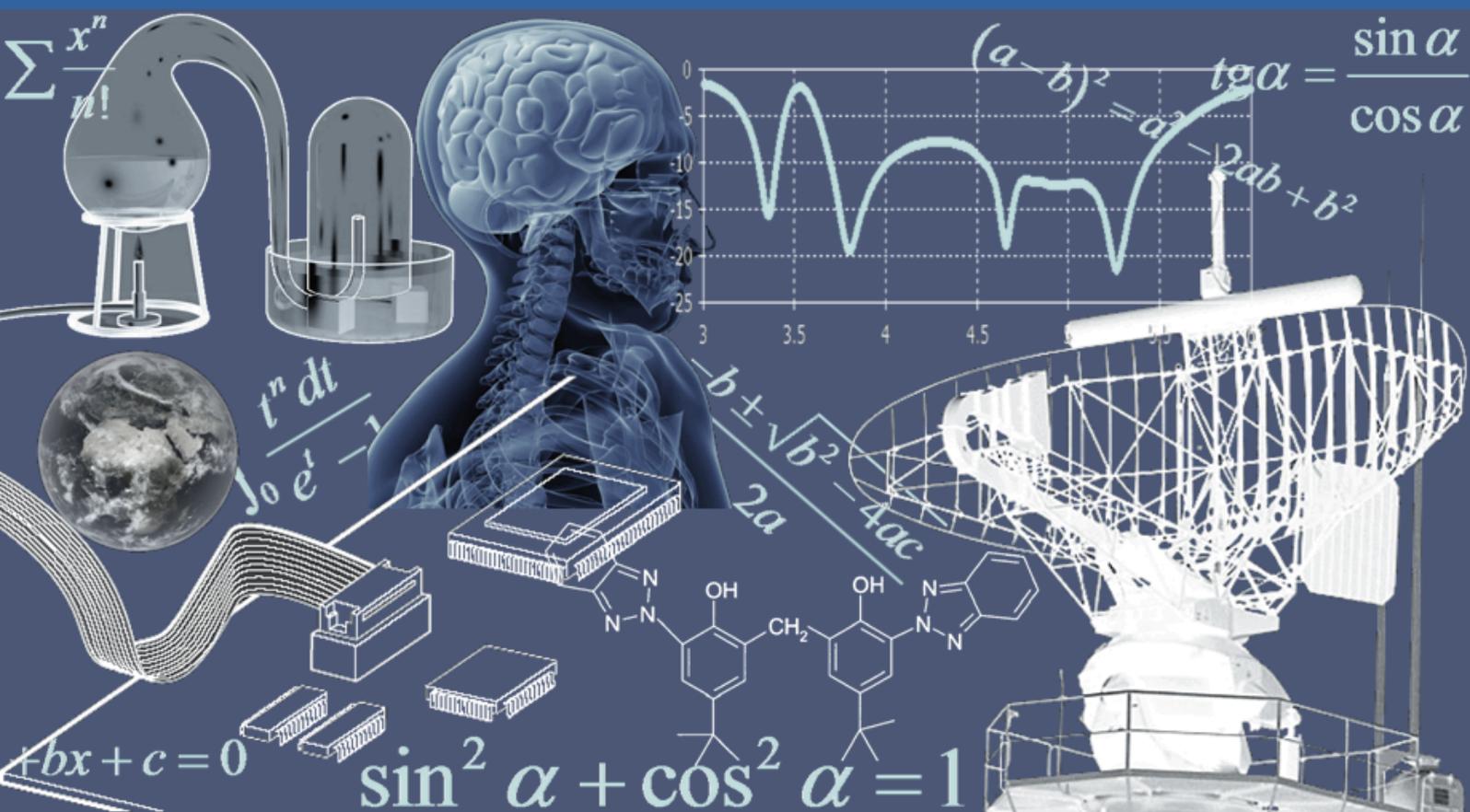


# INTERNATIONAL JOURNAL OF INNOVATION AND APPLIED STUDIES

Vol. 47 N. 1 November 2025



International Peer Reviewed Monthly Journal



## ***International Journal of Innovation and Applied Studies***

International Journal of Innovation and Applied Studies (ISSN: 2028-9324) is a peer reviewed multidisciplinary international journal publishing original and high-quality articles covering a wide range of topics in engineering, science and technology. IJIAS is an open access journal that publishes papers submitted in English, French and Spanish. The journal aims to give its contribution for enhancement of research studies and be a recognized forum attracting authors and audiences from both the academic and industrial communities interested in state-of-the art research activities in innovation and applied science areas, which cover topics including (but not limited to):

Agricultural and Biological Sciences, Arts and Humanities, Biochemistry, Genetics and Molecular Biology, Business, Management and Accounting, Chemical Engineering, Chemistry, Computer Science, Decision Sciences, Dentistry, Earth and Planetary Sciences, Economics, Econometrics and Finance, Energy, Engineering, Environmental Science, Health Professions, Immunology and Microbiology, Materials Science, Mathematics, Medicine, Neuroscience, Nursing, Pharmacology, Toxicology and Pharmaceuticals, Physics and Astronomy, Psychology, Social Sciences, Veterinary.

