

## MECHANICS SEMINAR

**Particle-structure interaction: a framework for the modeling of particle flows interacting with thin flexible structures.****Eduardo M. B. Campello**

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Time: 16:00

Microsoft Teams - <https://tinyurl.com/48fqbv82>

**Abstract.** This talk will present a computational framework for the simulation of problems wherein dry particle flows interact with thin flexible structures such as slender beams, plates, shells and membranes. Particle flows are described within a particle dynamics (discrete element-like) approach. Flexible structures, in turn, are described through fully consistent, kinematically-exact structural formulations, which are spatially discretized under the light of the finite element method and embedded within rigorous time-stepping dynamics schemes. Particle-to-particle, particle-to-structure and structure-to-structure contacts (including self-contact) are fully permitted and resolved. A simple and efficient strategy is proposed for capturing the interaction of the two types of medium (discrete and continuum) and couple their motion within a staggered, DEM-FEM iterative solution scheme. Some implementational aspects are discussed too. Numerical examples in the form of model problems are provided to assess our scheme and illustrate its applicability to the simulation of a wide range engineering applications. We believe that robust, efficient coupled DEM-FEM schemes may be a useful tool for the simulation of particle-structure interaction problems, such as (but not limited to) the bombardment of grains on rod-like and membrane structures, particle flows over surfaces covered by fur, modern advanced manufacturing, and many others.