CASE WESTERN RESERVE UNIVERSITY

CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT SEMINAR

DR. DAWA SEO

Assistant Professor

Dept. of Civil and Environmental Engineering

Wayne State University

Date: Thursday, March 19th, 2026

Time: 4:00pm – 5pm EST

Location: In person, Bingham Building, Vose #138

Zoom Link: [Here]

From Micro to Macro: Exploring the Mechanics of Brittle Granular Materials

Abstract: Granular materials, such as sand, salt, and glacial till, are pervasive in nature and play crucial roles in a wide range of industrial applications, including geophysics, civil engineering, mining technology, and the energy sector. A key challenge in studying particulate materials is understanding how the size and shape of brittle particles evolve under high pressures, a phenomenon referred to as breakage. This talk presents recent advancements in the study of brittle granular materials at multiple scales, utilizing cutting-edge methods that combine high- fidelity computational modeling (digital twins, hydrocode) with image-based experimental data to simultaneously analyze microscale properties and macroscale responses, a framework referred to here as digital granular mechanics. Key findings include insights into how the evolution of particle morphologies under continuous breakage, along with particle arrangements, influences macroscopic stress-strain responses during quasi-static loading and wave propagation under shock compaction.

Bio Dr. Dawa Seo is an Assistant Professor in the Department of Civil and Environmental Engineering at Wayne State University. Her research integrates computational, experimental, and theoretical approaches to investigate the multiscale behavior of geomaterials and geostructures, addressing challenges related to natural and human-induced geohazards. Her work focuses on granular mechanics, functional geomaterials, multistrain and multiscale mechanics, and 4D image processing in geomechanics. She develops advanced computational models across strain regimes, from quasi-static deformation to dynamic shock compaction, combined with deep learning and in situ time-resolved imaging techniques. Before joining Wayne State University, she was a Director's Postdoctoral Fellow at Los Alamos National Laboratory, where she studied shock compaction in granular materials.