



Open PhD position “Friction control across the scales”

Funded by the French National Research Agency ANR, we seek one highly motivated individual with a strong interest in pursuing a PhD degree for conducting research on surface forces in soft matter. The candidate must hold a master's degree (or equivalent) in Physics, Chemical Physics, Materials Science, Chemical Engineering or related fields.

Description of the project:

The increasing miniaturization of many technological devices is accompanied by an increased surface area-to-volume ratio. Under these conditions, designing of moving parts requires accurate control of surface forces (e.g. friction and adhesion) to achieve precise positioning and proper lifetime. However, traditional lubrication solutions may prove ineffective at nanometric scales or in biomedical applications; this calls for the development of original and reliable methods of control of friction and adhesion at small scales. A large number of studies addressing the effect of velocity, pressure, type of materials, or lubricants on friction have been reported. However, a factor often overlooked, vibrations, is also of great significance. The main goal of this project is to explore the relationship between vibration, contact aging and friction, from macroscopic to the atomic scale, with the purpose of improve the understanding of how energy is dissipated when two surfaces are rubbed, and of developing original friction-control strategies. We seek to evaluate the influence of externally imposed oscillations on the relative motion between two surfaces in contact, to develop novel strategies for controlling friction in mechanical devices. Experimental studies from nanometric to millimetric scales will be conducted to evaluate the potential of using low amplitude vibrations to facilitate the motion of surfaces in contact (from single to multiple asperity contacts) and its influence on wear and adhesion, in relation to the structural and mechanical properties of the surfaces in contact. The work will be carried out in close collaboration with the members of the team “Soft Matter: Structure and Dynamics” at the Paul Pascal Research Centre (CNRS; University of Bordeaux). The successful candidate will be granted a 3-year contract, and will receive training in physical chemistry of surfaces and interfaces, and advanced techniques of surface forces measurements (Atomic Force Microscopy and Surfaces Forces Apparatus).

Applications will be accepted until September 23, 2025. Please submit your application including: CV, a letter describing your research interest and skills, and contact information of two referees, via the CNRS website, <https://emploi.cnrs.fr/>. For more information, contact:

Dr. Carlos Drummond
carlos.drummond@crpp.cnrs.fr