Tentative Outline

Special/Thematic Issue for the journal Current Materials Science

Title of the Thematic Issue: "Advance Biomaterials and Composites"

Guest Editor: Prof. Divya Bajpai Tripathy

- **Scope of the Thematic Issue:**

The field of biomaterials and composites has witnessed remarkable advancements in recent years, opening up new possibilities in various areas of science, engineering, and medicine. This abstract provides a comprehensive overview of the latest developments and emerging trends in the field of advanced biomaterials and composites. Biomaterials are materials designed and engineered to interact with biological systems for therapeutic, diagnostic, or regenerative purposes. The integration of biomaterials with living tissues has revolutionized medical treatments and interventions, offering improved biocompatibility, durability, and tailored functionalities. Recent advances have focused on the development of smart biomaterials capable of responding to external stimuli, such as temperature, pH, or electric fields. These stimuli-responsive biomaterials enable precise control over drug release, tissue engineering, and bio-sensing applications. In parallel, the incorporation of composites into biomaterial design has led to enhanced mechanical properties, improved biodegradability, and increased functionality. Composite biomaterials combine the advantages of multiple materials, such as polymers, ceramics, metals, and carbon-based materials, to achieve superior performance and versatility. The emergence of nanotechnology has further facilitated the development of nanocomposite biomaterials, where nanoscale reinforcements are integrated to enhance structural integrity, drug delivery, and bioactivity. The introduction of novel processing techniques and fabrication methods has significantly contributed to the advancement of biomaterials and composites. Additive manufacturing, or 3D printing, has gained substantial attention as a versatile tool for fabricating complex biomaterial structures with high precision and patient-specific customization. Additionally, bio fabrication techniques, such as bioprinting and tissue engineering, have paved the way for the development of functional human tissues and organs, potentially revolutionizing regenerative medicine and transplantation. Furthermore, the integration of bioactive molecules, such as growth factors, peptides, and antibodies, within biomaterial matrices has demonstrated remarkable potential for controlling cellular behavior, promoting tissue regeneration, and combating infections. Surface modification techniques, including surface coatings, grafting, and functionalization, have also been explored to enhance biocompatibility, reduce immune response, and improve cell-material interactions.

Current thematic issue aimed to provide a great resource of the ongoing advances in biomaterials and composites, highlighting their potential applications in tissue engineering, drug delivery, biosensing, and medical devices. The combination of innovative biomaterial design, fabrication techniques, and functionalization strategies has the potential to revolutionize healthcare and drive significant progress in personalized medicine, regenerative therapies, and next-generation medical technologies.

Keywords: Polymeric biomaterials, Hydrogels, Nanocomposites, Biofilms, Bio coatings

Sub-topics:

- Polymeric Biomaterials and their applications comprehensive review
- Nanocomposites and their biomedical applications
- Biofilms and their applications in food and pharma industry
- Hydrogels in Tissues engineering and drug delivery
- Bio-Inspired Materials: Exploring Advanced Biopolymers for Composite Applications
- Biopolymer Composites: From Natural Resources to High-Performance Materials

Tentative titles of the articles:

- Polymeric Biomaterials
- Advancing Biopolymers: Enhancing Performance and Durability in Composite Material
- Applications of biopolymers and composites in the Food Industry
- Bio-Inspired Materials: Exploring Advanced Biopolymers for Composite Applications
- Next-Generation Biopolymer Composites: Innovations for a Greener Future
- Innovations in Advanced Biopolymer Composites towards Tissue engineering and drug delivery applications

Schedule:

- Thematic issue submission deadline: **Sep 2024**

Contacts:

Guest Editor Name: Prof. Divya Bajpai Tripathy
Affiliation: Galgotias University, India
Email: divyabaj@gmail.com