UNIVERSIDADE FEDERAL DE SÃO CARLOS - UFSCar
Centro de Ciências Exatas e de Tecnologia – CCET
DEPARTAMENTO DE ENGENHARIA DE MATERIAIS – DEMa
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIA E ENG. DE MATERIAIS - PPGCEM

INTERNATIONAL SEMINARS IN MATERIALS SCIENCE AND ENGINEERING OF DEMa/PPGCEM-UFSCar

BIOLOGICAL MATERIALS: LEARNING FROM NATURE

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Abstract:

Biological systems in nature have evolved over millions of years to adapt to environmental and ecological challenges. Nature seeks to leverage available materials with an emphasis on hierarchy and local control of microstructure to meet functional needs using the least amount of material. As such, biological systems incorporate intelligent, unique, and complex structural design concepts. Where general principles have been identified across several organisms, these have not been translated into engineered materials with similar generality. As an alternative to traditional manufacturing techniques, additive manufacturing (AM) has accelerated the growth of complex parts that can greatly expand the possibilities for bioinspired applications.

In this talk, I will describe the use of bioinspiration in two cellular, hierarchical natural systems: (a) combs made by honeybees (*apias mellifera*) and (b) Cholla cactus. In order to understand the structure of these materials, a correlative microscopy-based approach was used, based on time-evolved lab scale x-ray microscopy (microtomography), to investigate the hierarchical microstructure at multiple length scales and to extract key structural parameters (lattice structure, cell size, thickness of cell edges, etc.). Important bioinspired design principles guidelines were then validated and studied by fabricating and testing 3D printed structures.

Date: 18th may 2022
Time: 4 pm (São Carlos time – GMT-3)
Location: link https://meet.google.com/qyw-qmfh-iok