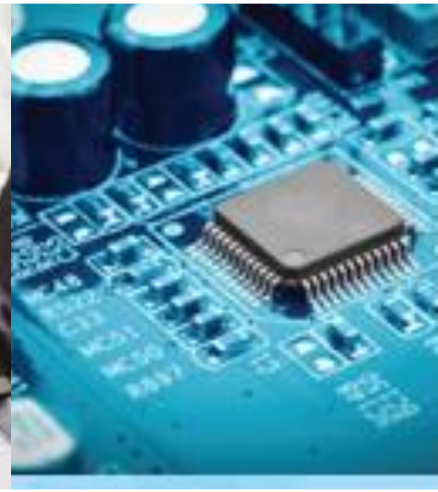

# Inspiring Innovation at "Birla Institute of Technology and Science Pilani" with IEEE Xplore

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**Giridhar M Kunkur**

Librarian and Unit Chief
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1st May, 2021

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- Brief overview of IEEE
- Content for "BITS P" & Publication with IEEE *Xplore*
- Open Science & IEEE
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- Q n A

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** Source: 1790 Analytics

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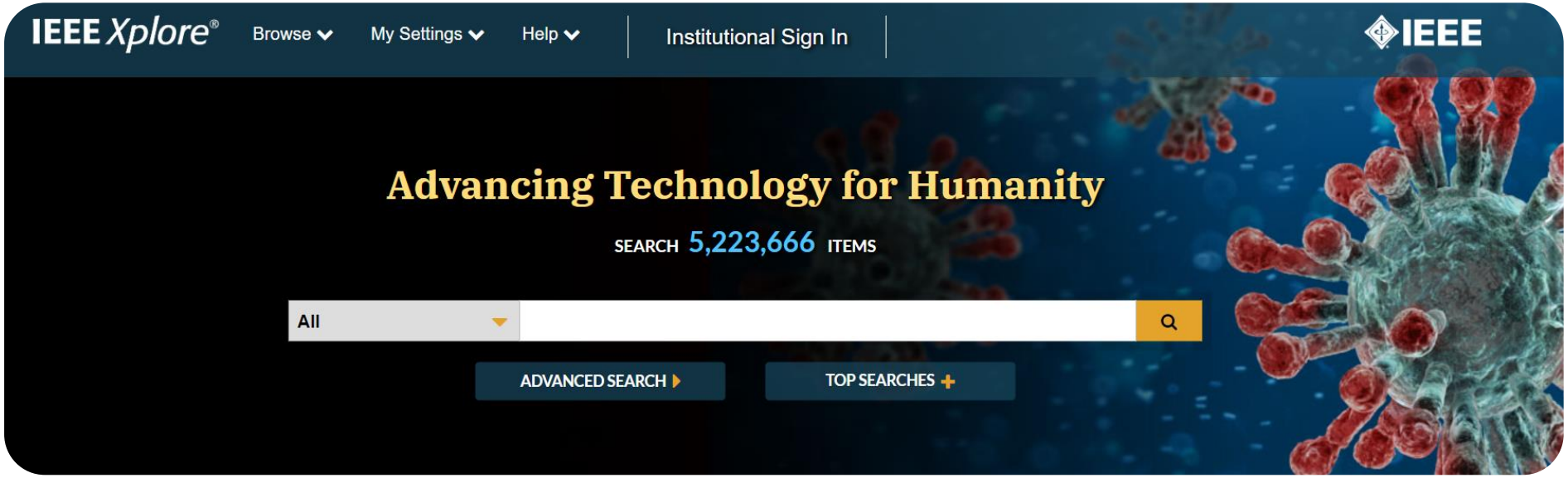

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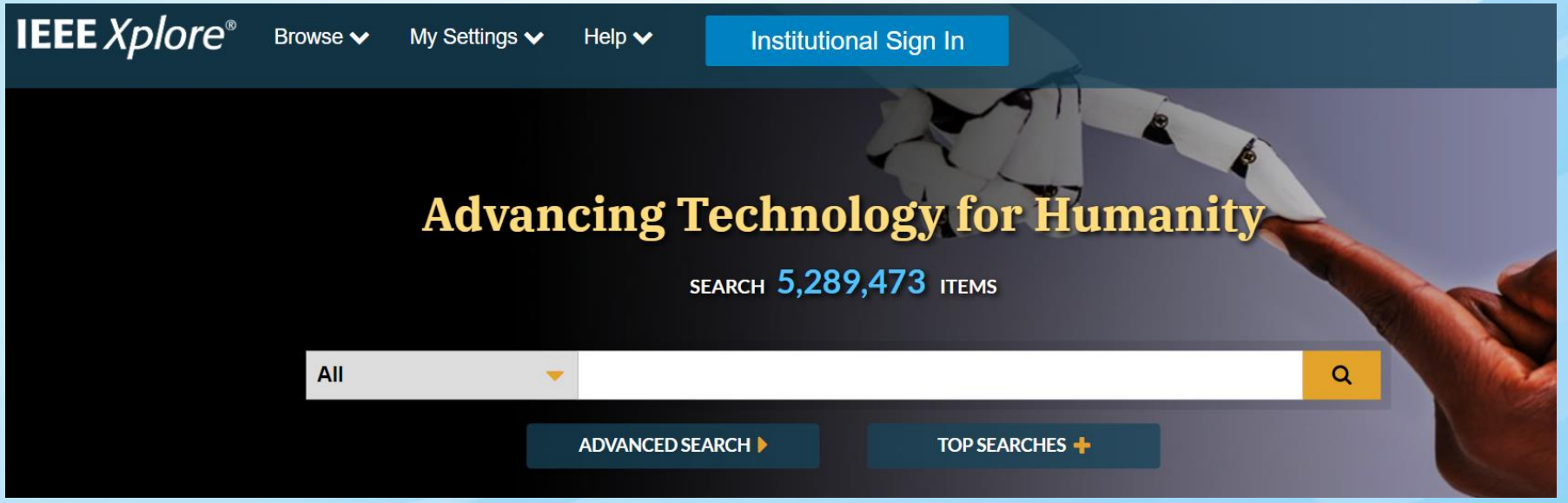


