

ISSN: 1947-3931 Volume 16, Number 3, March 2024



Engineering



ISSN: 1947-3931



<https://www.scirp.org/journal/eng>

Journal Editorial Board

ISSN Print: 1947-3931 ISSN Online: 1947-394X

<https://www.scirp.org/journal/eng>

Editor-in-Chief

Prof. David L. Carroll

Wake Forest University, USA

Editorial Board

Dr. Murad Y. Abu-Farsakh

Prof. Sheeraz Ahmed

Prof. Nadhir Al-Ansari

Prof. Moh'd A. M. Al-Nimr

Dr. Wisam S. Al-Rekabi

Prof. Abbas Amini

Prof. Michael Bank

Prof. Shahnor Basri

Prof. Roberto Capata

Prof. Bin Chen

Prof. Luisa Durães

Dr. Adinel Gavrus

Dr. Aritra Ghosh

Dr. Krzysztof Górski

Dr. Sung-Cheon Han

Prof. David Hui

Prof. Yunho Hwang

Prof. Nagwa Ahmed Abdelhalim Ibrahim

Dr. Renjie Ji

Prof. Sathiyasekar K

Prof. Jayanna Kanchikere

Dr. Yi-Yang Li

Prof. Elzbieta Macioszek

Prof. Magdi Mahmoud

Prof. Andrzej S. Nowak

Prof. Kaveh Ostad-Ali-Askari

Prof. Reinaldo Rodriguez Ramos

Dr. P. Sanjeevikumar

Prof. Marcelo Silva Sthel

Prof. Kune Y. Suh

Prof. Hongbin Sun

Prof. Gui-Hua Tang

Prof. Costin D. Untaroiu

Prof. Vijayakumar Varadarajan

Prof. Jung-Chang Wang

Dr. Rodrigo Sérgio Wiederkehr

Dr. Yufei Wu

Prof. Wei Zhan

Prof. Lei Zhang

Louisiana State University, USA

Iqra National University, Pakistan

Lulea University of Technology, Sweden

Jordan University of Science and Technology, Jordan

University of Basrah, Iraq

Western Sydney University, Australia

Jerusalem College of Technology, Israel

Putra University, Malaysia

University of Roma Sapienza, Italy

Xi'an Jiaotong University, China

University of Coimbra, Portugal

European University of Brittany, France

University of Exeter, UK

Technical University of Radom, Poland

Daewon University College, South Korea

University of New Orleans, USA

University of Maryland, USA

Helwan University, Egypt

China University of Petroleum, China

Anna University, India

St. Peter's Engineering College, India

The Chinese University of Hong Kong, China

Silesian University of Technology, Poland

King Fahd University for Petroleum and Minerals, Saudi Arabia

Auburn University, USA

Isfahan University of Technology, Iran

University of Havana, Cuba

Department of Electrical and Electronics Engineering, South Africa

North Fluminense State University, Brazil

Seoul National University, South Korea

Tsinghua University, China

Xi'an Jiaotong University, China

University of Virginia, USA

The University of New South Wales, Australia

National Taiwan Ocean University (NTOU), Chinese Taipei

University of Louisville, USA

City University of Hong Kong, China

Texas A&M University, USA

University of Maryland, USA

Table of Contents

Volume 16 Number 3

March 2024

Review on the Usage of Synchronous and Asynchronous FIFOs in Digital Systems Design

D. W. Hu, Y. J. Lei, L. N. Wang 61

Engineering (ENG)

Journal Information

SUBSCRIPTIONS

The *Engineering* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published monthly by Scientific Research Publishing, Inc., USA.

Subscription rates:

Print: \$89 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

SERVICES

Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2024 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

Copyright for individual papers of the journal:

Copyright © 2024 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

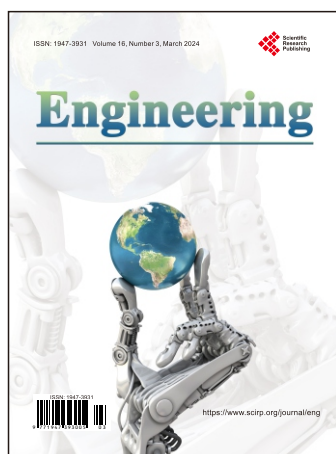
Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: eng@scirp.org



Engineering (ENG)

ISSN Print: 1947-3931 ISSN Online: 1947-394X

<https://www.scirp.org/journal/eng>

Engineering is an international journal dedicated to the latest advancements in engineering. The goal of this journal is to provide a platform for engineers and academicians all over the world to promote, share, and discuss various new issues and developments in different areas of engineering. All manuscripts must be prepared in English and are subject to a rigorous and fair peer-review process. Generally, accepted papers will appear online within 3 weeks followed by printed hard copy. The journal publishes original papers including but not limited to the following fields:

