

## **Lubrication theory**

A broad variety of capillary flows can be described by the so-called lubrication approximation. This method finds its origin in "lubrication", i.e. the reduction of friction between solid surfaces by a thin layer of lubricant. In this lecture we will derive the lubrication equations, and subsequently discuss applications in the context of lubrication and capillary flows.

## **Drop coalescence**

We consider the elementary process of drop coalescence, during which two liquid drops merge into a single large drop. While the reason for coalescence is obvious (reduction of the surface free energy), the initial dynamics right after contact is singular with diverging pressures and velocities. Here we discuss the coalescence of spherical drops by scaling laws, and the coalescence of drops on a substrate by similarity solutions of the lubrication equation.