

Abstract

3D Micro-Structures – Fabrication and Function

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Herein I present the use of Direct Laser Writing (DLW) in soft polymer materials as a possible approach towards the realisation of micro-actuators, sensors, and 3D biocompatible scaffolds for tissue engineering applications.

DLW represents a new route towards the creation of 3D assemblies from a wide range of materials, that can possess features associated with biological systems, in particular the ability to switch or change characteristics in response to an external stimulus. Moreover, the actuation of these structures can be directed based on the endoskeleton-like framework of the structure itself, chosen during the DLW process.

DLW also enables the fabrication of 3D constructs with control over physical factors that are known to play an important role on cell-substrate interaction such as scaffold roughness, geometry and mechanical properties.

During this talk I will give several illustrations of 3D soft-gel constructs¹ and bio-inspired vehicles for movement and sensing at the micro-scale.²⁻⁶

- (1) A. Tudor, et al., *Materials Today*, 21, 807 (2018).
- (2) L. Florea et al., *Adv. Mater.* 26, 7339 (2014).
- (3) W. Francis et al., *Chem. Commun.* 51, 2342 (2015).
- (4) X. Yang et al., *Adv. Mater.*, 30, 1801821 (2018).
- (5) W. Francis et al., *Sens. Actuat. B.*, 250, 608 (2017).
- (6) S. Zarghami et al. *ACS Appl. Mater. Interfaces* (2019)