

# **NAECON 2021 - IEEE National Aerospace and Electronics Conference**

**Dayton, Ohio, USA  
16 – 19 August 2021**



**IEEE Catalog Number: CFP21NAE-POD  
ISBN: 978-1-6654-4860-4**

**Copyright © 2021 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:	CFP21NAE-POD
ISBN (Print-On-Demand):	978-1-6654-4860-4
ISBN (Online):	978-1-6654-4859-8
ISSN:	0547-3578

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

---

## AES Focused Session: Aerospace Power Systems and Power Electronics

### **Robust Stabilization of Parallel Inverters-Based Microgrid: Droop Control Strategy ..... 1**

*Asma Alfergani<sup>1</sup>, Nagi Buaossa<sup>2</sup>, Ahmed Tahir<sup>1</sup>, Anas Suliman<sup>1</sup>, Malik Al-Warfali<sup>1</sup>, Hussin Ragb<sup>3</sup>*

<sup>1</sup>University of Benghazi, Libya; <sup>2</sup>University of Dayton, USA; <sup>3</sup>Christian Brothers University, USA

### **Towards the Integration of Hf<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub>-based Negative Capacitance Dielectrics on $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Substrates ..... 7**

*Guillermo A. Salcedo<sup>1</sup>, Ahmad E. Islam<sup>1</sup>, Michael K. Dietz<sup>2</sup>, Suraj Cheema<sup>3</sup>, Kevin D. Leedy<sup>1</sup>, Kyle J. Liddy<sup>1</sup>, Andrew J. Green<sup>1</sup>, Weisong Wang<sup>2</sup>, Sayeef Salahuddin<sup>3</sup>, Kelson D. Chabak<sup>1</sup>, James M. Sattler<sup>1</sup>*

<sup>1</sup>Air Force Institute of Technology, USA; <sup>2</sup>Wright State University, USA; <sup>3</sup>University of California-Berkeley, USA

### **Safe and Low-Cost Lithium-Ion Battery Management System Developed for Aircraft Applications ..... 12**

*Anthony Frierson<sup>1</sup>, Bang-Hung Tsao<sup>1</sup>, Max Tsao<sup>1</sup>, Justin Chu<sup>1</sup>, Hana Tinch<sup>1</sup>, Joseph Fellner<sup>2</sup>, Luis Herrera<sup>3</sup>*

<sup>1</sup>University of Dayton Research Institute, USA; <sup>2</sup>Air Force Research Laboratory, USA; <sup>3</sup>University at Buffalo, USA

### **The Efficiency Measuring Apparatus for the Design of Li-Ion Batteries Equalizers ..... 18**

*Ngalua Sandrine Mubenga*

The University of Toledo, USA

## AES Focused Session: Autonomous Systems

### **Collision Avoidance of Unmanned Aerial Vehicles in an Urban Environment ..... 25**

*Daegyun Choi<sup>1</sup>, Donghoon Kim<sup>1</sup>, Kyuman Lee<sup>2</sup>*

<sup>1</sup>University of Cincinnati, USA; <sup>2</sup>Kyungpook National University, Korea

