

# Cavitation propagation and waves in granular media.

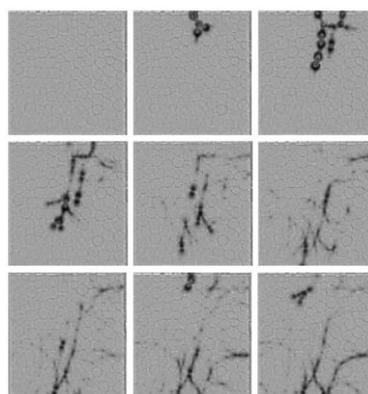
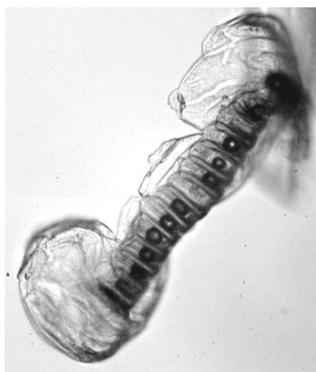
**Xavier NOBLIN**

Laboratoire de Physique de la Matière Condensée, UMR 7336, CNRS-UNS, Nice.

In a first part, I will present the propagation of cavitation events in quasi-static conditions both in natural and artificial systems. The nucleation and growth of vapor bubble in a stretched liquid medium is a common phenomenon in trees or along boat helices. It can also be observed in ferns, triggering a catapult mechanism ejecting the spores by using negative pressures down to -90 bar [1]. The interesting feature is that in more than 10 adjacent cells, all cavitation bubbles can appear in a few microseconds. I will present our results on the collective dynamics of nucleating bubbles in fern sporangia. I will then show how we studied the same phenomenon in artificial devices made in hydrogels by microfabrication and how we can model the fast propagation.

In a second part, I will talk about the propagation of linear and non linear elastic waves in 1D and 2D granular media. By using photoelastic methods, we succeed in visualizing waves in such granular piling at around 100000 fps. We study in particular the effect of grain geometry and roughness on the propagation, along with wave amplitude.

[1] X. Noblin et al., The fern sporangium: a unique catapult, SCIENCE, 2012.



A coffee break will be served at 11h00. The seminar will be given in English.