MAE Seminar Series

THURSDAY,

DECEMBER 02

4:00 P.M.

ZOOM INFORMATION

MEETING ID:

976 2525 0508

PASSWORD: MAE503

FRACTURE INVESTIGATION IN HIERARCHICALLY STRUCTURED POROUS MATERIALS

ABSTRACT

Many materials surrounding us from man-made materials including foams, ceramics, concrete, and cement to natural materials such as biological tissue, rocks, and soil are considered porous materials. Due to their unique properties, such as lightweight, heat resistance, sound absorption, thermal conductivity, electrical resistivity, porous materials are appealing to various engineering and scientific applications. Heterogeneous porous media are defined as materials whose structures are characterized by multiple periodicities over several disparate length scales. Such hierarchical structure poses challenges in understanding damage and fracture in these materials. This talk will address how computational tools enable us to enhance our fundamental knowledge of fracture propagation mechanisms in such materials across multiple length scales and under multi-physical processes. This talk covers various topics including: (i) at the nanoscale, molecular dynamics simulation will be used to obtain mechanical properties and fracture energy release rate for various pore morphology, (ii) at continuum scale, a chemically driven phase-field damage in a porous structure will be discussed, and finally (iii) at the micro-macro scales, a two-scale homogenization method coupled with the state-of-the-art phase-field fracture technique will be used to highlight the impact of the pore shape and size on the fracture pattern.

BIO SKETCH

Pania Newell is currently an assistant professor in the Department of Mechanical Engineering and holds an adjunct position at the School of Computing as well as the Department of Civil Engineering at the University of Utah. She obtained her M.S. and Ph.D. from the University of New Mexico and University Colorado-Boulder, respectively. Her research interest lies at the interface of material sciences and mechanics. In particular, she is interested in multi-scale, multi-physics phenomena in heterogeneous porous materials through developing theoretical, computational, and experimental frameworks combined with data sciences.

Dr. Pania Newell

Assistant Professor

Mechanical Engineering

The University of Utah

University at Buffalo

Department of Mechanical and Aerospace Engineering

School of Engineering and Applied Sciences