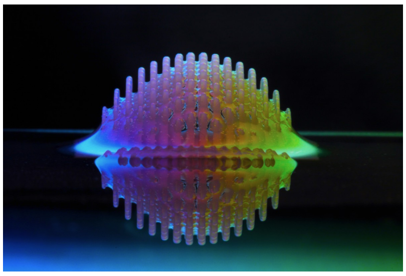
Created in 2000, GRASP brings together around twenty researchers, including five senior scientists, who explore the fascinating world of soft matter, a field initiated by Nobel Prize winner Pierre-Gilles de Gennes. Each year, GRASP publishes about ten articles in high-impact journals and coordinates some fifteen active research projects.

Unlike "hard" condensed matter, soft matter corresponds to materials that can bend, flow, stick, or even break apart. This includes foams, emulsions, powders, gels, and biological tissues. Thanks to its elasticity and flow properties, it can be transformed into flexible sensors for health monitoring, or into novel adaptive materials able to adjust and even "learn" from their environment.



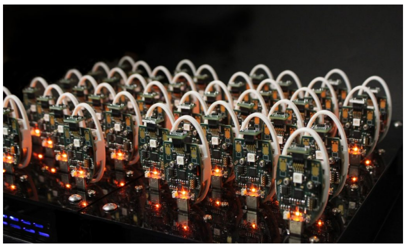
One of GRASP's key areas of expertise is the control of capillary interactions, the subtle forces that act between objects placed at liquid interfaces. By mastering these forces, researchers can design self-assembling microsystems, encode information into liquid surfaces to create tiny capillary machines and motors, and imagine new strategies for smart fabrication at small scales. Over the past two decades, such interactions, famously illustrated by the "Cheerios effect," have enabled the creation of intricate micro- and mesoscale assemblies with applications in electronics, photonics, soft robotics, and biotechnology, although most studies initially focused on simple attractive interactions. Recent breakthroughs now make it possible to control capillary forces in more sophisticated ways, combining advanced 3D printing, profilometry, and magnetic fields to engineer programmable, reconfigurable, and motile structures. These so-called capillary machines are able to perform directed motion, particle sorting, and fluid mixing, bridging the gap between passive assemblies and functional mesoscale devices. This shift marks a transition from static assemblies to dynamic systems capable of encoding and processing information. Inspired by biological processes, capillary machines now mimic swimming, metachronal wave propulsion, and modular reconfiguration, and they promise to revolutionize mesoscale fabrication by opening the way to capillary factories and even synthetic life, a transformative leap for materials science, soft robotics, and bio-inspired engineering.

Another flagship project is SpaceGrains, funded by the European Space Agency (ESA). This project investigates how powders and grains behave in reduced gravity, an essential challenge for future lunar and Martian exploration. Regolith, the dusty soil covering the Moon and Mars, is sticky, abrasive, and potentially harmful to astronauts' lungs. Understanding its behavior in space is also key to the future exploitation of extraterrestrial resources, such as iron-rich asteroids containing rare earth elements. In 2027, GRASP will perform an experiment aboard the International Space Station to study how granular materials can be handled in microgravity.

GRASP's expertise has also led to practical innovations. The group invented new instruments for characterizing powders and soft materials, which inspired the creation of the spin-off Granutools in 2015. Today, this company employs 20 people and supplies instruments to major players such as Nestlé, UCB, and BASF. Granutools was awarded the Deloitte Prize for the fastest-growing company in Wallonia, underscoring the industrial impact of GRASP's science.

Looking ahead, GRASP is pioneering active soft systems, in which small robotic components exert forces on each other to mimic the building blocks of life. The group is now able to design prototypes of synthetic tissues capable of adaptation and learning, thus opening a new frontier where physics meets biology. Current projects include magnetic materials that fold and unfold on demand (imagine a stent remotely activated by a magnet), and centimeter-sized cooperative robots that work together to accomplish complex tasks.

From healthcare to space exploration and advanced robotics, GRASP illustrates how the physics of soft matter can inspire entirely new technologies. A quiet revolution for classical engineering.



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