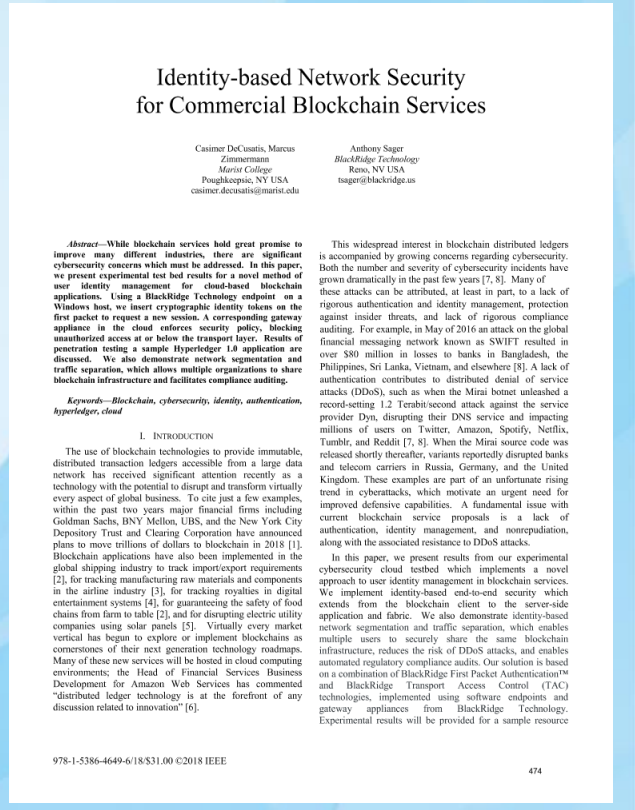

Identity-based Network Security
for Commercial Blockchain Services

Casimer DeCusatis, Marcus Zimmermann
*Marist College*
Poughkeepsie, NY USA
casimer.decusatis@marist.edu

Anthony Sager
*BlackRidge Technology*
Reno, NV USA
tsager@blackridge.us

***Abstract*—While blockchain services hold great promise to improve many different industries, there are significant cybersecurity concerns which must be addressed. In this paper, we present experimental test bed results for a novel method of user identity management for cloud-based blockchain applications. Using a BlackRidge Technology endpoint on a Windows host, we insert cryptographic identity tokens on the first packet to request a new session. A corresponding gateway appliance in the cloud enforces security policy, blocking unauthorized access at or below the transport layer. Results of penetration testing a sample Hyperledger 1.0 application are discussed. We also demonstrate network segmentation and traffic separation, which allows multiple organizations to share blockchain infrastructure and facilitates compliance auditing.**

***Keywords*—Blockchain, cybersecurity, identity, authentication, hyperledger, cloud**

## I. Introduction

The use of blockchain technologies to provide immutable, distributed transaction ledgers accessible from a large data network has received significant attention recently as a technology with the potential to disrupt and transform virtually every aspect of global business. To cite just a few examples, within the past two years major financial firms including Goldman Sachs, BNY Mellon, UBS, and the New York City Depository Trust and Clearing Corporation have announced plans to move trillions of dollars to blockchain in 2018 [1]. Blockchain applications have also been implemented in the global shipping industry to track import/export requirements [2], for tracking manufacturing raw materials and components in the airline industry [3], for tracking royalties in digital entertainment systems [4], for guaranteeing the safety of food chains from farm to table [2], and for disrupting electric utility companies using solar panels [5]. Virtually every market vertical has begun to explore or implement blockchains as cornerstones of their next generation technology roadmaps. Many of these new services will be hosted in cloud computing environments; the Head of Financial Services Business Development for Amazon Web Services has commented "distributed ledger technology is at the forefront of any discussion related to innovation" [6].