- Aerospace Engineering
- Agricultural Engineering
- Applied Thermal Engineering
- Aquacultural Engineering
- Architecture and Civil Engineering
- Automobile Engineering
- Bioengineering
- Biological Engineering
- Biomedical Engineering
- Biomolecular Engineering
- Bionic Engineering
- Bioprocess and Biosystems Engineering
- Biotechnology and Bioengineering
- Building Services Engineering
- Business & Information Systems Engineering
- Cardiovascular Engineering and Technology
- Cellular and Molecular Bioengineering
- Chemical Engineering & Technology
- Civil Engineering
- Coal Science and Engineering
- Coastal Engineering
- Communication Engineering
- Computational Methods in Engineering
- Computer Aided Engineering
- Computer Applications in Engineering Education
- Computer Engineering
- Computer Methods in Applied Mechanics and Engineering
- Computer-Aided Civil and Infrastructure Engineering
- Crystal Engineering
- Data and Knowledge Engineering
- Earthquake Engineering & Structural Dynamics
- Ecological Engineering
- Electrical and Electronic Engineering
- Energy and Power Engineering
- Energy Engineering
- Energy Systems Engineering
- Engine Engineering
- Engineering Analysis with Boundary Elements
- Engineering and Technology Management
- Engineering Applications of Artificial Intelligence
- Engineering Cybernetics
- Engineering Economy
- Engineering Education
- Engineering Failure Analysis
- Engineering for Sustainability
- Engineering Fracture Mechanics
- Engineering Geology and the Environment
- Engineering in Life Sciences
- Engineering in Medicine
- Engineering Manufacture
- Engineering Materials
- Engineering Mathematics
- Engineering Physics and Thermophysics
- Engineering Science in Medicine
- Engineering Structures
- Engineering Tribology
- Engineering with Computers
- Environmental Engineering
- Environmental Science & Engineering
- Fire Protection Engineering
- Food Engineering
- Food Process Engineering
- Fusion Engineering and Design
- Fuzzy Information and Engineering
- Geophysics and Engineering
- Geotechnical and Geological Engineering
- Green Energy Engineering
- Industrial Engineering
- Landscape and Ecological Engineering
- Macromolecular Materials and Engineering
- Macromolecular Reaction Engineering
- Magnetic Resonance Engineering
- Maintenance Engineering
- Management Engineering
- Maritime Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Mechatronics Engineering
- Medical Engineering & Technology
- Metabolic Engineering
- Metallurgical Engineering
- Microelectronic Engineering
- Micromechanics and Microengineering
- Military Engineering
- Mineral Resources Engineering
- Mining Engineering
- Molecular Engineering
- Nanoengineering
- Natural Gas Science and Engineering
- NeuroEngineering and Rehabilitation
- Nuclear Engineering and Design
- Numerical Methods in Engineering
- Ocean Engineering
- Oil Engineering
- Optics and Lasers in Engineering
- Optimization and Engineering
- Particle Engineering
- Petroleum Engineering
- Petroleum Science and Engineering
- Polymer Engineering and Science
- Power Engineering
- Precision Engineering and Manufacturing
- Probabilistic Engineering Mechanics
- Process Engineering
- Production Engineering
- Protein Engineering, Design and Selection
- Public Safety Information
- Radar Engineering
- Rare Metal Materials and Engineering
- Reliability, Quality and Safety Engineering
- Renewable Energy Engineering
- Requirements Engineering
- RF and Microwave Engineering
- Rock Mechanics and Rock Engineering
- Safety Systems Engineering
- Science and Engineering Ethics
- Social and Environmental Impact of Engineering Innovation
- Software and Knowledge Engineering
- Soil Dynamics and Earthquake Engineering
- Sports Engineering
- Strain Analysis for Engineering Design
- Structural Engineering and Materials
- Surface Engineering and Applied Electrochemistry
- Systems and Control Engineering
- Systems and Software Engineering
- Systems Assurance Engineering and Management
- Test Engineering
- Tissue Engineering and Regenerative Medicine
- Transportation Engineering
- Wind Engineering and Industrial Aerodynamics

We are also interested in: 1) Short Reports—2-5 page papers where an author can either present an idea with theoretical background but has not yet completed the research needed for a complete paper or preliminary data; 2) Book Reviews—Comments and critiques.

★ Notes for Intending Authors

Submitted papers should not be previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. For more details, please access the website.

★ Website and E-Mail

<https://www.scirp.org/journal/eng>

E-mail: eng@scirp.org

What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

What is Open Access?

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

- High visibility for maximum global exposure with open access publishing model
- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience



Website: <https://www.scirp.org>

Subscription: sub@scirp.org

Advertisement: service@scirp.org