Modelling Camp

PhD program in Civil, Chemical and Environmental Engineering
RETE ITALIANA DI MECCANICA DEI FLUIDI

Course Description

The Modelling Camp is a 5-day workshop, aimed at providing participants with hands-on experience on mathematical modelling and data analysis, under the guidance of instructors. The mentors will present different problems, inspired by real questions that have arisen in industry, medicine and environmental science. The students will split into groups (5/6 students each) and will work for a week on one of the problems of their choice.

Scientific communication is an important part of the camp. All groups are expected to give a presentation at the end of the working week and to submit a written report within a month of the end of the course.

The camp is open to PhD students and it is designed to promote a broad range of problem-solving skills. No registration fee is required, but we will not be able to provide accommodation.

Mentors

Vincenzo Armenio, University of Trieste
Ross Ethier, Georgia Tech, USA
Michele La Rocca, University of Rome 3
Jan Pralits, University of Genoa
Rodolfo Repetto, University of Genoa
Agnese Seminara, University of Genoa
Marco Tubino, University of Trento

Registration

To register to the course please write an email to Rodolfo Repetto (rodolfo.repetto@unige.it). Registration deadline: March 15th.

Teaching period and schedule

May 15-19, 2023

	Mon 15/05	Tue 16/05	Wed 17/05	Thu 18/05	Fri 19/05
9.00-11.00		Group work	Group work	Group work	Final presentations
11.00-13.00	Presentation of the problems				
14.30-16.00	Group work		Presentation of preliminary results		
16.00-18.00			Group work		

On Wednesday 22 we will organise an informal social dinner.

Examples of problems from the past years

Spray drying kinetics

The study regards the spray-drying process involved in encapsulation of different industrial products, e.g. powder coffee or drugs.
The mathematical model concerns a two-stage drying process, involving evaporation of liquid drops and heating of the solid product.

Wave propagation across the liver in health and disease

Flux and pressure waves propagate across the liver and are generated both at the arterial side (hepatic artery) and at the downstream venous side (hepatic veins).

The mathematical model is aimed at reproducing and interpreting wave forms observed clinically, which are markedly different in healthy and fibrotic livers.
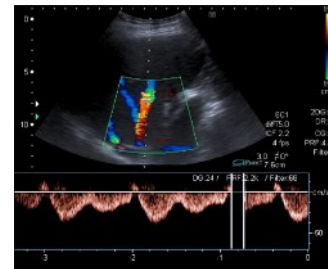
A flexible fibre to investigate the statistical properties of turbulence

The problem focuses on a possible strategy for investigating turbulent flows characteristics by considering the fluid-structure interaction experienced by an immersed flexible fibre.