

Extrinsic control of advanced manufacturing techniques for bioinspired materials

Steven E. Naleway, Debora Lyn Porter, Josh Fernquist, Tony J. Yin, Maddie Schmitz, Elise Hotz, Josh Alexander, Max Mroz

Department of Mechanical Engineering

University of Utah, 1495 E 100 S, Salt Lake City, UT, 84112, USA

ICACC'22

January 23-28 2022

Daytona Beach, FL, USA

Bioinspired fabrication techniques that are able to mimic the structure and properties of biological materials are of interest to a wide range of scientific and engineering fields. We propose that these bioinspired techniques can be controlled through either intrinsic (those that modify from within by altering the constituents) or extrinsic (those that apply external forces or templates) means. Through these classifications, examples of extrinsic (through energized magnetic and ultrasound external fields) freeze cast, aerogel, and FDM printed structures will be discussed with a focus on providing advanced control of the final material structure and properties. Applications in biomedical and defense applications will be discussed.