### **Decentralized Collision Avoidance via Fuzzy Potential Fields ..... 33**

*Anirudh Chhabra, Daegyun Choi, Donghoon Kim*

University of Cincinnati, USA

### **Space Station Power Forecasting with LSTMs for an Embedded Platform ..... 40**

*Joseph R. Kocik, Alan D. George*

University of Pittsburgh, USA

### **An Embedded Implementation of Improved SSD with RTMaps and NXP Bluebox2.0 for Autonomous Platforms ..... 44**

*Niranjana Ravi, Mohamed El-Sharkawy*

Indiana University–Purdue University Indianapolis, USA

### **A Distributed Platform for Flight Dynamics Simulation of Unmanned Aerial Vehicles ..... 51**

*Zhenhua Jiang, Ashish Parimi*

University of Dayton, USA

<b>Symbols to represent AI systems .....</b>	<b>61</b>
<i>Teresa D. Hawkes<sup>1</sup>, Trevor J. Bihl<sup>2</sup></i>	
<sup>1</sup> Applied Research Solutions, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Front Collision Detection System of Unmanned Ground Vehicle using 90nm CMOS .....</b>	<b>69</b>
<i>Patrick Steward<sup>1</sup>, Syed Mukarram Ali<sup>2</sup>, Andrea Gray<sup>3</sup>, Xiaomeng Zhang<sup>1</sup>, Shuo Li<sup>1</sup>, Xiaodong Zhang<sup>1</sup>, Saiyu Ren<sup>1</sup></i>	
<sup>1</sup> Wright State University, USA; <sup>2</sup> Stony Brook University, USA; <sup>3</sup> Embry-Riddle Aeronautical University, USA	
<b>Deep Learning Algorithm for Atomization Characterization using Shadowgraph Images .....</b>	<b>74</b>
<i>Barath Narayanan Narayanan, Sidaard Gunasekaran, Joseph Ivarson, Lars Maneck</i>	
University of Dayton, USA	
<b>An Implementation of Simultaneous Localization and Mapping using Dynamic Field Theory .....</b>	<b>80</b>
<i>Stephen Reynolds<sup>1</sup>, David Fan<sup>1</sup>, Tarek M. Taha<sup>1</sup>, Ashley DeMange<sup>2</sup>, Todd Jenkins<sup>2</sup></i>	
<sup>1</sup> University of Dayton, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Symbolic Probabilistic Cognitive Reasoner on Neuromorphic Hardware .....</b>	<b>84</b>
<i>David Fan<sup>1</sup>, Ashley DeMange<sup>2</sup>, Todd Jenkins<sup>2</sup>, Yuki Adams<sup>3</sup>, Tarek Taha<sup>4</sup></i>	
<sup>1</sup> University of Dayton Research Institute, USA; <sup>2</sup> Air Force Research Laboratory, USA;	
<sup>3</sup> Applied Research Solutions, USA; <sup>4</sup> University of Dayton, USA	
<b>AES Focused Session: Cyber Systems</b>	
<b>Malware Detection using the Context of API Calls .....</b>	<b>92</b>
<i>Monika Chandrasekaran<sup>1</sup>, Anca Ralescu<sup>1</sup>, David Kapp<sup>2</sup>, Temesgen Kebede<sup>2</sup></i>	
<sup>1</sup> University of Cincinnati, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Single Property Feature Selection applied to Malware Detection .....</b>	<b>98</b>
<i>Omar Rawashdeh<sup>1</sup>, Anca Ralescu<sup>1</sup>, David Kapp<sup>2</sup>, Temesgen Kebede<sup>2</sup></i>	
<sup>1</sup> University of Cincinnati, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Synthesizing DNAs of a System's Binary Files from its Functional and Structural Representation .....</b>	<b>106</b>
<i>Sunday Cosmos Ngwobia<sup>1</sup>, Anca Ralescu<sup>1</sup>, David Kapp<sup>2</sup>, Temesgen Kebede<sup>2</sup></i>	
<sup>1</sup> University of Cincinnati, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>AES Focused Session: Integrated Photonics</b>	
<b>Ni-Silicide Schottky Barrier Micropyramidal Photodetector Array .....</b>	<b>116</b>
<i>Grant W. Bidney<sup>1,2</sup>, Boya Jin<sup>1</sup>, Lou Deguzman<sup>1</sup>, Joshua M. Duran<sup>2</sup>, Gamini Ariyawansa<sup>2</sup>, Igor Anisimov<sup>2</sup>, Nicholaos I. Limberopoulos<sup>2</sup>, Augustine M. Urbas<sup>2</sup>, Kenneth W. Allen<sup>3</sup>, Sarath D. Gunapala<sup>4</sup>, Vasily N. Astratov<sup>1,2</sup></i>	
<sup>1</sup> University of North Carolina at Charlotte, USA; <sup>2</sup> Air Force Research Laboratory, USA; <sup>3</sup> Georgia Institute of Technology, USA;	
<sup>4</sup> California Institute of Technology, USA	
<b>Light-Concentrating Microcone Array for Improving Performance of Infrared Imaging Devices .....</b>	<b>119</b>
<i>Boya Jin<sup>1</sup>, Aaron Brettin<sup>1</sup>, Grant W. Bidney<sup>1,2</sup>, Joshua M. Duran<sup>2</sup>, Gamini Ariyawansa<sup>2</sup>, Igor Anisimov<sup>2</sup>, Nicholaos I. Limberopoulos<sup>2</sup>, Augustine M. Urbas<sup>2</sup>, Kenneth W. Allen<sup>3</sup>, Sarath D. Gunapala<sup>4</sup>, Vasily N. Astratov<sup>1,2</sup></i>	
<sup>1</sup> University of North Carolina at Charlotte, USA; <sup>2</sup> Air Force Research Laboratory, USA; <sup>3</sup> Georgia Institute of Technology, USA;	
<sup>4</sup> California Institute of Technology, USA	

