MAR15-2015-020942

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

3-D Constructs–Molded vs. Printed: The differences from a cell based perspective

MARCIA SIMON, Professor and Director of Graduate Studies, School of Dental Medicine, Stony Brook

Additive manufacturing technologies are increasingly being used to replace standard extrusion or molding methods in engineering polymeric biomedical implants and devices. The principal advantage of this new technology is the ability to print directly from a scan and hence produce parts which are an ideal fit for an individual, which eliminates much of the sizing and fitting associated with standard manufacturing methods. The question though arises whether devices which may be macroscopically similar, serve identical functions, and be produced from the same polymeric material, in fact interact in the same manner with living tissue. Here we will discuss the differences in the surface structures produced by these manufacturing methods and the interactions of dental pulp stem cells with structures of multiple length scales as they impact cell differentiation and tissue mineralization.

In collaboration with Kuan Che Feng, Mariah Geritano, Michael Cuiffo, and Gary Halada, Materials Science and Engineering, Stony Brook University; Adriana Pinkas-Sarafova, Oral Biology and Pathology and Materials Science and Engineering, Stony Brook University; Sihana Rugova, Oral Biology and Pathology, Stony Brook University; and Miriam Rafailovich, Materials Science and Engineering, Stony Brook University.