

# **2023 IEEE International Conference on Memristive Computing and Applications (ICMCA 2023)**

**Jinan, China  
8 – 10 December 2023**



**IEEE Catalog Number: CFP23QZ6-POD  
ISBN: 979-8-3503-1624-7**

**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:	CFP23QZ6-POD
ISBN (Print-On-Demand):	979-8-3503-1624-7
ISBN (Online):	979-8-3503-1623-0

**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

Dynamics and Information Modulation in the Chialvo Neuron Networks with Fractional-Order Discrete Memristor Coupling .....	1
<i>Shaobo He, Mingling Ma, Mengjiao Wang, Zhijun Li</i>	
Firing Patterns Transition and Multistability in an Autapse-Rulkov Model .....	7
<i>Peng Zhang, Yue Deng, GuiBin Xing, Fang Yuan</i>	
Finding Coexisting and Multi-Cavity Chaotic Attractors in Memristor-Based Hénon Map .....	13
<i>Qiujie Wu, Yuan Wu, Jiaqi Meng, Ping Ma</i>	
Passivity-Based Fractional-Order Sliding Mode Control for Fractional-Order Hyperchaotic Systems with Unknown Parameters .....	19
<i>Junxuan Guo, Chaojun Wu, Liyi Fang, Ningning Yang</i>	
A Comprehensive Review of DRAM NBTI Issues and Solutions .....	25
<i>Faxian Shan, Pinghui Li, Ming Wang, Wei Tang, Yue Cao, Shun Wang, Hu Cai, Chuangming Hou, Zhiyong Jiang</i>	
Memristive Circuit Design of Operant Conditioning with Bridging .....	30
<i>Yu Zhai, Yi Yue, Rui Duan, Bairen Chen, Junwei Sun, Yanfeng Wang</i>	
Reinforcement Learning Circuit Based on Memristive Neural Network .....	36
<i>Yi Yue, Bairen Chen, Yu Zhai, Junwei Sun, Yanfeng Wang</i>	
When a Neuron and Its Self-Cascade System Coupled by a Memristor Synapse .....	41
<i>Chenlong Yi, Chunbiao Li, Yongxin Li, Rita Yi Man Li</i>	
A Memristive Chaotic System: Attractor Self-Reproducing, Amplitude Control and Offset Boosting.....	47
<i>Yongxin Li, Chunbiao Li, Yikai Gao, Xin Zhang, Christos Volos, Wanning Yu</i>	
Dynamics Analysis and Projective Synchronization of a Novel Fractional-Order System and Application in Image Encryption .....	53
<i>Bofan Wang, Xia Yang</i>	
A Memristive Chaotic 5D System with 3D Offset Boosting.....	59
<i>Xin Zhang, Chunbiao Li, Xiaoliang Cen, Akif Akgul, Yikai Gao</i>	
A Full-Functional Pavlov Associative Memory Biomimetic Neural Circuit with Memcapacitor .....	65
<i>Bairen Chen, Yu Zhai, Yi Yue, Junwei Sun, Yanfeng Wang</i>	
Chaos and Synchronization in a Memristor-Coupled HR-FN Neuron .....	71
<i>Yikai Gao, Chunbiao Li, Xin Zhang, Keyu Huang, Yongxin Li, Karthikeyan Rajagopal</i>	
Fast Finite-Time Adaptive Neural Control for Pure-Feedback Stochastic Nonlinear Systems .....	77
<i>Ximei Zhao, Hanyu Zhang, Lijun Shao, Lili Huang, Jiao Li</i>	
Dynamics and Complexity Analysis of a Fractional-Order Financial Risk System Based on Adomian Decomposition Method .....	83
<i>Kehao Yang, Yihao Fu, Song Zheng, Muhamad Deni Johansyah</i>	
Design and Implementation of Memristive Hyperchaotic Image Encryption Experimental Platform Based on Embedded Linux System .....	89
<i>Xinhui Chen, Xiaoyuan Wang, Xinrui Zhang, Zijian Liu, Congyin Ha, Xianming Wu</i>	

