

## COMPUTATIONAL MECHANICS IN MANUFACTURING OF COMPOSITE STRUCTURE

### 1000 - MANUFACTURING AND MATERIALS PROCESSING

YINGJIE XU<sup>1</sup>, HUI CHENG<sup>2</sup>, YULIANG HOU<sup>3</sup>

<sup>1</sup> Northwestern Polytechnical University, Xi'an 710072, China  
[xu.yingjie@nwpu.edu.cn](mailto:xu.yingjie@nwpu.edu.cn)

<sup>2</sup> Northwestern Polytechnical University, Xi'an 710072, China  
[chenghui@nwpu.edu.cn](mailto:chenghui@nwpu.edu.cn)

<sup>3</sup> Zhengzhou University, Zhengzhou 450001, China  
[yulianghou@zzu.edu.cn](mailto:yulianghou@zzu.edu.cn)

**Key words:** Composite structures, Manufacturing, Materials processing, Computational Mechanics.

### ABSTRACT

The high strength and damage resistance of composites makes it a very important material for a number of practical applications, such as sports equipment and terrestrial, nautical, and aerospace vehicles. Most composite structures are designed to be made to near-net-shape in the forming process and undergoing a post-manufacturing. Those forming and post-manufacturing processes pose great engineering challenges as the deformation of a single fiber or a matrix element of debonding of the interface in microscale will affect the neighboring structure in those thermo-electric-mechanical coupling process and causes defects as delamination, damage, burr, debonding et al. in macroscale.

The purpose of this minisymposium is to bring together experts in computational mechanics, composite sciences and technology to exchange results in modeling and simulation of manufacturing and materials processing, as well as its influence on the behavior of composite structures. Researchers from academia and industry alike are welcome to present their work, engage and share ideas with other researchers who will take part in this exciting congress. Particular areas of interest for the session include, but not limited to:

- Process-induced residual stress deformation of composite structures
- Modeling of the process of composite structures: autoclave, resin transfer molding, injection molding, etc.
- Modeling the influence of the processing conditions and the service performances of the processed composite products
- Multiscale mechanics in machining (cutting, drilling, milling etc.) of composite
- Computational mechanics in joining (bolting, riveting, adhesion, interference joining, cure joining etc.) and repairing (patch repair, injection repair etc.) of composite structure

- Modeling the corrosion of composite structure and joint
- Multiphysics and multiscale methods in repairing of composite structure