Title: Interdisciplinary Advances in Hybrid and Biomedical Materials: Design, Development, and Applications

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PROPOSAL

1. Introduction and Rationale:

Recent decades have witnessed rapid advancements in **hybrid** (**MMCs)** and **biomedical materials**, driven by the growing need for high-performance, lightweight, durable, and biocompatible solutions. MMCs, with their superior mechanical, thermal, and wear properties, have found extensive applications in aerospace, automotive, defense, and energy sectors. Meanwhile, biomedical materials, including metallic implants, bioresorbable alloys, and nanostructured composites, are playing a transformative role in healthcare through innovations in prosthetics, implants, and tissue engineering scaffolds.

This special issue seeks to bridge the interdisciplinary gap between **materials science, biomedical engineering, manufacturing technologies, and applied mechanics**, fostering cross-domain research to address critical challenges such as mechanical reliability, corrosion resistance, fatigue performance, biocompatibility, and functional integration. The goal is to provide a platform for disseminating **state-of-the-art research and practical applications** that highlight the synergy between Hybrid materials development and biomedical material innovations.

2. Scope of the Special Issue:

This Special Issue provides a platform for disseminating knowledge, fostering collaboration, and creating unparalleled networking opportunities. It invites researchers, academicians, and industry professionals to present and discuss advances in the following areas (but not limited to):

- Applications of composite materials
- Metallic composites and their properties
- High molecular weight polymers
- Thermal processing techniques
- Biomedical testing and applications
- Plasma treatment and surface modification
- Bonding and joining technologies
- Laser-based processing methods
- Microelectromechanical systems (MEMS)
- Metal hydrides and hydrogen storage materials
- Structure–property relationships in biological and biomedical materials

3. Outcomes and Impact

The proposed special issue will provide a comprehensive overview of interdisciplinary advances in hybrid and biomedical materials, stimulate cross-disciplinary collaborations, and highlight innovative pathways for future research and industrial applications. It will serve as a valuable resource for both academic researchers and practitioners, advancing the development of sustainable, high-performance materials for diverse engineering and healthcare needs.

4. Target Audience:

This special issue is aimed at researchers, academicians, and industry professionals working in materials science, biomedical engineering, mechanical engineering, nanotechnology, and healthcare. It will attract contributions from interdisciplinary communities engaged in both fundamental research and applied technologies.

Call for Papers: September 1, 2025
Submission Deadline: December 31, 2025