Adjusted and Controllability Properties of Memristor Rucklidge System .....	94
<i>Hongyan Zang, Lili Huang, Shourong Zhang, Annie Anak Joseph, Haiyan Fu, Tengfei Lei</i>	
A Novel Discrete Memristive Chaotic Rulkov Neuron Model with Electromagnetic Radiation and Its Application in Image Encryption.....	99
<i>Haipei Zhu, Dawei Ding, Zongli Yang</i>	
A Novel Fractional-Order Hyperchaotic System Influenced by Memristor and Its Remote Sensing Image Encryption Application.....	105
<i>Xinvue Xu, Dawei Ding, Zongli Yang</i>	
Dynamics Analysis of Fractional-Order Memristive Neural Network and Its Application in Military Image Encryption .....	110
<i>Fan Jin, Dawei Ding, Zongli Yang</i>	
Multistability and Hidden Attractors in a Fractional-Order Memristive Tabu Learning Neuron Model and Its Medical Image Encryption .....	115
<i>Siqi Chen, Dawei Ding, Zongli Yang</i>	
A New Method for Predefined-Time Synchronization Control of Memristive Cohen-Grossberg Neural Networks.....	120
<i>Aidi Liu, Wenyue Yu, Lili Huang, Jian Guo, Tengfei Lei, Hui Zhao</i>	
A New Class of Sine-Cosine Chaotic Systems and Its Application to Image Encryption .....	126
<i>Yunxiao Ye, Jinbo Wu, Liming Wu, Lei Kou, Cuimei Jiang, Fangfang Zhang</i>	
Dynamical Analysis of a New Equation Inspired by a Floodlight Model .....	132
<i>Jie Li, Michaël Antonie van Wyk, Fangfang Zhang, Wenzhe Liu, Muhammed Aswat, Willie Cronje</i>	
Coexisting Attractors with Nonlinear Offset-Boosting and Transient Chaos in a Memristive Complex-Valued Network.....	137
<i>Lin Chai, Jian Liu, Tengfei Lei, Jiao Li, Yiqun Li</i>	
Heterogeneous Neural Network: Hidden Firing Patterns, Phase Synchronization and Multistability.....	143
<i>Lili Huang, Hongyan Zang, Tengfei Lei, Na Li, Haiyan Fu, Aidi Liu</i>	
A Class of Controllable Chaotic Oscillators with Memory Components in Series Or Parallel .....	149
<i>Keyu Huang, Chunbiao Li, Yongxin Li, Yikai Gao, Herbert Ho-Ching Iu, Chenlong Yi</i>	
Memristor-Based Mixed Training Scheme with Multi-Level Sparsification.....	155
<i>Feier Xiong, Xiaofang Hu, Yue Zhou</i>	
Spiking and Bursting Dynamics in a Memristive Complex-Variable Laser Network .....	161
<i>Yiqun Li, Jian Liu, Lin Chai</i>	
No-Code MLOps Platform for Data Annotation .....	166
<i>Hyeongbok Kim, Beomjin Kim, Wenxin Lu, Lu Li</i>	
Classification of Optical Character Recognition Based on Memristive Neural Networks .....	172
<i>Lijun Shao, Lili Huang, Xin Zhao, Ximei Zhao, Min Su, Yan Ren</i>	
Stabilization and Complete Synchronization of a New Time-Reversed System .....	176
<i>Zhi Liu, Keyi Li, Zhonglian Wang, DeLong Fu, Guoqing Liu, Rongwei Guo</i>	

Multi-Scroll, Extreme Multi-Stability, and Phase Synchronization Phenomena of Memristor-Based Complex-Valued Chain Networks .....	181
<i>Xiaotong Zhang, Jian Liu, Lin Chai</i>	
Extreme Multistability with Offset Boosting of a Memristor-Coupled Complex-Valued Ring Network .....	187
<i>Wenjing Wang, Jian Liu, Lin Chai</i>	
Analysis of Attractor Growing of Memristor in FitzHugh-Nagumo Neuron .....	193
<i>Min Su, Zhaoxing Wang, Lili Huang</i>	
A New Predefined Time Stability Theorem and Its Application in Multi-Modal Memristive Neural Network Synchronization .....	198
<i>Hui Zhao, Lei Zhou, Qingjie Wang, Aidi Liu, Jingliang Peng</i>	
Fault Tolerance Framework for Memristor Based Binarized Neural Networks .....	204
<i>Jingyu Qian, Yang Yu, Cao Huang</i>	
Enhancing Mobile Game Performance with Hybrid Optimization Techniques.....	209
<i>Zain Ul Abidin, Jing Zhang, Sheraz Ali, Urooj Iqbal</i>	
Exponentially Synchronization Control of Memristive Neural Network with Fractional Brownian Motion .....	215
<i>Fengyin Gao, Yongmei Zhao, Yajun Wang</i>	
A Math Model for Ag/TiOx/FTO Memristor with Positive Photoconductance Effect .....	221
<i>Jiale Lu, Bingtao Yan, Guangdong Zhou, Xiaofang Hu</i>	
Dynamic Analysis of Memristive Bursting Networks with Super Multistability .....	227
<i>Kaiyi Wang, Mingfa Wang, Hui Chang, Baoxing Han, Mi Zhang, Xintong Yue</i>	
Design and Application of Tri-Valued Memristors Based Ternary Data Selector Circuit .....	234
<i>Xiaoyuan Wang, Xinggao Bao, Xinhui Chen, Zhonghai Zhang, Herbert H.C. Iu, Tyrone Fernando</i>	
Design of Handwritten Recognition System Based on Convolutional Neural Network .....	239
<i>Bo Li, Rongqiang Tian, Guangjin Yu, Ruohan Wen, Xiaoqian Mu, Yuan Liu</i>	
Dynamics of a Nonlinear System with Multiple Coexisting Attractors.....	245
<i>Changchun Sun, Qicheng Xu</i>	
Stabilization for a Class of Switched Chaotic Systems Via Arbitrary Switching .....	250
<i>Changchun Sun, Qicheng Xu</i>	
Simulation and Chaos Prediction of Wind Power Generator Based on Memristive LSTM Network .....	255
<i>Tengfei Lei, Haiyan Fu, Hongyan Zang, Lili Huang, Chunbiao Li, Akif Nadeem, Yuoyifan Zhong</i>	
Digital Twin Enabled Fault Detection Method for RRAM-Based Neural Computing Systems.....	261
<i>Qiaojian Han, Dongfeng Yuan</i>	
Time-Sensitive Semantic Communication Using Dynamic Spiking Neural Networks.....	266
<i>Daojun Liang, Bingzheng Zhang, Dongfeng Yuan</i>	

**Author Index**