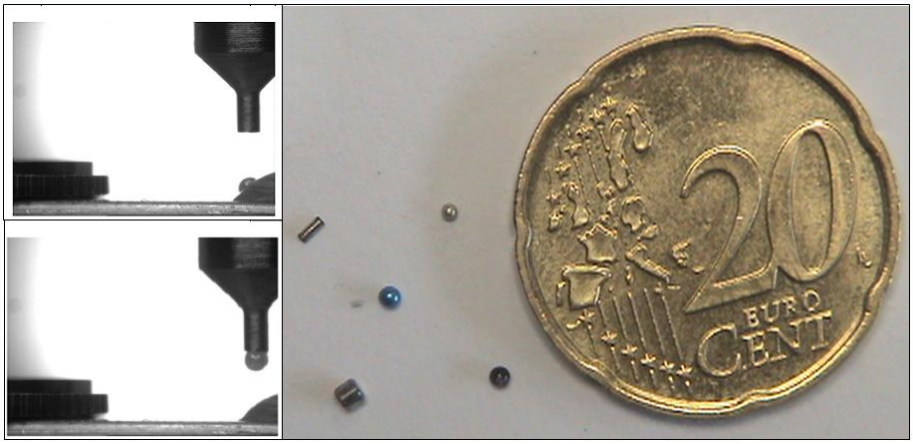
## Surface tension in Microsystems and its application in Microassembly

*Brief description of the topic of the seminar*

Surface tension is a property of the surface of a liquid that causes it to behave as an elastic sheet. It allows small insects, such as the water strider, to walk on water or small objects, even metal ones, to float on the surface of water, and it is the cause of capillary action.

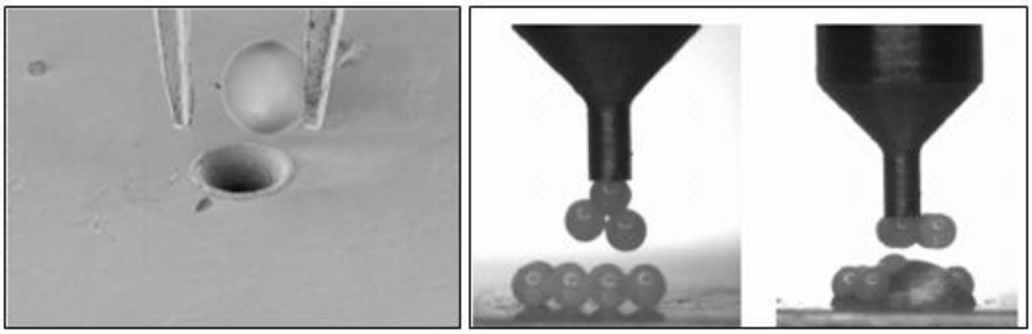
***Surface tension allows insect to walk on water or a coin to remain on the surface***

This force can be adopted to grasp microobjects with a submillimeter size and mass of few milligrams. In microassembly, surface tension gripping has been introduced in the late ’90 for the purpose of gripping millimetric silicon chips and from then it has found many applications to grasp various kind of objects of different size.




***A microsphere grasped by means of a surface tension gripper and typical objects that is possible to grasp it***

Surface tension forces can also originate from interaction of layers of absorbed moisture on two surfaces. These forces generate problems in the manipulation of parts with dimension lower than 1 millimeter because they become of the same entity or prevalent in comparison with gravity: the correct grasping of a singular object becomes difficult and the releasing of the micropart from a mechanical gripper is very difficult.



**The sticking of a microsphere to the gripper and the multiple grasping of spheres**

**Pierre Lambert** graduated as a electromechanical engineer at Université libre de Bruxelles in 1998. After a two year experience as engineer for two French companies, he started a PhD on microassembly under the supervision of Prof. Alain Delchambre. He defended his PhD in 2004 on the use and modelling of capillary forces in microassembly.
After postdoctoral stays in the Ecole Polytechnique Fédérale de Lausanne and the Université Pierre et Marie Curie, he joined the academic staff of the Université libre de Bruxelles.
Since October 2007, he is Assistant Professor and leader of a research group of 6 PhD students in microtechnology. The main research topics are surface forces, scaling laws, miniaturized products. The main research skills cover (mathematical, non dimensional, physical) modelling, simulation, experiments (design of experiments), and mechanical design of experimental test beds (forces measurement set ups, in the range 1nN-1N) and demonstrators (acoustical levitator, surface tension gripper, feeding/sorting device using surface tension).