This widespread interest in blockchain distributed ledgers is accompanied by growing concerns regarding cybersecurity. Both the number and severity of cybersecurity incidents have grown dramatically in the past few years [7, 8]. Many of these attacks can be attributed, at least in part, to a lack of rigorous authentication and identity management, protection against insider threats, and lack of rigorous compliance auditing. For example, in May of 2016 an attack on the global financial messaging network known as SWIFT resulted in over $80 million in losses to banks in Bangladesh, the Philippines, Sri Lanka, Vietnam, and elsewhere [8]. A lack of authentication contributes to distributed denial of service attacks (DDoS), such as when the Mirai botnet unleashed a record-setting 1.2 Terabit/second attack against the service provider Dyn, disrupting their DNS service and impacting millions of users on Twitter, Amazon, Spotify, Netflix, Tumblr, and Reddit [7, 8]. When the Mirai source code was released shortly thereafter, variants reportedly disrupted banks and telecom carriers in Russia, Germany, and the United Kingdom. These examples are part of an unfortunate rising trend in cyberattacks, which motivate an urgent need for improved defensive capabilities. A fundamental issue with current blockchain service proposals is a lack of authentication, identity management, and nonrepudiation, along with the associated resistance to DDoS attacks.

In this paper, we present results from our experimental cybersecurity cloud testbed which implements a novel approach to user identity management in blockchain services. We implement identity-based end-to-end security which extends from the blockchain client to the server-side application and fabric. We also demonstrate identity-based network segmentation and traffic separation, which enables multiple users to securely share the same blockchain infrastructure, reduces the risk of DDoS attacks, and enables automated regulatory compliance audits. Our solution is based on a combination of BlackRidge First Packet Authentication™ and BlackRidge Transport Access Control (TAC) technologies, implemented using software endpoints and gateway appliances from BlackRidge Technology. Experimental results will be provided for a sample resource

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1966 — 2021

From: 1966 To: 2021

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- IEEE Sensors Journal (40)
- 2020 IEEE 17th India Council International Conference (INDICON) (21)
- 2012 International Conference on Cloud Computing Technologies, Applications and Management (ICCCTAM) (19)
- IEEE Access (17)
- 2015 Annual IEEE India Conference (INDICON) (16)
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**Author**

Enter Author Name

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- Sanket Goel (37)
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**On parameter optimization of linear systems**

V. Jain; H. Koenig

IEEE Transactions on Automatic Control

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**NEWEST**

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Prabhat Kumar Rai; Henning Idsøe; Rajesh Reddy Yakkati; Abhinav Kumar; Mohammed Zafar Ali Khan; Phaneendra K. Yalavarthy; Linga Reddy Cenkeramaddi

IEEE Sensors Journal

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Vikas Hassija; Vinay Chamola; Vikas Saxena; Divyansh Jain; Pranav Goyal; Biplab Sikdar

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Year: 2019 | Volume: 7 | Journal Article | Publisher: IEEE

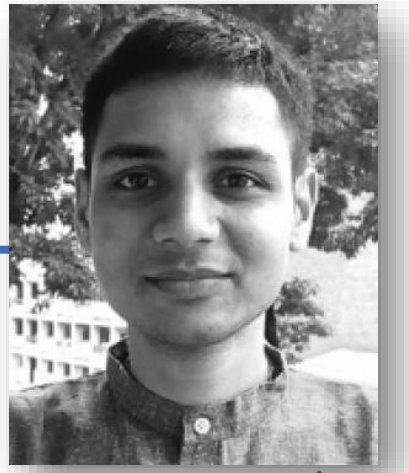
**MOST POPULAR**

**A Comprehensive Review of the COVID-19 Pandemic and the Role of IoT, Drones, AI Blockchain, and 5G in Managing its Impact**

Vinay Chamola; Vikas Hassija; Vatsal Gupta; Mohsen Guizani

IEEE Access

Year: 2020 | Volume: 8 | Journal Article | Publisher: IEEE



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## Vinay Chamola

**Affiliation**
Department of Electrical and Electronics Engineering
Birla Institute of Technology and Science (BITS)
Pilani, India

**Publication Topics**
Internet of Things, game theory, cellular radio, cryptographic protocols, cryptography, Internet, battery powered vehicles, data privacy, data structures, directed graphs, protocols, vehicle-to-grid, 5G mobile
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**Biography**
Vinay Chamola (Senior Member, IEEE) received the B.E. degree in electrical and electronics engineering and the master's degree in communication engineering from the Birla Institute of Technology and Science, Pilani, India, in 2010 and 2013, respectively, and the Ph.D. degree in electrical and computer engineering from the National University of Singapore, Singapore, in 2016. He was a Visiting Researcher with the Autonomous Networks Research Group (ANRG), University of Southern California, Los Angeles, CA, USA, in 2015. He also worked as a Postdoctoral Research Fellow with the National University of Singapore, where he worked in the area of Internet of Things. He is currently an Assistant Professor with the Department of Electrical and Elect... Show More

