



## MECHANICS SEMINAR

# Modeling the flow of granular materials: A multiscale perspective

**Lu Jing**

Northwestern University

13 October 2021

Time: 16:00

Microsoft Teams - <https://tinyurl.com/semmec0121>

### **Abstract.**

Flow of granular materials lies at the heart of many geophysical (debris flows, sediment transport) and industrial phenomena (bulk solids handling, advanced manufacturing). Granular materials exhibit a rich variety of behaviors ranging from microscopic particle interactions to macroscopic continuum flows, and these multiscale features pose significant challenges to fundamental understanding and predictive modeling of granular flows. In this talk, two common yet poorly understood aspects of granular flows are discussed: within the flow, granular materials segregate due to different constituent particle species, leading to stratified flow structures; beneath the flow, slip occurs along apparently rough substrates, resulting in unexpected flow mobility. A multiscale paradigm is followed to tackle each problem by first identifying critical granular mechanisms at the particle level and then providing associated closures for large-scale continuum modeling. These findings are expected to enhance physics-based granular flow modeling for various applications, including geohazard assessment in geo-engineering and bulk solids handling in industry.