The Laboratory of Fluid Mechanics and Rheology at the University of Patras has **three Marie-Currie openings at the Doctoral level, Early-Stage Researcher" (ESR)**, under the supervision of Profs Yannis Dimakopoulos and John Tsamopoulos, in the following area:

MODELING AND FLOW OF ELASTO-VISCOPLASTIC MATERIALS

The proposed research is focused on predicting and controlling deformation and flow of a group of complex materials abundant in nature and industry, called **Yield-Stress (YS)** or **viscoplastic (VP)** materials. These start to flow when a sufficient stress is applied to them but behave as solids otherwise.

Predicting the behaviour of YS materials is particularly challenging for at least three reasons:

(a) It is challenging to determine material properties accurately.

(b) Inappropriate constitutive models have often been used, i.e., generalized Newtonian fluid models, whereas recent experiments have shown that they also exhibit **elastic** and **thixotropic pr**operties.

(c) It is challenging to compute complex flows because of their transient nature.

In response to **the challenge of predicting flows of YS materials**, it is imperative to establish a coherent and efficient approach to predict such flows by (a) developing more accurate and general YS constitutive models, (b) developing advanced numerical methods for computing complex YS flows In this way, it will become possible to bridge the gap between science and modelling developed in academia (fluid mechanics, rheology, and computational methods) and process engineering (food, chemical, pharmaceutical, oil exploration, construction, etc.).

The overall goal of our research effort is to develop such models and test them in homogeneous and specific complex and practical flows.

The position is funded in part by a Marie-Currie ITN project for a period of **four years**. Candidates must have BS or MS degrees. in Chemical or Mechanical Engineering, Physics, Materials Science, Appl. Mathematics, or a related field. **Review of candidate applications will begin December 18, 2020, and will continue until the positions are filled.** Prospective candidates should prepare a single PDF document including (1) a cover letter detailing motivation, research experience, and research interests, (2) curriculum vitae, (3) names and email addresses of three references. These can be sent by email to Prof. John Tsamopoulos at tsamo@chemeng.upatras.gr.

In the selection process, candidates will be assessed upon the following skills:

- Ability to analyze and model complex physical problems
- Programming skills (good knowledge of at least a language among Fortran 2015, C++, Python, Matlab)
- Background in soft matter, multiphase flows, and transport phenomena
- Enthusiasm about working in a multidisciplinary, collaborative environment.
- Excellent interpersonal and communication skills (written and spoken English)
- Ability to work and collaborate in a diverse environment.

The candidates

- Can be of any nationality, and there is no age limit.
- At the time of recruitment, they must be in the first four years of their research careers and not yet have been awarded a doctoral degree. The four years start to count from the date when a researcher obtained the degree which would formally entitle him/her to embark on a doctorate.
- Researchers are required to undertake transnational mobility (i.e., move from one country to another) when taking up their appointment. One general rule applies to the appointment of researchers: At the time of recruitment by the host beneficiary, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host beneficiary for more than 12 months in the three years immediately prior to the reference date. Note that the *mobility* rule applies to the

beneficiary where the researcher is recruited and not to beneficiaries to which the researcher is sent or seconded.

- For all recruitment, the eligibility and mobility of the researcher will be determined at the time of their (first) recruitment in the project.

Links

1. Details on YieldGap Project:
http://fluidslab.chemeng.upatras.gr/index.php/2020/12/11/yieldgap-project/

2. Details for Candidates:
http://fluidslab.chemeng.upatras.gr/index.php/2020/12/14/yieldgap-open-positions/

3. General information about our lab and research activities:
http://fluidslab.chemeng.upatras.gr/, http://www.chemeng.upatras.gr/