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**SPECIAL ISSUE ON**

## **Reformulating Materials Science and Engineering Education**

### **Guest Editors**

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Recent advances in materials science and engineering have led to novel families of materials and to myriads of examples of innovative synthetic matter with previously unachievable properties, which are transforming several industries and reshaping society. To cite a few, in the last decades, smart and shape-morphing materials have renovated additive manufacturing and enabled 4D printing, metamaterials have led to new ways of interacting with electromagnetic fields and to counterintuitive mechanical properties, new carbon allotropes and related nanocomposites have affected electronics and led to exciting energy applications, bioinspired materials with functional gradients of properties, multi-scale features and multi-phasic domains have reshaped healthcare, and high-performance composites have made the dream of nuclear fusion tangible. New materials are fundamental for most areas of engineering, including: mechanical, industrial, chemical, aerospace, information and communication, robotics and electronics, biomedical, biological systems, civil and architecture. However, these novel families of materials and materials' examples and applications are seldom covered in classical introductory courses to materials science and engineering, which are common in most engineering degrees. Even in materials science and engineering bachelor and master's degrees, these innovations are not always incorporated at the desired pace, as needed for reaching well-trained professionals capable of researching and developing industrial innovations with remarkable societal impact.

In parallel, advances in all fields of engineering contribute to an increasingly rapid rate of discovery and change in materials science and engineering. For instance, additive manufacturing has permitted a progressive blend of the geometry-material-process triad, leading to structures of materials with multiple functionalities and exotic properties that just two decades ago were literally impossible to achieve. Original polymer chemistries and chemical processes have fostered extremely varied examples of stimuli-responsive systems for smart interactions with the environment. The development of laser and

plasma technologies have led to new methods for processing matter and combining materials, hence achieving hierarchical structures and multi-layered geometries with unique properties. Artificial intelligence is aiding in the (even automated) discovery of advanced materials with complex chemistries. The taming of cells, bacteria and archaea for the controlled architecture of extracellular matrices with living entities has given birth to the field of engineered living materials. The ways by which different engineering disciplines contribute to advancing materials science and engineering should be also incorporated as crucial issues for different courses populating most engineering degrees.

This special issue on *Reformulating Materials Science and Engineering Education* is aimed at discussing innovative and successful approaches in science, engineering, and technology of materials for a new generation of professionals contributing to these fascinating fields.

Submitted papers are expected to discuss aspects such as:

- Active learning methods for materials science and engineering.
- Project and problem-based learning actions in materials science and engineering.
- Service-learning experiences involving novel materials and related technologies.
- e-, m-, b-learning experiences in materials science and engineering.
- Technology-enhanced materials science and engineering education, interactive learning resources, simulators, rapid prototyping tools, 3D/4D printing technologies.
- Educational experiences aimed at fostering the sustainable development of novel materials and sustainable products, processes and systems based on them.

#### **Important Deadlines**

Submission of complete drafts:	30 <sup>th</sup> July 2023.
Notification of reviewers' feedback:	31 <sup>st</sup> August 2023.
Submission of revised manuscripts:	30 <sup>th</sup> September 2023.
Notification of reviewers' feedback:	31 <sup>st</sup> October 2023.
Submission of final manuscript:	30 <sup>th</sup> November 2023.

**Submissions are to be sent by e-mail in MSWord to contact guest-editor: Prof. Andrés Díaz Lantada: [andres.diaz@upm.es](mailto:andres.diaz@upm.es)**

Manuscripts should be written in English and limited to 12 one-sided, one-column, single-spaced pages. Manuscripts should include keywords, complete affiliation addresses and short biographies of the authors, and citing and listing of references should be in the IJEE style. Figures and illustrations should be suitable for non-color printing.

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