**Publications** 46 | **Citations** 626

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11

# New IEEE Journals – 2020 & 2021

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- IEEE Journal on Selected Areas in **Information Theory**
- IEEE Transactions on **Technology and Society**
- IEEE Transactions on **Artificial Intelligence** (launch Mid 2020)
- IEEE BITS the **Information Theory Magazine** (launch early 2021)

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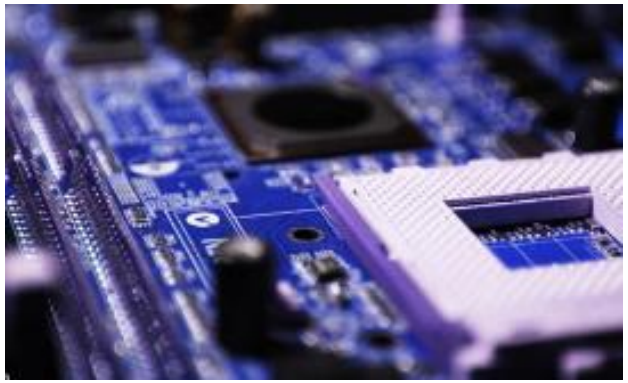

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IEEE International Conf. on **Artificial Intelligence Circuits and Systems** (AICAS)
IEEE International Conf. on **Blockchain and Cryptocurrency** (ICBC)
IEEE 6th International Conf. on **Energy Smart Systems** (ESS)
IEEE **Sustainability** through ICT Summit (StICT)
IEEE International Conf. on **Artificial Intelligence** Testing (AITest)
IEEE International Conf. on **Decentralized Applications and Infrastructures**
IEEE Asia **Power and Energy** Engineering Conference (APEEC)
International Conf. on **Control of Dynamical and Aerospace Systems** (XPOTRON)
IEEE International Conf. on **Flexible and Printable Sensors and Systems** (FLEPS)
Latin American **Electron Devices** Conference (LAEDC)
IEEE International Conf. on Industry 4.0, **Artificial Intelligence, and Communications Technology** (IAICT)
IEEE Decentralized **Energy Access Solutions** Workshop (DEAS)
IEEE **PES GTD** Grand International Conference and Exposition Asia (GTD Asia)



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| IEEE Journal of Translational Engineering in Health and Medicine | 2013 |
| IEEE Journal on Exploratory Solid-State Computational Devices and Circuits | 2015 |
| IEEE Open Journal of Antennas and Propagation | 2020 |
| IEEE Open Journal of Circuits and Systems | 2020 |
| IEEE Open Journal of the Communications Society | 2020 |
| IEEE Open Journal of the Computer Society | 2020 |
| IEEE Open Journal of Engineering in Medicine and Biology | 2020 |

| Name | Year |
|---|---|
| IEEE Open Journal of the Industrial Electronics Society | 2020 |
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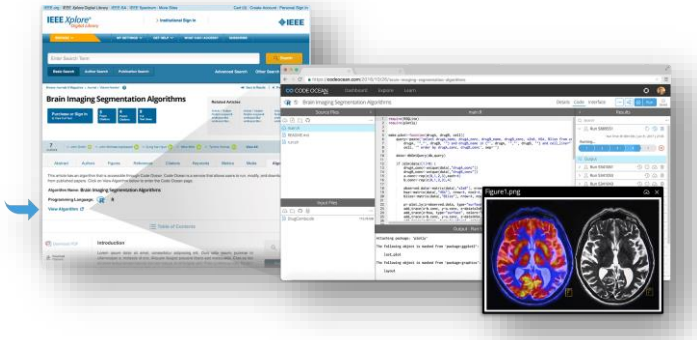


