

2023 IEEE 16th Dallas Circuits and Systems Conference (DCAS 2023)

**Denton, Texas, USA
14 – 16 April 2023**



**IEEE Catalog Number: CFP23505-POD
ISBN: 979-8-3503-9919-6**

**Copyright © 2023 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:	CFP23505-POD
ISBN (Print-On-Demand):	979-8-3503-9919-6
ISBN (Online):	979-8-3503-9918-9

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

CURRAN ASSOCIATES INC.
proceedings
.com

Technical Papers Published with IEEE Xplore and special session talks (organized by sessions)

April 14, 2023

Session # A

- A-1 EEG Signal Classification Using Memristor-Based Reservoir Computing System...1
MD Razuan Hossain (University of Mississippi, USA); Nicholas Xavier Armendarez and Ahmed Salah Mohamed (The Pennsylvania State University, USA); Anurag Dhungel (University of Mississippi, USA); Joseph S. Najem (The Pennsylvania State University, USA); MD Sakib Hasan (University of Mississippi, USA)
- A-2 45nm CMOS Tunable Low Pass Filter for On-Chip ECG Sensing...5
Eduardo DeLaCruz and Tomasz Jagoda (CSULB, USA); Ava Hedayatipor (California State University Long Beach, USA)
- A-3 Error Control Codes Based Modified Orthogonal Latin Squares for High-Speed Cache Memories...10
Rabah Abood Ahmed (Al-Nahrain University, Iraq)
- A-4 Nonlinear Parameter Modulation for Low-Cost Enhancement of Chaotic Entropy...16
Partha Sarathi Paul, Maisha Sadia and MD Sakib Hasan (University of Mississippi, USA)
- A-5 Design and Security-Mitigation of Configurable and Generative Hardware Cryptosystems...20
Tanvir Rahman (University of Florida, USA & FICS, USA); Fahim Rahman, Md Kawser Bepary and Md Saad Ul Haque (University of Florida, USA)
- A-6 Implementation of Secure and Privacy-Aware AI Hardware Using Distributed Federated Learning...26
Fathi Amsaad (739 Newton Dr & Wright State University, USA)
- A-7 A Survey on FHE Acceleration...32
Banafsheh Saber Latibari, Kevin Immanuel Gubbi, Houman Homayoun (University of California Davis, USA), and Avesta Sasan (University of California, Davis, USA)

Session # B

- B-1 MIMO Antenna Optimization: From Configuring Structure to Sizing with the Aid of Neural Network...38
Farzad Mir (University of Houston, USA); Lida Kouhalvandi (Istanbul Technical University, Turkey); Farshad Ebrahimi (University of Houston, USA); Ladislau Matekovits (Politecnico di Torino, Italy)
- B-2 Laser Induced Graphene as a Cost-Effective and Bioagent-Free Tactile Pressure Sensor...42
Joseph Scarlett, Christopher Ferdin and Shawana Tabassum (The University of Texas at Tyler, USA)
- B-3 On Exploiting the Synaptic Interaction Properties to Obtain Frequency-Specific Neurons...46
Guillaume Marthe (INSA Lyon & Inria Lyon, France); Claire Goursaud (INSA-Lyon, France); Romain Caze (IEMN, France); Laurent Clavier (Institut Mines-Telecom, IMT Nord Europe, France)
- B-4 Diamond-Based Plasmonic Terahertz Devices...52

Muhammad Mahmudul Hasan (Florida International University, USA); Yuhui Zhang (Rensselaer Polytechnic Institute, USA);
Nezih Pala (Florida International University, USA); Michael Shur (Rensselaer Polytechnic Institute, USA)

- B-5 Single Photon Detectors for Quantum Computing...56
Mst Shamim Ara Shawkat (Florida International University, USA)
- B-6 Start-Up Circuit for Synchronous Switched Energy Extraction from Triboelectric Energy Harvesters...60
Madhav Pathak, Cheng Huang and Ratnesh Kumar (Iowa State University, USA)
- B-7 Design of a 60 GHz Active Quasi-Circulator in 22nm FDSOI Process...62
Sujan Chowdhury (Technical University of Dresden, Germany); Mehedi Hasan (University of Maryland, USA)
- B-8 Filter Assessment for Zeta Converter Topologies in Photovoltaic Applications...66
Yousef Zahid (University of Arkansas, Fayetteville, USA); Xiaoqing Song (University of Arkansas Fayetteville, USA)

April 15, 2023

Session # A

- A-1 Design and Packaging of a Custom Single-Lead Electrocardiogram (ECG) Sensor Embedded with Wireless Transmission...71
Mahfuzur Rahman (Texas Tech University, USA); Robert Hewitt (Associate Professor, USA); Bashir I Morshed (Texas Tech University, USA)
- A-2 Fabrication and Characterization of Flexible Solid-State MIM Supercapacitor with Inkjet-Printing of Stacked Ag NP and Polymer Dielectric Layers...75
Mst Moriom Rojy Momota (Texas Tech University, USA); Tamanna Ferdous (The University of Memphis, USA); Tomoko Fujiwara (University of Memphis, USA); Bashir I Morshed (Texas Tech University, USA)
- A-3 An Analysis of Intraoral Pressure to Evaluate Infant Feeding Using a MEMS Biosensor...80
Paul Flynn, Maisha Naowar and Jimi Francis (University of Texas at San Antonio, USA)
- A-4 A Compact Wireless Headstage Based Optogenetic Neuromodulation and 32-Channel Electrophysiological Recording System...83
Nabanita Saha (The University of Texas at Dallas, USA); Erik Alvarez and April Becker (University of North Texas, USA); Ifana Mahbub (University of Texas at Dallas, USA)
- A-5 A Low Power Differential ISFET-pH Lab-On-Chip for Remote Cell Monitoring...87
Mohammad Farhan (The University of Tennessee, Knoxville, USA); Farin Rahman (The University of Tennessee Knoxville, USA); Andalib Nizam (University of Tennessee, Knoxville, USA); Mst Shamim Ara Shawkat (Florida International University, USA); Nicole McFarlane (University of Tennessee, USA)