IJIAS hopes that Researchers, Graduate students, Developers, Professionals and others would make use of this journal publication for the development of innovation and scientific research. Contributions should not have been previously published nor be currently under consideration for publication elsewhere. All research articles, review articles, short communications and technical notes are pre-reviewed by the editor, and if appropriate, sent for blind peer review.

Accepted papers are available freely with online full-text content upon receiving the final versions, and will be indexed at major academic databases.

## ***Editorial Advisory Board***

**Amir Samimi**, Ph.D. of Science in Chemical engineering, Process Engineer & Risk Specialist of Oil and Gas Refinery Company, Iran  
**Mahsa Ja'fari**, Department of Chemical Engineering, Abadan Faculty of Petroleum, Petroleum University of Technology, Abadan, Iran  
**Alin Velea**, Paul Scherrer Institute, Switzerland  
**Kamyar Hasanzadeh**, Aalto University, Finland  
**Ogbonnaya N. Chidibere**, University of East Anglia, United Kingdom  
**Oumair Naseer**, University of Warwick, United Kingdom  
**Wei Zheng**, University of Texas Health Science Center at San Antonio, USA  
**Hu Zhao**, University of Southern California, USA  
**Haijian Shi**, Kal Krishnan Consulting Services, Inc, USA  
**Syed Ainul Abideen**, University of Bergen, Norway  
**Malika Maataoui**, Mohammed V University, Morocco  
**Fabio De Felice**, University of Cassino and Southern Lazio, Italy  
**Giovanni Leonardi**, Mediterranea University of Reggio Calabria, Italy  
**Siham El Gouzi**, Instituto Andaluz de Ciencias de la Tierra, Spain  
**Mohamed KOSSAÏ**, European Business School EBS Paris, France  
**Mustafa Batuhan AYHAN**, Marmara University, Turkey  
**Andrzej Klimczuk**, Warsaw School of Economics, Poland  
**Corinthias P. M. Sianipar**, Tokyo University of Science, Japan  
**Irfan Jamil**, Sinohydro Engineering, China  
**Sukumar Senthilkumar**, Chonbuk National University, South Korea  
**Bratu (Simionescu) Mihaela**, Bucharest University of Economic Studies, Romania  
**Mirela Maria Codescu**, National Institute for R&D in Electrical Engineering ICPE-CA, Romania  
**Milen Zamfirov**, St. Kliment Ohridski Sofia University, Bulgaria  
**Svetoslava Saeva**, Neofit Rilski South-West University, Bulgaria  
**Dimitris Kavroudakis**, University of the Aegean, Greece  
**Vaitsa Giannouli**, Aristotle University of Thessaloniki, Greece  
**Nataša Pomazalová**, Mendel University in Brno, Czech Republic  
**Hazem M. Shaheen**, Damanhour University, Egypt  
**Shalini Jain**, Manipal University Jaipur, India  
**Amin Jula**, National University of Malaysia, Malaysia  
**Mahdi Moharrampour**, Islamic Azad University, Buin zahra Branch, Iran  
**Ricardo Rodriguez**, Technological University of Ciudad Juarez, Mexico  
**Yuniel E. Proenza Arias**, Universidad de las Ciencias Informáticas, Cuba  
**Elizabeth Bissell Miller**, University of Missouri, Columbia  
**Bertin Désiré SOH FOTSING**, University of Dschang, Cameroon  
**Antonella Petrillo**, University of Cassino and Southern Lazio, Italy  
**Hong Zhao**, The Pennsylvania State University, USA  
**Jianjun Chen**, The University of Chicago, USA  
**Shaju George**, Royal University for Women, Kingdom of Bahrain  
**Chandrasekaran Subramaniam**, Kumaraguru College of Technology, India  
**Ilango Velchamy**, New Horizon College of Engineering, India  
**M. Kumaresan**, M.P.N.M.J. Engineering College, India  
**Mohammad Valipour**, University of Tehran, Iran  
**Mohameden Sidi El Vally**, King Khalid University, KSA  
**Mona Hedayat**, Boston Children's Hospital, Harvard Medical School, USA  
**Suresh Kumar Alla**, Advanced Medical Technologies, BD Technologies, USA  
**Ahmed Hashim Mohaisen Al-Yasari**, Babylon University, Iraq  
**Aziz Ibrahim Abdulla**, Tikrit University, Iraq  
**Khalid Mohammed Shaheen**, Technical College of Mosul, Iraq  
**Baskaran Kasi**, Kuala Lumpur Infrastructure University College, Malaysia  
**Nurul Fadly Habidin**, Universiti Pendidikan Sultan Idris, Malaysia  
**Adnan Riaz**, Allama Iqbal Open University, Pakistan  
**Syed Noor Ul Abideen**, KPK Agricultural University, Pakistan  
**Arab Karim**, M'Hammed Bougara University of Boumerdes, Algeria  
**Zoubir Dahmani**, UMAB University of Mostaganem, Algeria  
**Mohsen Brahmi**, Sfax University, Tunisia  
**Mongi Besbes**, University of Carthage, Tunisia  
**Mai S. Mabrouk**, Misr University for Science and Technology, Egypt  
**Olfat A Diab Kandil**, Misr University for Science and Technology, Egypt