**Propagation of a p-polarized Plane Wave across a Transparency and Chiral Interface Using a k-vector Approach ..... 123**

*Akram Muntaser, Monish Chatterjee*

University of Dayton, USA

**Propagation of Left- and Right-Circularly Polarized Electromagnetic Waves across a Chiral/Achiral Interface under Variable Magnetic Permeability with Dielectric Loss ..... 128**

*Nagi Buaossa, Monish R. Chatterjee*

University of Dayton, USA

**V-point Polarization Singularity Arising from Highly Focused Cylindrical Vector Beams ..... 138**

*Elforjani S. Jera<sup>1</sup>, Rajab Y. Atai<sup>1</sup>, Hussin K. Ragb<sup>2</sup>*

<sup>1</sup>University of Dayton, USA; <sup>2</sup>Christian Brothers University, USA

**Power Coefficients for Electromagnetic Wave Propagation Across an Achiral and Chiral Material Interface with Dielectric Loss ..... 142**

*Rajab Y. Atai, Monish R. Chatterjee, Elforjani S. Jera*

University of Dayton, USA

**Anisotropic Wet Etching of Si as a Fabrication Tool Enabling 3D Microphotonics Structures and Devices ..... 146**

*Grant W. Bidney<sup>1,2</sup>, Boya Jin<sup>1</sup>, Lou Deguzman<sup>1</sup>, Thomas C. Hutchens<sup>1</sup>, Joshua M. Duran<sup>2</sup>, Gamini Ariyawansa<sup>2</sup>, Igor Anisimov<sup>2</sup>, Nicholaos I. Limberopoulos<sup>2</sup>, Augustine M. Urbas<sup>2</sup>, Kenneth W. Allen<sup>3</sup>, Sarath D. Gunapala<sup>4</sup>, Vasily N. Astratov<sup>1,2</sup>*

<sup>1</sup>University of North Carolina at Charlotte, USA; <sup>2</sup>Air Force Research Laboratory, USA; <sup>3</sup>Georgia Institute of Technology, USA;

<sup>4</sup>California Institute of Technology, USA

**Spin-Orbital Angular Momentum Conversion under High NA Focusing of Vertically Polarized Vortex Beam ..... 150**

*Elforjani S. Jera<sup>1</sup>, Hussin K. Ragb<sup>2</sup>, Mohammed J. Kyamo<sup>3</sup>, Omar M. Darwish<sup>1</sup>, Nagi Buaossa<sup>1</sup>*

<sup>1</sup>University of Dayton, USA; <sup>2</sup>Christian Brothers University, USA; <sup>3</sup>Florida Institute of Technology, USA

**Modeling and Characterization of the Effect of Misalignment between Microsphere-Sensor on the Sensitivity of Microsphere-Lens-Enhanced MWIR SLS Photodetectors ..... 154**

*D.B. Megherbi<sup>1</sup>, P. Mack<sup>1</sup>, J. DiZoglio<sup>1</sup>, M.I. Vakil<sup>1,2</sup>, N. Limberopoulos<sup>2</sup>, A. Urbas<sup>2</sup>*

<sup>1</sup>University of Massachusetts, USA; <sup>2</sup>Air Force Research Laboratory, USA

**AES Focused Session: Machine Learning, Guidance and Control**

**Data and Feature Fusion Approaches for Anomaly Detection in Polarimetric Hyperspectral Imagery ..... 157**

*Trevor J. Bihl, Jacob A. Martin, Kevin C. Gross, Kenneth W. Bauer*

Air Force Research Laboratory, USA

**Learning Time Improvements to an Evolutionary Algorithm for Online, Non-Stationary, Optimization of Flight Control in a Flapping Wing Micro Air Vehicle ..... 164**

