



FLOW Autumn School on Rheology

October 22-26, 2018
Linné FLOW Centre, KTH Mechanics
Royal Institute of Technology
Stockholm, Sweden



<https://www.flow.kth.se/flow-graduate-school/2018-flow-interface-autumn-school-in-rheology-1.838502>

Scope:

Many fluids in today's engineering world are complex, i.e. they contain a small amount of a dispersed phase such as particles, droplets or polymers. It has been estimated that a significant amount of world's energy consumption comes from transport and handling of complex fluids, which behave qualitatively differently from Newtonian fluids. In Sweden, this knowledge is crucial for the process and food industries, and new technologies such as materials design or 3D printing. Moreover, complex fluid dynamics governs natural disasters (mud slides, volcano eruptions) and biomedical phenomena (e.g. blood flow). Facing the need for improved modelling, measurement and understanding of complex fluid flows, the FLOW Autumn School aims to provide the latest perspectives of the physical laws governing these flows, awareness of new and existing rheological models, advanced knowledge concerning the physical mechanisms behind their properties such as viscoelasticity or yield-stress, experimental and computational challenges and how they can be overcome. Practical problems involving complex fluid handling will be examined with emphasis on sources of the non-Newtonian behavior, rheological characterization of materials, behavior of non-colloidal and colloidal (particle size comparable to the length scale of thermal motion) suspensions, and industrial and medical applications.

Aspects concerning rheology from molecular to macroscale, state-of-the-art numerical approaches, modelling and experimental methods, will be discussed in our school with distinguished speakers. At KTH, the research and education within this

field of research is associated with the Linné FLOW Centre.

Topics and invited lecturers:

Erin Koos, *Colloidal systems*, **KU Leuven**, Belgium

Gareth McKinley, *Rheological modelling*, **MIT**, US

Sarah Hormozi, *Experiments and computations in yield-stress/complex fluids*, **Univ. of Ohio**, US

Cyrus Aidun, *Blood flow rheology*, **GeorgiaTech**, US

Fredrik Innings, *Industrial applications of rheology*, **Tetra-Pak**, Sweden

Massimiliano Villone, *Basics of rheology*, **Univ. of Naples**, Italy

The Autumn FLOW School is intended to give an overview of both general and more specific topics relevant to rheology of complex fluids and suspensions across length scales. For the exercises, you will need a laptop with installed Matlab, preferably running Linux. The schedule is:

- Monday (22/10), Welcome, organisation of the school, administration
Massimiliano Villone: *Introduction to Rheology*
Fredrik Innings: *Industrial Rheology and Measurements*
- Tuesday (23/10)
Cyrus K. Aidun: *The complex rheological nature of Blood Flow and consequences for Cardiological Diseases*
- Wednesday (24/10)
Sarah Hormozi: *Yield-stress fluids, and rheology of Particles in Complex Fluids*
- Thursday (25/10)
Gareth McKinley: *Large-amplitude oscillatory shear flows for characterizing Viscoplastic and Elastoplastic Materials*
- Friday (26/10)
Erin Koos: *Colloidal suspensions*

Administrative details:

Lectures will be given October 22 to 26, 2018 in the seminar room of KTH Mechanics (room Faxén) located on the KTH main campus, close to the city centre of Stockholm. The FLOW graduate school will provide lunches to the registered participants. The programme includes a school dinner on Wednesday night in a restaurant within walking distance from KTH. A project will be performed by pairs of student and sent electronically to the school organisers for the final evaluation, worth 3.5 ECTS points (if requested). The course is free of charge, and includes lunches plus the school dinner. Interested PhD students are invited to contact Outi Tammissola (outi@mech.kth.se) for registration. For further information visit the school homepage on www.flow.kth.se.

Contact and organiser:

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