Session # B

- B-1 Virtualization for Automotive Safety and Security Exploration...93
Md Rafiul Kabir and Sandip Ray (University of Florida, USA)

- B-2 Laser-Induced Graphene Sensor Interfaced with Machine Learning Classifiers for Hand Tremor Identification...97
Vivek Kumar Tiwari, Nafize Hossain and Shawana Tabassum (The University of Texas at Tyler, USA)
- B-3 MOSFET-Based H-Bridge Inverter for Wirelessly Charging Implantable Medical Devices...102
Nafize Hossain, Tanzila Noushin, Ratri Mukherjee, Mustafa Hannoun and Shawana Tabassum (The University of Texas at Tyler, USA)
- B-4 Blending Entrepreneurial Education in Senior and Graduate-Level Electrical Engineering Courses...107
Shawana Tabassum (The University of Texas at Tyler, USA); Prabha Sundaravadivel (University of Texas at Tyler, USA)

April 16, 2023

Session # A

- A-1 Advancement of PMCW Radar and Its Board-Level Prototyping...112
Michael C Brown and Changzhi Li (Texas Tech University, USA)
- A-2 A 23.7 to 29.9 GHz Tunable Fully Differential Voltage Controlled Oscillator Designed in 180nm CMOS Process...116
Karthik Kakaraparty and Ifana Mahbub (University of Texas at Dallas, USA)
- A-3 A Filter-Less RMS-Based S-FSK Demodulation Technique for SunSpec Rapid Shutdown Receiver...119
Basel Yaseen (Princess Sumaya University for Technology, Jordan); Amneh Akour (Texas Instrument, Jordan); Fadi R. Shahroury (Princess Sumaya University for Technology, Jordan); Hani H Ahmad (Princess Sumaya University for Technology, USA)
- A-4 Solar Energy Modeling and Assessment in Texas...124
King Man Siu, Di Wu and Keerthi Reddy Adapala (University of North Texas, USA)
- A-5 Dual-Band Matching and Decoupling Networks for Two-Element Antenna Arrays...130
Son Vu and Hung Luyen (University of North Texas, USA)

Session # B

- B-1 Efficient Bounding Box Selection for Object Localization...134
Ethan R Adams, Arthur Depoian II, Aidan G Kurz, Garrett Cayce, Jared C Riley, Colleen Bailey and Parthasarathy Guturu (University of North Texas, USA)
- B-2 Understanding the Innovations Required for a Green & Secure Artificial Intelligence Paradigm...138
Md Mashfiq Rizvee (University of Kansas, USA); Md Hafizur Rahman (University of Maine, USA); Sumaiya Shomaji (University of Kansas, USA); Prabuddha Chakraborty(University of Maine, USA)

- B-3 Potential and Pitfalls of Multi-Valued Logic Circuits for Hardware Security...144**
Tanvir Hossain, S M Mojahidul Ahsan and Tamzidul Hoque (University of Kansas, USA)
- B-4 Enhancing Continuous Chaos Communication Using Machine Learning in Resource-Limited Devices...150**
Jinha Hwang (California State University, Long Beach, USA); Nima Hoseinzadeh (University of Tennessee, USA); Ava Hedayatipor (California State University Long Beach, USA)
- B-5 Resistive RAM-Based PUF: Challenges and Opportunities...155**
S M Mojahidul Ahsan (University of Kansas, USA); Tanvir Hossain (University of Kansas, USA); MD Sakib Hasan (University of Mississippi, USA); Tamzidul Hoque (University of Kansas, USA)
- B-6 A Feasibility Analysis of Triboelectric Energy Harvester for Hip Implants...161**
Leila Donyaparastlivari, Mohammad Atmeh, Premananda Indic and Alwathiqbellah Ibrahim (The University of Texas at Tyler, USA)
- B-7 Theoretical Evaluation of Nonlinear Frequency Up-Conversion Triboelectric Harvester...165**
Hadeel Abumarar (University of Texas at Tyler, USA); Alwathiqbellah Ibrahim (The University of Texas at Tyler, USA)
- B-8 Parametric Investigation of Bistable Vibro-Impact Triboelectric Energy Harvester Using Frequency Up-Conversion...170**
Hadeel Abumarar (University of Texas at Tyler, USA); Alwathiqbellah Ibrahim (The University of Texas at Tyler, USA)
- B-9 Enhancing the Bandwidth of a Vibro-Impact Cantilever Beam Triboelectric Harvester Using Repulsive Magnetic Nonlinearity...175**
Qais Qaseem (University of Texas at Tyler, USA); Alwathiqbellah Ibrahim (The University of Texas at Tyler, USA)
- B-10 A Theoretical Parametric Analysis of Magnetoelastic Vibro-Impact Triboelectric Harvester...179**
Qais Qaseem (University of Texas at Tyler, USA); Alwathiqbellah Ibrahim (The University of Texas at Tyler, USA)