*John C. Gallagher*

University of Cincinnati, USA

<b>Validation of Doppler Lidar Sensor using Covariance Analysis .....</b>	<b>171</b>
<i>Tristan Williams, Robert C. Leishman</i>	
Air Force Institute of Technology, USA	
<b>Real-time Guidance Strategy for Active Defense Aircraft via Deep Reinforcement Learning .....</b>	<b>177</b>
<i>Zhi Li<sup>1</sup>, Jinze Wu<sup>1</sup>, Yuanpei Wu<sup>1</sup>, Yu Zheng<sup>2</sup>, Meng Li<sup>3</sup>, Haizhao Liang<sup>1</sup></i>	
<sup>1</sup> Sun Yat-sen University, China; <sup>2</sup> Science and Technology on Space Physics Laboratory, China;	
<sup>3</sup> Beijing Aerospace Technology Institute, China	
<b>Intelligent Joint Beamforming and Distributed Power Control for UAV-assisted Ultra-Dense Network: A Hierarchical Optimization Approach .....</b>	<b>184</b>
<i>Yuzhu Zhang<sup>1</sup>, Lijun Qian<sup>2</sup>, Hao Xu<sup>1</sup></i>	
<sup>1</sup> University of Nevada, USA; <sup>2</sup> Prairie View A&M University, USA	
<b>Vision-based Collision Avoidance through Deep Reinforcement Learning .....</b>	<b>191</b>
<i>Sirui Song, Yuanhang Zhang, Xi Qin, Kirk Saunders, Jundong Liu</i>	
Ohio University, USA	
<b>AES Focused Session: Radar, Tomography and RF Sensing</b>	
<b>Robust Hot Via Interconnect Technique with Silver Epoxy for GaAs MMIC .....</b>	<b>195</b>
<i>Mohammad Salah Abdullatif<sup>1</sup>, Sahand Noorizadeh<sup>1</sup>, Salam Hajjar<sup>2</sup></i>	
<sup>1</sup> National Instruments, USA; <sup>2</sup> West Virginia University, USA	
<b>Smart FFT Measurement for Reconfigurable Sensor Using a Wideband Digital Receiver .....</b>	<b>200</b>
<i>Prasanna Kumar Daram, Chien-In Henry Chen</i>	
Wright State University, USA	
<b>Statistical Methods for Comparing Regression Coefficients Between Hybrid LMS and LMS Algorithms for Smart Antenna .....</b>	<b>204</b>
<i>Salah Dauga</i>	
University of Dayton, USA	
<b>Unit Circle Roots Property for Sensor Array Signal Processing .....</b>	<b>210</b>
<i>Jared Smith, Arnab Shaw</i>	
Wright State University, USA	
<b>AES Focused Session: Terahertz and Millimeter Wave Devices</b>	
<b>Machine Learning Enabled Fall Detection with Compact Millimeter Wave System .....</b>	<b>217</b>
<i>Abdullah K. Alhazmi, Mubarak A. Alanazi, Chengkun Liu, Vamsy P. Chodavarapu</i>	
University of Dayton, USA	
<b>Design of GaN Bow-Tie THz Antenna for Space and Defense Applications .....</b>	<b>223</b>
<i>Ibrahim M. Abdel-Motaleb, Sai Dittakavi</i>	
Northern Illinois University, USA	

## AES Focused Session: Trusted Systems

### **USAF Digital Campaign: Think Big, Start Small, Scale Fast ..... 228**

*Christopher Garrett<sup>1</sup>, Mark W. Kassan<sup>2</sup>*

<sup>1</sup>Air Force Lifecycle Management Center, USA; <sup>2</sup>Air Force Materiel Command, USA

### **No Free Lunch with Open Mission Systems ..... 233**

*Nicholas S. Kovach, Kenneth Littlejohn*

Air Force Research Laboratory, USA

### **Low-Overhead In-Situ Aging Monitors Using a Reconfigurable FeFET for Trusted Hardware ..... 239**

*Gregory Muha, Joshua Mayersky, Rashmi Jha*

University of Cincinnati, USA

### **Mitigation of Side-Channel Attack for Artificial Intelligence (AI) Based ASICs Targeting Scientific Applications ..... 243**

*Sayantani Karmakar<sup>1</sup>, Supriya Karmakar<sup>2</sup>*

<sup>1</sup>Portland State University, USA; <sup>2</sup>Farmingdale State College-SUNY, USA

### **Solder-Defined Architectures for Trusted Computing ..... 246**

*Marc W. Abel*

Wright State University, USA

### **Mapping Heterogeneous Interfaces for System Integration ..... 254**

*Vahid Rajabian-Schwartz<sup>1</sup>, Thomas P. Evans<sup>2</sup>, Gilbert J. Clark<sup>1</sup>*