CODE OCEAN

# Facilitating Research Reproducibility

**An FPGA-Based Phase Measurement System**

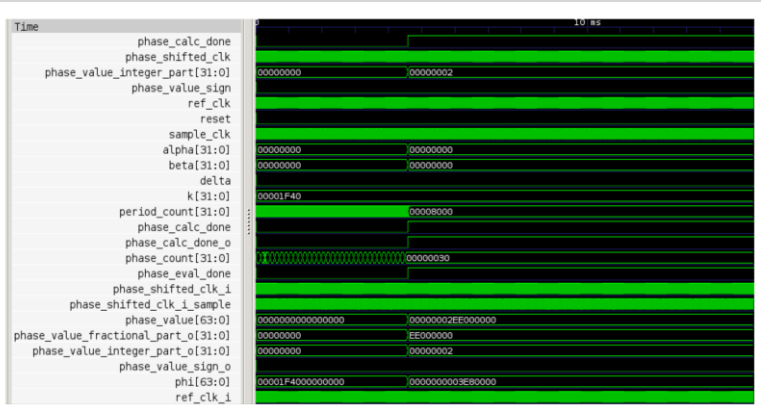
Jubin Mitra ; Tapan K. Nayak

IEEE Transactions on Very Large Scale Integration (VLSI) Systems

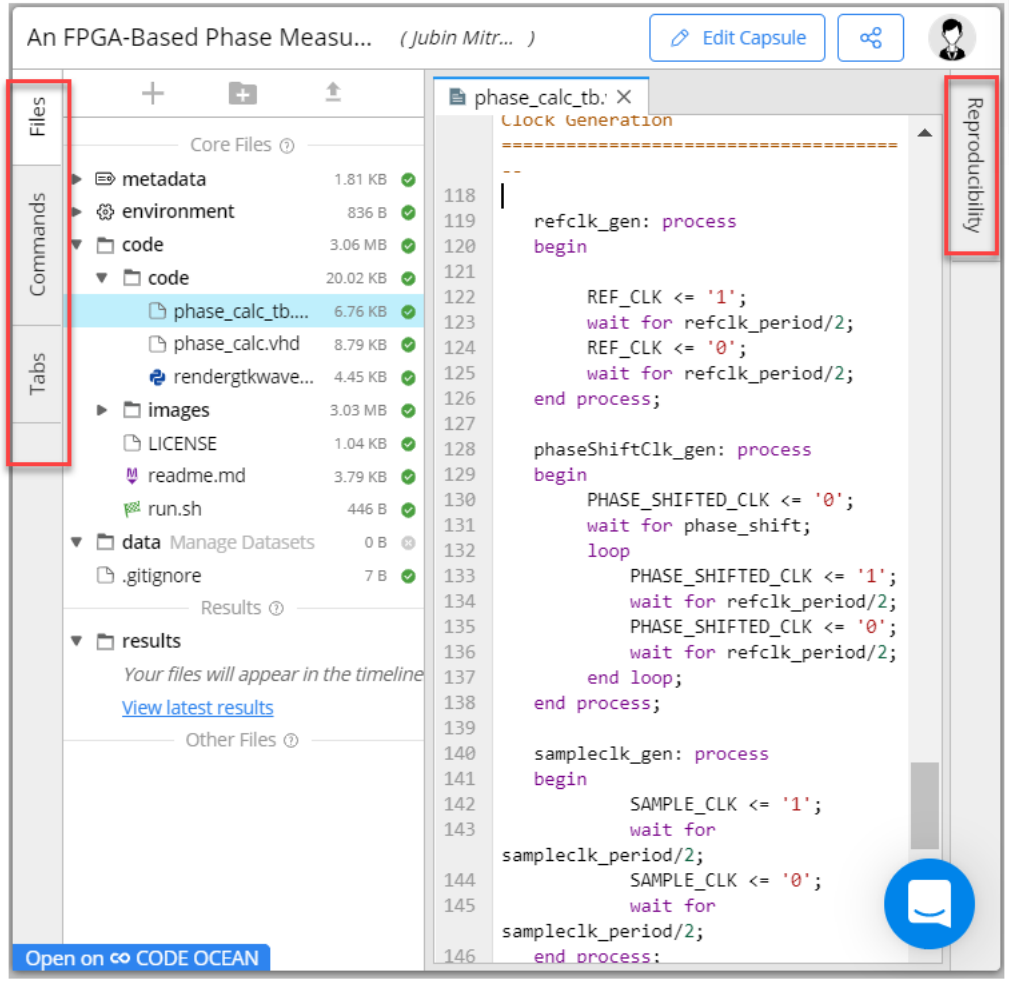
Year: 2018 | Volume: 26, Issue: 1 | Journal Article | Publisher: IEEE

Cited by: Papers (4)

