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プロジェクト 第15回バイオ・医療機器材料分野研究会

Additive Manufacturing and Bioprinting and their Biomedical Applications

演者: Prof. Dr. Min Wang

Department of Mechanical Engineering
The University of Hong Kong



日時: 2026年4月24日(金) 15:30~17:00

場所: 22号館 1階 第2会議室

Abstract

Additive manufacturing (AM, i.e., “3D printing”) has been developed since 1980s and provides a powerful manufacturing platform. In 2013, Tibbits ushered in a new era in AM: 4D printing, which uses 3D printing technologies and “smart materials” to fabricate objects that can change their shapes during service. There are numerous investigations into 3D/4D printing in biomedical engineering, with the majority focusing on tissue engineering (J. Lai, C. Wang and M. Wang, Appl. Phys. Rev., 8 (2021), 021322). For scaffold-based tissue engineering, 3D printing has unique advantages and can produce multicomponent and/or multilayered scaffolds with distinctive features. Some 3D printing technologies can also incorporate biochemical cues (e.g., growth factors). Bioprinting, which prints biomaterials with live cells, has progressed rapidly. Among recent advances, organoid bioprinting has created living structures for drug screening/discovery, regenerative medicine, etc. 4D printing has yielded, upon external stimulus/stimuli, shape-morphing biomedical products. For over two decades, we have been investigating 3D/4D printing in tissue engineering and have developed scaffolds and cell-scaffold constructs for regenerating different body tissues. We also conceptualized 5D printing and demonstrated its application in tissue engineering (J. Lai and M. Wang, J. Mater. Res., 38 (2023), 4692-4725,). This talk will introduce our research on 3D/4D/5D printing and bioprinting and discuss issues in biomedical AM and biofabrication.

お問い合わせ: 無機生体材料学分野 川下 将一 (内線: 8016)
E-mail: kawashita.bcr@tmd.ac.jp