

# WCPM/CSC joint seminar

## Contact and cavitation: Computer models for tribological processes

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Monday, 27<sup>th</sup> February, 1 p.m.

D2.02 Seminar room, Engineering

**Abstract:** Tribology is the science of mechanical processes at material surfaces, such as adhesion, friction or wear. Studying these is complicated because most surfaces are rough, interact with lubricants, water or air and because the interface between two materials is typically inaccessible to in-situ experimental techniques. In this talk, I give examples of how computer simulations at mesoscopic and atomic scales can help to elucidate the processes that take place at these “buried interfaces”. Mesoscopic simulations of elastic contact and plastic contact between rough surfaces allow a direct calculation of the area of intimate atomic contact [1]. Conditions within the contacting regions are typically extreme and give rise to severe plastic deformation. I will then describe simulations of interfacial effects that occur in the region of intimate atomic contact during shear. First, lubricant flow on surfaces sticking and slipping regions reveal how the material affects surface flow and that stick/slip contrast can lead to cavitation within the lubricant [2]. Second, in the absence of a lubricant, the sliding interface can accommodate shear by creating interfacial dislocations that control the interfacial strength of the material [3].

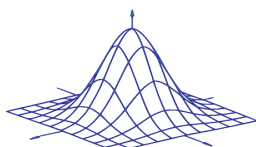
[1] Pastewka, Robbins, PNAS 111, 3298 (2014); Appl. Phys. Lett. 108, 221601 (2016)

[2] Savio, Pastewka, Gumbsch, Science Advances 2, e1501585 (2016)

[3] Sharp, Pastewka, Robbins, Phys. Rev. B 93, 121402(R) (2016)

A buffet lunch is available from 12:45 pm.

More info: <http://warwick.ac.uk/wcpm/seminars>



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