Soft Interfaces
Mini-colloquium 24

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2014 will mark twenty years since P.-G. de Gennes’ Dirac Memorial Lecture on “Soft Interfaces”. Since that time, experimental advances in the fabrication of extremely thin and soft materials, as well as the use of such materials in biology, has led to an explosion of activity revealing, amongst other things, the ability of surface energies to influence the deformation of solid materials. Micro-electromechanical devices can for instance be assembled, or conversely damaged, by capillary forces. Many biomedical applications also require the development of electronic systems that are able to bend and stretch without inducing the delamination of the rupture of tiny electronic circuits. Finally, preventing cracks on protective coatings is a major industrial issue. Nevertheless, controlled fracture paths may be used in future as a way to pattern surfaces. These various applications range from some classical disciplines such as fracture mechanics and wetting, to more recent topics such as elastocapillarity, fracture of soft materials or delamination or tearing of rigid thin films.

The colloquium will focus on a number of aspects of soft interfaces in which recent progress has been very significant, particularly within Europe, such as elastocapillarity, wetting, fracture in thin films, adhesion/delamination, buckling/wrinkling/crumpling . . .

Figure 1: (a) Wrapping of a rigid sphere with a flexible sheet (Hure et al. 2011), (b) Condensation of water droplets on a soft surface through durotaixs (Style et al. 2013), (c) Delamination of a thin rigid film adhering on a compressed soft substrate (Vella et al. 2009), (d) Exponential tearing of a thin sheet (Romero et al. 2013).