**Munir Ahmed G. Timol**, Veer Narmad South Gujarat University, India  
**Saravanan Vasudevan**, Arunai Engineering College, India

# Table of Contents

|  |         |
|--|---------|
| Pétrologie des formations birimiennes de zaakro: Implication géodynamique de la partie sud du sillon volcanosédimentaire de Toumodi-Fètèkro (Dorsale Man-Léo, Côte d'Ivoire)                                       | 1-16    |
| <i>Kouassi Brice Roland, Kouadio David Koffi, and Gnagnon Raymond Stephane Koffi</i>   |         |
| Energy Efficiency of Network Equipment: Best Hybrid Strategies   | 17-23   |
| <i>Lagasane Ouattara Kra, Tahi Narcisse, Losseni Kone, and Olivier Asseu</i>   |         |
| Advancing French-Fon Neural Translation System through Cross-Linguistic Transfer and Continuous Improvement  | 24-30   |
| <i>Béthel C. A. R. K. Atohoun, Jean-Paul Tognon, and Mikael A. Mousse</i>  |         |
| Le bar: Un prétexte d'une esthétique exutoire dans l'écriture de Tierno Monénembo  | 31-39   |
| <i>Yao Dicy Gnengba and Baquissoga Satra</i>   |         |
| Interannual variability of intra-seasonal rainfall descriptors and drawbacks on the spatio-temporal dynamics of <i>Helicoverpa armigera</i> and <i>Jacobiella facialis</i> infestations on cotton in Côte d'Ivoire | 40-49   |
| <i>Sekpa Charles DEKOULA, Malanno KOUAKOU, Pitou Woklin Euloge Koné, Gouzou Juste Roland DIDI, Guy Fernand YAO, Kouame Brou, and Ochou Germain OCHOU</i>   |         |
| Mosquito species composition and distribution dynamics in Kalehe Territory, Democratic Republic of the Congo: A focus on <i>Anopheles funestus</i> s.s. and <i>Anopheles gambiae</i> s.s                           | 50-55   |
| <i>Séverin N'DO, Bazoma BAYILLI, Jacques 1er Jumeau KABORÉ, Janvier BANDIBABONE BALIKUBIRI, Bertin ZAWADI MUSAKA, Adrien Marie Gaston BELEM, and Bantuzeko CHIMANUKA</i>   |         |
| Utilisation des espèces fourragères par les pasteurs et agroéleveurs pour le traitement sanitaire des ruminants domestiques à l'ouest du Burkina Faso  | 56-67   |
| <i>Nafizatou Coulibaly, Salifou Ouedraogo-Kone, Séverin N'DO, Relwendé Justin Ouedraogo, Abdoul Kader Gandema, Ouattara Lassina, and Paulin OUBA</i>   |         |
| Caractérisation du niveau de contamination des eaux de surface par l'orpaillage illicite: Cas de la rivière Mé (sud-est de la Côte d'Ivoire)   | 68-87   |
| <i>Anowa Evrade Larissa EBA, Kan Jean Kouame, Chy Charlene KOUASSI, René BALLIET, and Serge Kouacou DEH</i>  |         |
| Application de la théorie des jeux et de la télédétection à l'identification des zones sensibles aux inondations dans le bassin versant de la Marahoué (Côte d'Ivoire)   | 88-106  |
| <i>KAMENAN Satti Jean-Robert, Marc Youan Ta, Adja Miessan Germain, and Kouassi Amani Michel</i>  |         |
| Analyse des déterminants de l'élevage pastoral face aux changements globaux à l'aide du modèle Random Forest au Burkina Faso   | 107-117 |
| <i>Abdoul Kader Gandema, Salifou Ouedraogo-Kone, André Kiema, and Bilassé Zongo</i>  |         |
| Impact des cultures intercalaires de l'ail et de la citronnelle sur les attaques de <i>Diaphania hyalinata</i> (Lepidoptera: Crambidae) en culture de <i>Citrullus lanatus</i> (Thunb) à Man, Côte d'Ivoire        | 118-126 |
| <i>Dohouonan Diabaté, Aka Ahou Jeanne-Debor, Ohoueu Ehouman Jean Brice, Akpessa Akpa Alexandre Moïse, and Tano Yao</i>   |         |
| Détermination de l'activité des enzymes hépatiques chez les consommateurs des bières, dans la ville de Gemena de 2022 - 2023, Province de Sud Ubangi, RDC  | 127-137 |
| <i>Zachée Kombo Tehopele, MAMBESA BAINAMBOKA Martin, Daniel Mademogo, Cherubin Sangi Kelamose, Luc Boekoli Likonga, Justin NGAWI, and Richard Tanakula</i>   |         |