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WEDNESDAY, 19 AUGUST 2020

7 AM CALIFORNIA, 10 AM BOSTON

3 PM LONDON, 10 PM BEIJING

EML WEBINAR



**MARKUS
BUEHLER**
MIT

THE MECHANICS OF BIOMATERIOMICS

Nature produces a variety of materials with many functions, often out of simple and abundant materials, and at low energy. Such systems - examples of which include silk, bone, nacre or diatoms - provide broad inspiration for engineering. Here we explore the translation of biological composites to engineering applications, using a variety of tools including molecular modeling, AI, and experimental synthesis and characterization. This talk will present an overview of bottom-up designs of materials for various purposes, presenting a framework by which functional diversity is achieved from universal building blocks, especially focused on mechanical properties. Case studies of joint experimental-computational work of biomimetic materials design, manufacturing and testing will be covered – including work on the hierarchical mechanics of spider webs, protein design, and the use of categorization in the realization of hierarchical biomaterials in distinct manifestations.

Markus J. Buehler is the McAfee Professor of Engineering at MIT and leads MIT's Laboratory for Atomistic and Molecular Mechanics. His primary research interests focus on the structure and mechanical properties of biological and bio-inspired materials, to characterize, model and create materials with architectural features from the nano- to the macro-scale. His most recent book, *Biomateriomics*, presents a new design paradigm for the analysis of biomaterials using a categorization approach that translates insights from disparate fields such as materials and music. Buehler is the recipient of many awards including the Harold E. Edgerton Faculty Achievement Award, the Alfred Noble Prize, the Feynman Prize in Nanotechnology, the Leonardo da Vinci Award, and the Thomas J.R. Hughes Young Investigator Award. He is a recipient of the National Science Foundation CAREER award, the United States Air Force Young Investigator Award, the Navy Young Investigator Award, and the Defense Advanced Research Projects Agency (DARPA) Young Faculty Award, as well as the Presidential Early Career Award for Scientists and Engineers (PECASE). In 2018, Buehler was selected as a Highly Cited Researcher by Clarivate Analytics. In 2019, he received the Materials Horizons Outstanding Paper Prize, and his work was recognized as a highly cited author by the Royal Society of Chemistry.

Discussion leader: Professor Grace Gu, UC Berkeley

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