Dear Readers,

It gives me and my team immense pleasure to present you with the third issue of Mapana Journal of Sciences for the year 2023. Mapana Journal of Sciences (MJS) always upholds its commitment to cultivating a sound scientific temperament by publishing pioneering research and review articles in the vast domain of the sciences. As a continuing endeavour, we take immense pride in sustaining this tradition with our latest release. In this issue, we are delighted to showcase ten remarkable articles exploring the captivating domains of science.

In this issue, we have two review articles from the field of material sciences focusing on the development of environment-friendly materials for sustainable development. The article by Nair et al., gives a broad outlook on sustainable EMI shielding materials developed from biodegradable waste, with a detailed literature review on recent developments in the research area. Sudipta Saha and Priya Dutta have presented a detailed review on the replacement of synthetic cleaning agents with greener cleaning agents that are less toxic and biodegradable to lessen the adverse effects on the environment and living beings.

Apart from the review articles, the present issue introduces innovative research articles in the diverse fields of Sciences and Applied Sciences. In the field of Computer Science, Vijaya P addresses the critical issue of breast cancer detection, presenting an optimization-based deep learning technique for accurate classification using histopathological images. The method involves pre-processing, segmentation with FLICM, feature extraction (SURF, area, shape, and diameter), and detection using a DQN trained with AJSO. With the complexity of target tissues in mind, pre-processing employs a median filter to eliminate noise and FLICM segment blood cells. The study yields promising results, showcasing an accuracy of 91.1%, TPR of 92.1%, and TNR of 92%. These findings underscore the potential of the optimization-based deep learning technique in advancing cancer detection accuracy. The study envisions future enhancements through extensive databases to validate diverse classifications further. In contributing to ongoing

efforts for early detection, this research holds significance in improving breast cancer diagnostic methodologies globally. Another article by Sumanth addresses the critical issue of soil type classification in a region where agriculture stays critical to livelihoods. Recognising the diversity of soil types in India, the study employs a novel method, "Stacking Ensemble Learning with the Decision Tree Model," to enhance accuracy in soil classification. The results indicate superiority over traditional decision tree methods and machine learning algorithms like K-Nearest Neighbors, Support Vector Machine, and Bayesian Decision Tree. The proposed approach holds promise for optimising decision tree models in agricultural contexts, laying the foundation for subsequent articles exploring advanced soil classification techniques for sustainable agriculture.

Material science and related innovations are fast-developing scientific realms today. Satheesh et al. have reported the remarkable photocatalytic efficacy of nano Zinc oxide when exposed to UV light. ZnO nano oxides have been found useful in a variety of applications, including wrinkle removal, fire retardancy, and biomedicine. In this study, nano ZnO, aided by UV irradiation, has been effectively used in the photocatalytic degradation of carbaryl pesticides. The authors present an economically and practically feasible approach for producing ZnO with recycling capabilities and the ability to maintain the purity of the catalyst. In another study, reported by Kannan et al., the authors focus on the structural elucidation of the synthesised ligands and their complexes. The article discusses the structural importance of the frameworks for complexation and bioactivity supported by the analytical findings. The outcome of this study could be significant for commercial attention to both pharmaceutical concerns and research organisations for exploring new drugs.

From Physics and Electronics, Amit Kumar investigates how dielectric characteristics of gate influence drain current and quantum capacitance in wrap-around CNTFET devices. Using Nanohub's FETtoy simulator with the NEGF model, the research finds that the choice of gate dielectrics significantly affects drain current, with higher k values yielding increased currents. However, due to the nano-sized device, the drain current saturates early,

necessitating optimised dielectric and operational bias selection. The study highlights the potential of CNTFETs for low-voltage and low-current applications in portable electronic devices. It emphasises the importance of gate dielectric choices, particularly in high-k materials, where quick current saturation occurs, and identifies the limiting factor of quantum capacitance tied to the lower density of states in nanostructures. This concise exploration contributes to the understanding and optimisation of CNTFET performance for practical electronic applications.

In the field of Mathematics, we present the two articles in the areas of mathematical modelling and fluid mechanics. Among these, the article by Liya et al., proposes the mathematical modelling of traffic flow using the layer of parameters that can affect traffic models incorporating human behaviour. Bheemudu and Ramakrishna have done a detailed study on the problem of magnetoconvection over a Maxwell fluid that occurs due to porous media with the Darcy–Brinkman model via magnetic field.

As we bring out another issue of Mapana-Journal of Sciences, we extend our heartfelt appreciation to all the authors, reviewers, editorial board members, and section editors whose contributions have made this publication possible. The diversity of topics and disciplines in this issue exemplifies the interdisciplinary nature of contemporary scientific research. Mapana takes pride in spreading light to significant endeavours that foster scientific culture and research. We eagerly anticipate embarking on future ventures of knowledge and discovery. The MJS will continue to enrich its readers by publishing the latest updates in diverse fields of scientific research and will always be a forum to exchange research ideas and findings.

Dr Manoj Balachandran
Editor