

# Shape-changing : geometry and instabilities of active materials

Benoît Roman, PMMH ESPCI

We can witness everyday in Nature the fascinating process of self- shaping systems : organs form, plants grow, leaves develop, flowers bloom with amazing control of complex shapes. This morphogenesis is due to the advent of specific spatial distribution of internal active forces (or strain).

In stark contrast, the many manufacturing techniques developed by human all rely on making sure that the materials used are homogeneous passive, and applying external forces that impose the shape from outside.

Could we mimic morphogenesis with physical systems?

This talk will discuss the physics of self-shaping, which involves geometry, instabilities and inverse problems, review examples of « programmable active materials » designed for shape-morphing, and mention possible applications.