<sup>1</sup>Air Force Research Laboratory, USA; <sup>2</sup>Carnegie Mellon University, USA

### **A Temporal Model for the Prisoner's Dilemma and an Iterated Attacker-Defender Network Game ..... 261**

*Nicholas Kovach, Gary Lamont*

Air Force Research Laboratory, USA

## CAS Focused Session: Deep Learning and Artificial Intelligence

### **Network Compression and Frame Stitching for Efficient and Robust Speech Enhancement ..... 269**

*Nidal Abuhajar<sup>1</sup>, Tao Sun<sup>1</sup>, Zhewei Wang<sup>1</sup>, Shuyu Gong<sup>1</sup>, Charles D. Smith<sup>2</sup>, Xianhui Wang<sup>1</sup>, Li Xu<sup>1</sup>, Jundong Liu<sup>1</sup>*

<sup>1</sup>Ohio University, USA; <sup>2</sup>University of Kentucky, USA

### **Explainable Artificial Intelligence Methodology for Handwritten Applications ..... 277**

*Paul Whitten, Francis Wolff, Chris Papachristou*

Case Western Reserve University, USA

### **A Multi-Levelled Approach and its Application in Classifying Malware Programs using Multiple Sources of Telemetry Data ..... 283**

*Ouboti Djaneye-Boundjou<sup>1</sup>, Temesguen Messay-Kebede<sup>2</sup>, David Kapp<sup>2</sup>*

<sup>1</sup>University of Dayton, USA; <sup>2</sup>Air Force Research Laboratory, USA

<b>Investigating the Generation of Adversarial Malware Features and the Use of Adversarial Training .....</b>	<b>288</b>
<i>Ouboti Djaneye-Boundjou<sup>1</sup>, Temesguen Messay-Kebede<sup>2</sup>, David Kapp<sup>2</sup></i>	
<sup>1</sup> University of Dayton, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Visualizations of Fusion of Electro Optical (EO) and Passive Radio-Frequency (PRF) Data .....</b>	<b>294</b>
<i>Asad Vakil<sup>1</sup>, Erik Blasch<sup>2</sup>, Robert Ewing<sup>3</sup>, Jia Li<sup>1</sup></i>	
<sup>1</sup> Oakland University, USA; <sup>2</sup> Air Force Office of Scientific Research, USA; <sup>3</sup> Air Force Research Laboratory, USA	
<b>Artificial Dataset Generation for Automated Aircraft Visual Inspection .....</b>	<b>302</b>
<i>Nathan J. Gaul, Robert C. Leishman</i>	
Air Force Institute of Technology, USA	
<b>Dynamic Speed Estimation of Moving Objects from Camera Data .....</b>	<b>307</b>
<i>Ashish Parimi, Zhenhua Jiang</i>	
University of Dayton Research Institute, USA	
<b>Human Subject Identification via Passive Spectrum Monitoring .....</b>	<b>317</b>
<i>Huaizheng Mu<sup>1</sup>, Robert Ewing<sup>2</sup>, Erik Blasch<sup>3</sup>, Jia Li<sup>1</sup></i>	
<sup>1</sup> Oakland University, USA; <sup>2</sup> Air Force Research Laboratory, USA; <sup>3</sup> Air Force Office of Scientific Research, USA;	
<b>Multilevel Random Forest Algorithm in Image Recognition for Various Scientific Applications .....</b>	<b>323</b>
<i>Sayantani Karmakar<sup>1</sup>, Supriya Karmakar<sup>2</sup></i>	
<sup>1</sup> Portland State University, USA; <sup>2</sup> Farmingdale State College-SUNY, USA	
<b>Context-Aware Malware Detection Using Topic Modeling .....</b>	<b>326</b>
<i>Wayne Stegner<sup>1</sup>, David Kapp<sup>2</sup>, Temesgen Kebede<sup>2</sup>, Rashmi Jha<sup>1</sup></i>	
<sup>1</sup> University of Cincinnati, USA; <sup>2</sup> Air Force Research Laboratory, USA	
<b>Real-Time Video-based Heart and Respiration Rate Monitoring .....</b>	<b>332</b>
<i>Jafar Pourbemany, Almabrok Essa, Ye Zhu</i>	
Cleveland State University, USA	
<b>Securing Machine Learning: A Red vs Blue Approach .....</b>	<b>337</b>
<i>Alex Hildenbrandt, Ashley Diehl</i>	
Air Force Research Laboratory, USA	
<b>CAS Focused Session: Digital Signal and Image Processing</b>	
<b>A Machine Learning Approach to Modulation Detection in Wireless Communications .....</b>	<b>341</b>
<i>Venkataramani Kumar, Fuhao Li, Jielun Zhang, Feng Ye, Guru Subramanyam</i>	
University of Dayton, USA	
<b>Octree-Based Compression for Geiger-Mode LiDAR .....</b>	<b>348</b>
<i>Brenton Sundlie</i>	
University of Dayton Research Institute, USA	