Abstract (html) (2628 Kb) Code




**Code:** C/C++ An FPGA-Based Phase Measurement System

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- Can store and link related documentation – scripts, visualizations, related documentation
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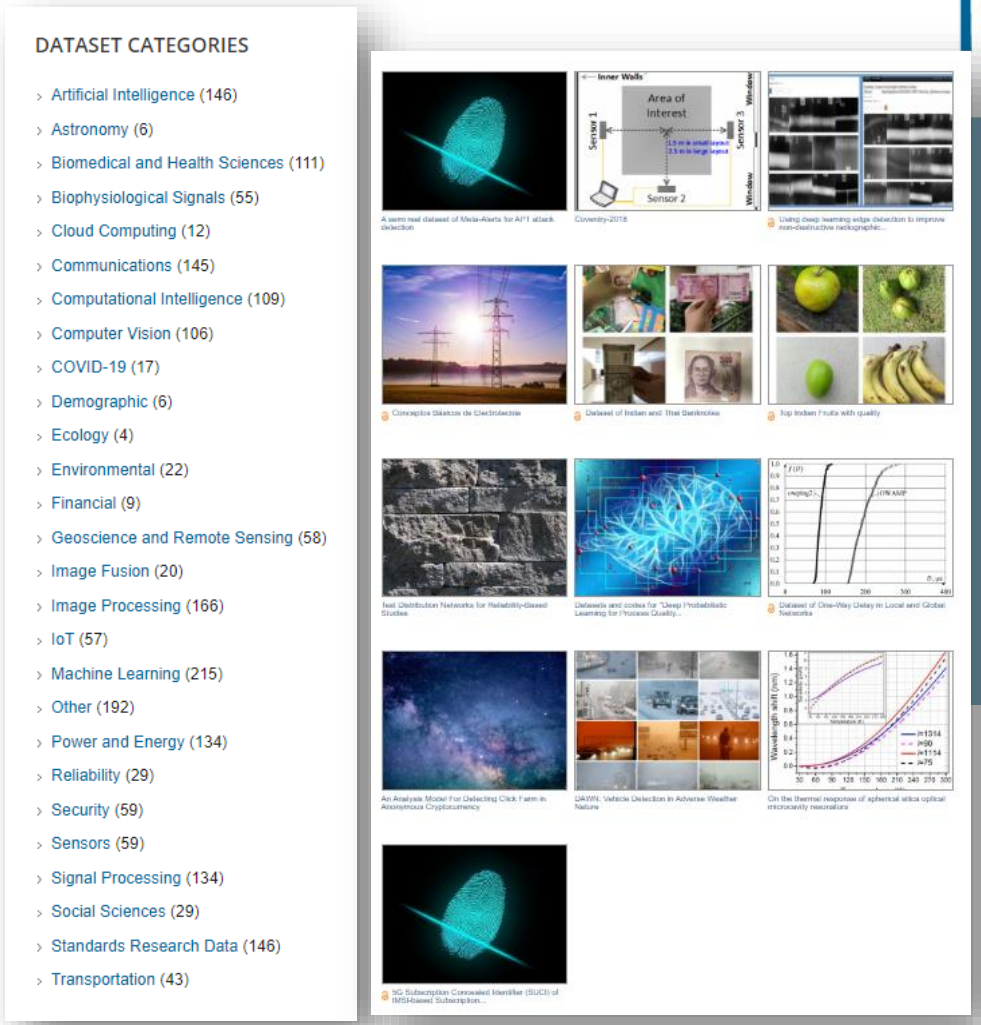


