

9 PhD Fellowships and/or post-doctoral positions available in the “Thales” funded project:

“Complex Visco-elastic and Visco-plastic Materials: From Microscopic Structure and Dynamics to Macroscopic Flow”

The positions are available at the 3 participating institutions: **IESL-FORTH (Crete)**, **University of Patras** and **National Technical University (Athens)**. PhD candidates should hold Master’s degree in the field of Physics, Chemistry, Materials Science or Engineering. Postdoctoral candidates should have a PhD degree with relevant experience in Soft Matter, experiments or theory/computation.

Project description

The aim of the project is to investigate the **flow of complex visco-elastic and visco-plastic materials** with emphasis in the elucidation of the relation of microscopic structure and dynamics with mechanical properties. A wide variety of products consist of such materials with complex rheological response intermediate between solids and liquids. **Polymers, colloids and granular** systems - all studied here - are main representatives with applications in consumer products often involving complex flows during their processing.

We aim to tackle some of the fundamental open problems related with the flow of such visco-elastic and visco-plastic systems using a synergy of state of the art experimental techniques combining rheology, light scattering and microscopy as well as computational methods and computer simulations.

Our research plan will focus in three directions:

A. Dynamics and rheology of **colloidal suspensions, glasses and gels** emphasizing in understanding their dynamics at rest as well their yielding and particle rearrangements under shear,

B. experimental and computational **shear and extensional rheology of polymer melts and solutions** with particular aim in elucidating the effects of branching and entanglements, and

C. study of **granular flows and dynamics** with applications in seismic dampers, clustering in production lines, also related with vehicle traffic control.

The research plan will be achieved with the cooperation of the three Greek groups and the participation of several senior researchers from Europe and the US with complimentary expertise in experiments, theory and simulations.

Candidates may contact the coordinator (Prof. G. Petekids, georgp@iesl.forth.gr) who will direct them to the appropriate project partner. Please indicate your topic (A, B, or C) of interest.

<http://www.iesl.forth.gr/> , <http://www.materials.uoc.gr/el/research/polymers/polymers.html>

Further information may also be provided by the partner leaders: Prof. J. Tsamopoulos, tsamo@chemeng.upatras.gr (Patras), and Prof. E. Mitsoulis, mitsouli@metal.ntua.gr (Athens)