**High-Resolution Label Free Cellphone Microscopy Using Contact Ball Lenses ..... 356**

*Boya Jin<sup>1</sup>, Grant W. Bidney<sup>1,2</sup>, Igor Anisimov<sup>2</sup>, Nicholas I. Limberopoulos<sup>2</sup>, A.V. Maslov<sup>3</sup>, V.N. Astratov<sup>1,2</sup>*

<sup>1</sup>University of North Carolina at Charlotte, USA;<sup>2</sup>Air Force Research Laboratory, USA;<sup>3</sup>University of Nizhny Novgorod, Russia

**Tensile Stress Measurement Applied in Small Rockets Fins Using Force Gauges in the Quarter Bridge Method ..... 359**

*Hans Marcelo, Jafet Santivañez, Roberto Alicedo, Daniel Inchicaqui*

Universidad Nacional de Ingeniería, Peru

**XBT: An FPGA Accelerated Binary Translation ..... 365**

*Ke Chai, Frank Wolff, Chris Papachristou*

Case Western Reserve University, USA

**Electromagnetic Propagation across a 2D Aperture and a Magnetic Chiral Boundary ..... 373**

*Nagi Buaossa, Monish R. Chatterjee*

University of Dayton, USA

**Ensemble Method of Lung Segmentation in Chest Radiographs ..... 382**

*Barath Narayanan Narayanan, Manawduge Supun De Silva, Russell C. Hardie, Redha Ali*

University of Dayton, USA

**Dimension Reduction in Direction Finding Optimization ..... 386**

*David Easterling<sup>1</sup>, Joshua Stevenson<sup>1</sup>, David Beane<sup>2</sup>, Michael Corey<sup>3</sup>*

<sup>1</sup>University of Dayton Research Institute, USA;<sup>2</sup>TEKsystems, USA;<sup>3</sup>Air Force Research Laboratory, USA

**Convolutional Neural Networks for Enhanced Compression Techniques ..... 392**

*Matthew Gnacek<sup>1</sup>, Cory Heatwole<sup>1</sup>, David Fan<sup>1</sup>, Marc Hoffman<sup>2</sup>*

<sup>1</sup>University of Dayton Research Institute, USA;<sup>2</sup>Air Force Research Laboratory, USA

**CAS Focused Session: Emerging Electronics and Microsystems**

**Critical Datapath Cells for NCL Asynchronous Circuit Area Reduction ..... 400**

*Dallas A. Phillips, John M. Emmert*

University of Cincinnati, USA

**Study of Drift in RRAM Devices Under Various Operating Conditions ..... 405**

*Brett Hochman<sup>1</sup>, Rashmi Jha<sup>1</sup>, Kevin Leedy<sup>2</sup>*

<sup>1</sup>University of Cincinnati, USA;<sup>2</sup>Air Force Research Laboratory, USA

**Low Power High Speed ADCs using GNRfet Device Technology ..... 411**

*Mounica Patnala<sup>1</sup>, Trond Ytterdal<sup>2</sup>, Maher Rizkalla<sup>1</sup>*

<sup>1</sup>Indiana University–Purdue University Indianapolis, USA;<sup>2</sup>Norwegian University of Science and Technology, Norway

**CAS Focused Session: Sensor Fusion**

**Sensor Fusion for Context Analysis in Social Media COVID-19 Data ..... 415**

*Grace Y. Smith, Christine M. Schubert Kabban, Kenneth M. Hopkinson, Mark E. Oxley, George E. Noel, Huaining Cheng*

Air Force Institute of Technology, USA