



# OIST SEMINAR

Date: March 9th, 2014 (Mon)

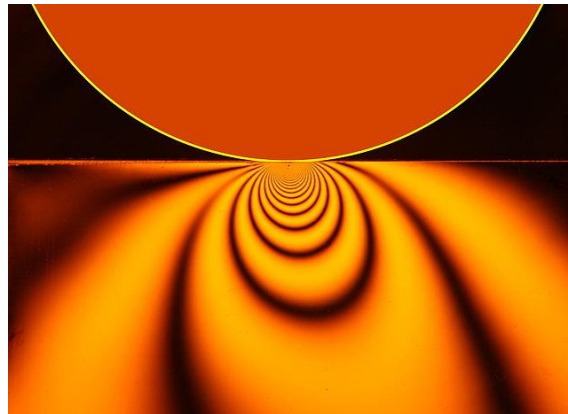
Time: 3:00 pm – 4:00 pm

Venue: D015, Lab1

**Speaker: Prof. Sonia A.G. Oliveira**

(School of Mechanical Engineering Federal University of Uberlândia – Brazil)

## The challenges of tribology: contact mechanics, friction, and wear



### Abstract

"Tribology" was the term suggested by Peter Jost, in 1966, for the study of contact, friction, and wear. The term may be relatively new, but the study of contact, friction and wear harks back to the time when humans first tried to produce fire by rubbing two pieces of rock or wood. Several inventions of ancient times involved tribology; these include the wheel and the stone ground mill, among others. Leonardo da Vinci established the two fundamental laws of friction, in 1494. His results were forgotten for about 200 years, until Amontons rediscovered the relationship between normal force and friction force. Another major contribution to tribology was given by Coulomb, who established the dry friction law. With regard to contact mechanics, Hertz was the largest contributor. His most important results, which date back to 1882, are still the basis for the study of contact stresses between two bodies with curved surfaces. As a result of contact and friction, wear occurs. Wear, as a research topic, appeared much later in time, and remains one of the lesser-known phenomena of tribology. In this seminar, which is intended for non-specialists, I will discuss some of the research on tribology that is being carried out at the Federal University of Uberlândia, including experimental work on wear and on the use of coatings for wear reduction and the improvement of mechanical properties. I will put emphasis on the work of a group of researchers, including me, who use the finite-element method to simulate contact mechanics, various tribological phenomena and experimental wear tests. So far, we have mostly worked with the macroscopic aspects of contact. One of the challenges has been to elucidate what happens at the microscopic level and try to explain its effects on the mechanisms of wear.

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