of Tennesseee)

#### 8-1 Word recognition clinical testing of personalized deep reinforncement learning compression.......139

Sara Akbarzadeh (The University of Texas at Dallas), Nasim Alamdari (University of Texas at Dallas), Christina Campbell (University of Texas at Dallas), Edward Lobarinas (University of Texas at Dallas), Nasser Kehtarnavaz (University of Texas at Dallas)

#### 8-2 Deep Learning Deployment......141

Shailesh Nirgudkar (Mathworks)

#### 8-3 Low Power Implementation of ECG R-wave Peak Detector in 180nm......143

Anindita Paul (Manhattan College), edit Jaime Ramirez-Angulo (New Mexico State University), Antonio Lopez (Nil), Ramón González Carvajal (University of Seville), Alejandro Diaz-Sanchez (Nil)