COMPUTATIONAL AND DATA-DRIVEN MECHANICS OF BIOLOGICAL AND SYNTHETIC MATERIALS/COMPOSITES

SEUNGHWA RYU*, FLAVIA LIBONATI†, DENVID LAU**, AND SHU-WEI CHANG††

*KAIST
291 Daehak-ro, Yuseong-gu, Daejeon, 34141, Korea
ryush@kaist.ac.kr / https://sites.google.com/site/seunghwalab/

† Politecnico di Milano
Via Giuseppe Candiani, 72, 20158 Milano MI, Italy
flavia.libonati@polimi.it

** City University of Hong Kong
83 Tat Chee Ave, Kowloon Tong, Hong Kong, China
denvid.lau@cityu.edu.hk / http://bccw.cityu.edu.hk/denvid.lau/

††National Taiwan University
No. 1, Section 4, Roosevelt Rd, Da’an District, Taipei City, Taiwan
changsw@ntu.edu.tw / https://sites.google.com/site/ntuchangsw/home

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ABSTRACT

The past decade has witnessed exciting advances in the understanding of the mechanical behaviors of synthetic and biological materials/composites, which demonstrate great potential in a wide range of engineering applications for the energy, construction, environment, and biomedical industry. The rational design within the space of microstructural hierarchy and complexity urges the development of novel theoretical frameworks and advanced computational methods. Promising achievements have been made by bridging the atomic description of materials and continuum-level structural analysis. Recently, data-driven and machine learning-based methods are actively adapted to investigate biological and biomimetic materials as well as to design mechanically strengthened composites without imposing any constraint on their microstructure. This symposium will focus on the research in computational and data-driven mechanics for biological and synthetic materials/composites, including but not limited to carbon nanostructures, two-dimensional materials, biopolymers, biocomposites, and 3D printed composites, to represent the cutting-edge multidisciplinary research across multiple length- and time-scales.