

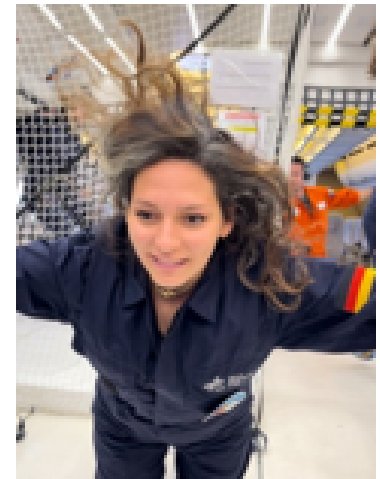


UNIVERSITY OF DELAWARE
ARTS & SCIENCES
DEPARTMENT OF PHYSICS AND ASTRONOMY

Monday, October 21, 2024

2:00 PM

Sharp Lab – Room 215



Center for Neutron Science and Delaware Space Grant Consortium Present:

DR. OLFA D'ANGELO

Institut Supérieur de l'Aéronautique et de l'Espace ISAE-SUPAERO in Toulouse, France

Going Against Gravity – How Do Granular Materials Flow Outside Earth's Gravitational Pull?

Granular matter is the most abundant solid material on Earth, and beyond: it covers the surface of the Moon, Mars, and asteroids. Yet, the role of gravity in shaping granular flows remains poorly understood, leading to critical instrument failures in past space missions.

We explore the rheology of granular materials at packing densities below jamming by different avenues. We apply agitation while shearing to isolate microscopic mechanism(s) behind flow behaviors. We use low gravity platforms to isolate intrinsic granular properties from gravity-induced ones. I will present some of the low gravity platforms available through the German Aerospace Center (DLR), including new rheology experiments conducted on the sounding rocket program MAPHEUS.

Our results reveal that while agitation indeed reduces packing density, it increases fluidity, resulting in flow behaviors similar among thermal and agitated amorphous materials across scales. We also identify behaviors unique to granular media, suggesting a distinction between the jamming transition and the granular glass transition.

