

PREFACE TO THE EDITION

The forthcoming issue of the **International Journal of Pure Science Research Studies (IJPSRS)** presents a distinguished collection of contributions that reflect the depth, diversity, and analytical rigor of contemporary pure science research. Spanning quantum physics, biocatalysis, graph theory, stochastic processes, and analytic number theory, the articles in this volume demonstrate how foundational scientific inquiry continues to expand the frontiers of knowledge while shaping future technological and theoretical developments.

At the forefront of quantum science, this issue includes a comprehensive study on quantum tunneling in semiconductors, examining how a once purely theoretical phenomenon now underpins nanoscale device engineering and next-generation computing architectures. By analyzing tunnel field-effect transistors and resonant tunneling devices, the study illustrates how quantum effects are transforming transistor design paradigms and redefining computational performance limits.

Advancing molecular science and biotechnology, the exploration of CRISPR-based catalysts for selective bond activation envisions a novel intersection between gene-editing technologies and enzyme engineering. By synthesizing developments in biocatalysis, protein design, and CRISPR-mediated modification, this contribution highlights emerging possibilities for sustainable chemistry, pharmaceutical synthesis, and biofuel innovation.

Mathematical sciences are strongly represented through rigorous investigations in graph theory and number theory. The analysis of domination numbers in Cartesian products of graphs extends foundational results concerning structural bounds and theoretical conjectures, offering insights relevant to network optimization and combinatorial complexity. Complementing this, the study of random walks on graphs and expected hitting times bridges probability theory and linear algebra, revealing deep connections between stochastic processes, transition matrices, and graph Laplacians.

The issue concludes with an exploration of prime gaps and twin primes in arithmetic sequences, contributing to ongoing inquiries in analytic number theory. By examining asymptotic behavior and distribution patterns within constrained residue classes, the study enriches contemporary discussions surrounding sieve methods and bounded gap theorems.

Collectively, the articles in this issue underscore the enduring vitality of pure science as both a theoretical enterprise and a catalyst for innovation. From subatomic quantum behavior to abstract prime distributions, the research presented herein affirms IJPSRS's commitment to promoting rigorous scholarship that advances foundational understanding across disciplines.

The editorial board extends its sincere appreciation to the authors and reviewers whose scholarly dedication has shaped this volume. We trust that this issue will stimulate further inquiry and meaningful dialogue within the global scientific community.

Dr. Sandhya E
Chief editor

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