

# PETROLEUM TECHNOLOGY DEVELOPMENT JOURNAL

An International Journal

July 2020 Volume 10 Number 2

## SUBSCRIPTION

For details of subscription please contact the Administrative Secretary at the Journal address.

## ADVERTISING

For details of advertisement, please contact the Administrative Secretary at the Journal address.

## BOOK REVIEW

Books for review should be sent to:

Dr. Kevin Idehen  
Petroleum Training Institute,  
Effurun, Delta State, Nigeria  
Email: deputyeditor@ptdjournal.com

## THE JOURNAL ADDRESS

Petroleum Technology Development Journal  
PTDF House, Plot 1058 Memorial Drive  
Central Area Cadastral Zone AOO  
Abuja, FCT  
Nigeria.  
Tel. 234 (0)9-870-0042  
Editor: editor@ptdjournal.com  
Website: www.ptdjournal.com

## EDITOR'S ADDRESS

College of Law  
Crescent University  
Km 5 Ayetoro Road, Lafenwa  
Abeokuta  
Ogun State, Nigeria.  
Tel. 234 (0) 8034035322

## PUBLISHER

Petroleum Technology Development Fund  
Abuja, Nigeria

First published in 2001 as Petroleum Training Journal. Journal name was changed to Petroleum Technology Development Journal in 2010

*All rights reserved. This journal is copyrighted and so no part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means whatsoever, or photocopied without the prior written permission of the copyright owner.*

©2020 Petroleum Technology Development Fund  
ISSN 1595-9104

## EXECUTIVE SECRETARY PETROLEUM TECHNOLOGY DEVELOPMENT FUND:

Dr. Bello Aliyu Gusau

## JOURNAL MANAGEMENT

### Editor:

Momodu Kassim-Momodu, PhD, Chartered FCIPD, FCArb

**Deputy Editor:** Kevin Idehen, PhD

**Administrative Secretary:** Neeka Jacobs, PhD

## EDITORIAL BOARD

Prof. Momodu Kassim-Momodu - Chairman

Dr. Kevin I. Idehen

Dr. S. C. Onwudiwe

Prof. Abiola J. Kehinde

Prof. Cornelius Sunny Nwajide

Prof. I. A. Muhammed-Dabo

Prof. A. A. Audu

Prof. Maimuna Waziri

Engr. Jide Adebulehin

Engr. Yinka Agboola

Mr. Mannir Abubakar

## TECHNICAL ADVISERS

**Prof. C. S. Nwajide**, Geoscan Technical Services Ltd., Awka, Anambra State, Nigeria; **Prof. A. A. Audu**, Bayero University, Kano, Kano State, Nigeria; **Prof. Abiola Kehinde**, Department of Chemical Engineering, University of Lagos, Lagos, Nigeria. **Prof. Olalekan Olafuyi**, Department of Petroleum Engineering, University of Benin. Benin City, Nigeria; **Prof. Maimuna Waziri**, Dean of Science, Federal University, Gashua, Nigeria, **Prof. I. A. Muhammed-Dabo**, Department of Chemical Engineering, Ahmadu Bello University, Zaria, Nigeria. **Prof. Damfebo Derri**, Niger Delta University, Yenagoa, Nigeria. **Prof. Abiola J. Kehinde**