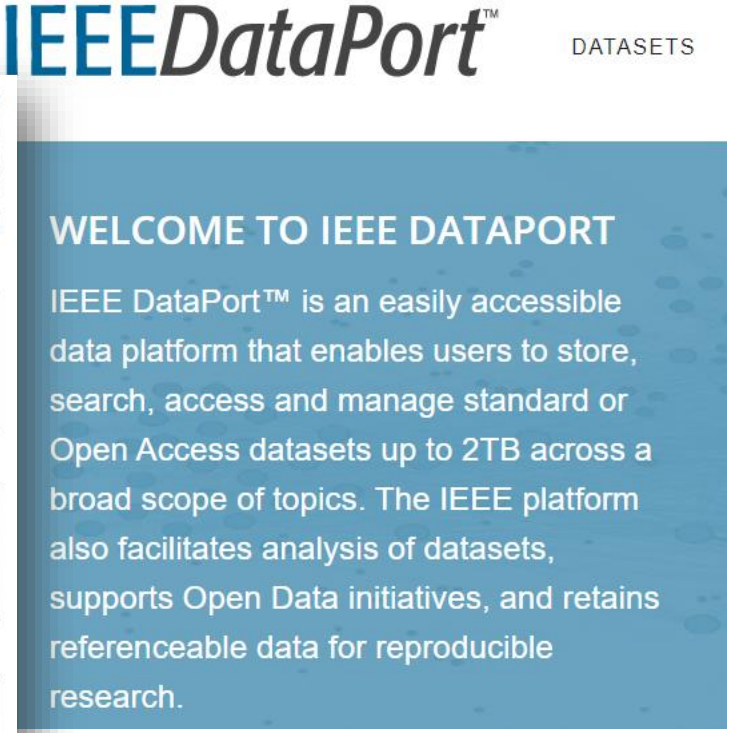


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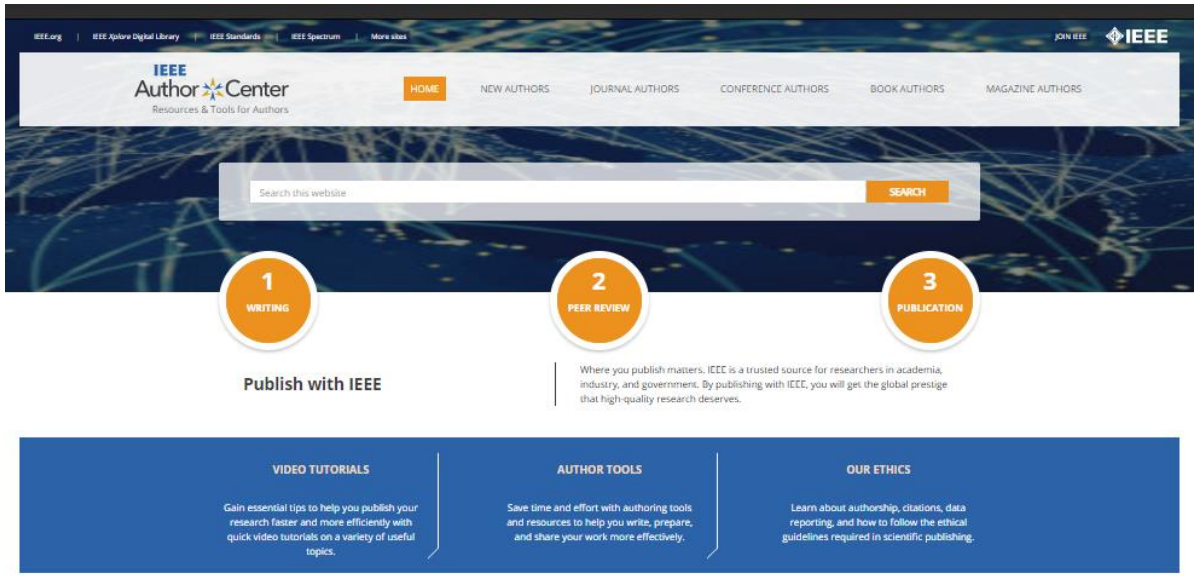


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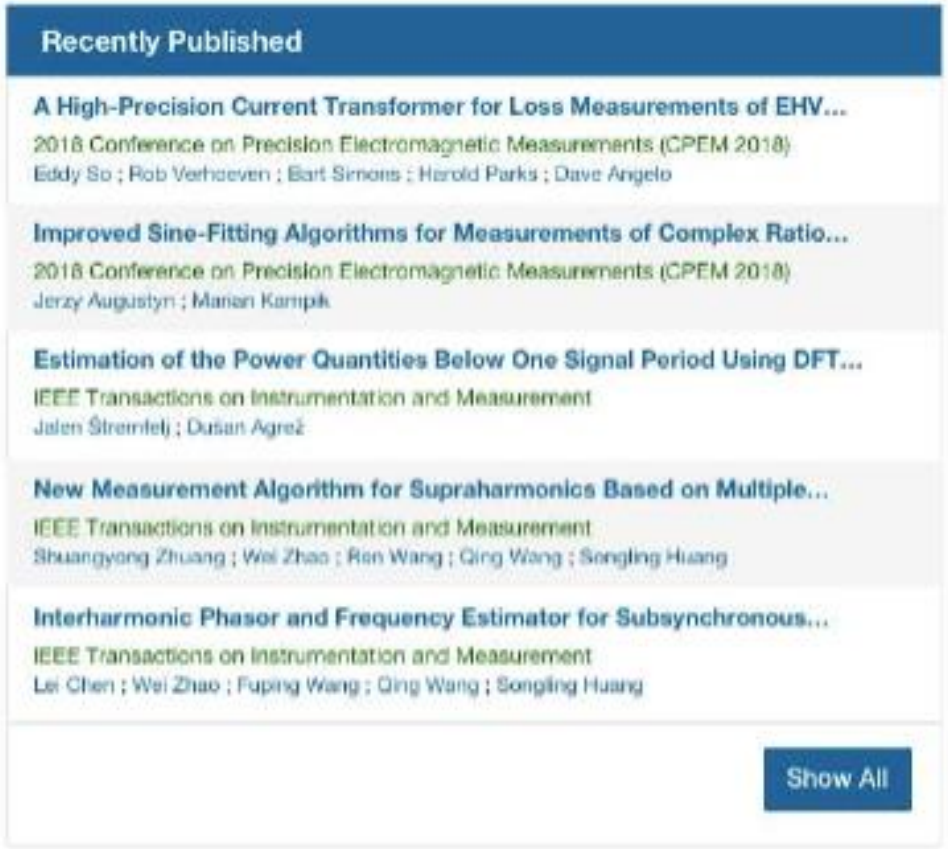

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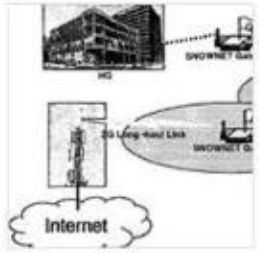
Subdividing One Channel of 5GHz Wireless LAN into Narrow Channels for Factory IoT

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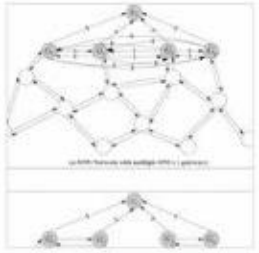
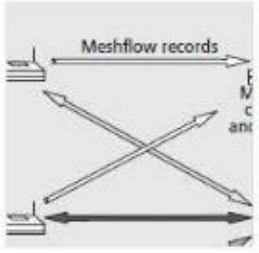


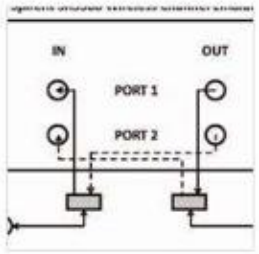
Characterization of 2.6GHz wireless channel in meeting room scenario using reverberation theory



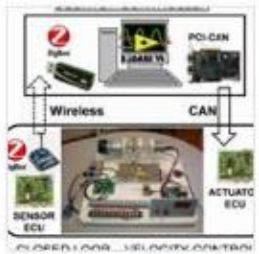

Wireless network design and analysis for real time control of launch vehicles

Disaster satellite communication experiments using WINDS and wireless mesh...

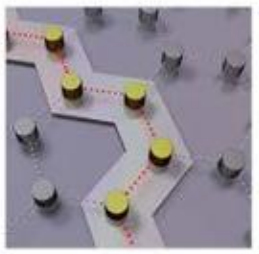
Live demonstration: Modular multi-radio wireless sensor platform with plug&play modules...




Disaster-resilient wireless mesh network - Experimental test-bed and demonstration




A 0.08-cc fully integrated LTCC transceiver front-end module for 5-GHz wireless LAN systems



The performance of video streaming over wireless-N

Link Impairments for Wireless LANs in Factory Environments



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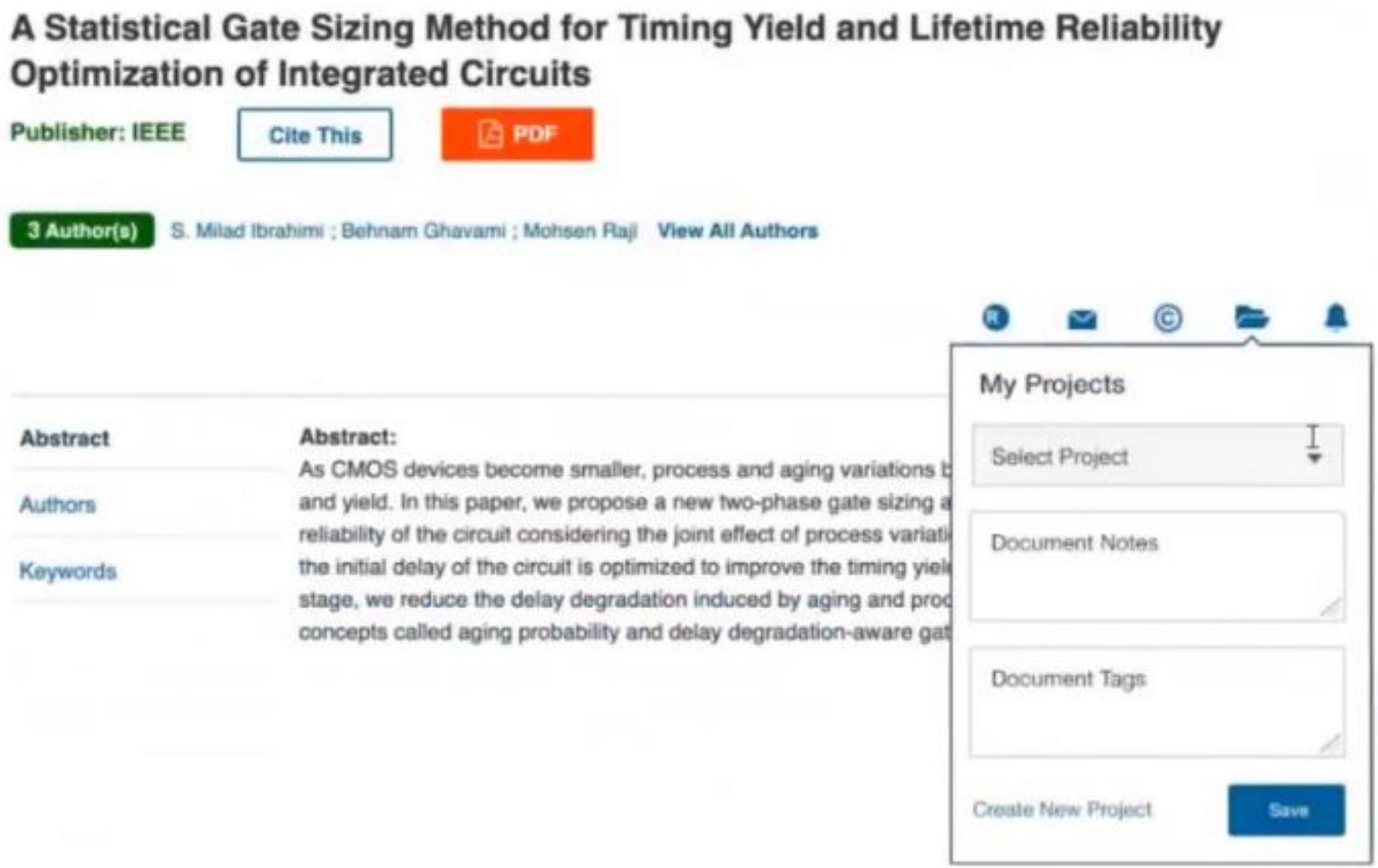
# My Projects

Exploration Stage



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