Mathematisches Forschungsinstitut Oberwolfach

Member of Leibniz Association

Banach Center
INSTITUTE OF MATHEMATICS PAS

Optimal Transport Theory and Hydrodynamics (from Euler to Monge and vice versa)

Banach Center – Oberwolfach Graduate Seminar

Organizers: Yann Brenier, Paris
Mikaela Iacobelli, Zurich
Filippo Santambrogio, Villeurbanne
Date (ID): 12 - 18 November 2023 (2346b)
Deadline: 1 September 2023 (new)

Optimal transport theory is a very successful field of mathematics connecting calculus of variations, probability theory, differential geometry, partial differential equations, functional analysis, statis-tics and computer sciences. Going back to Monge around 1780, this theory has deep connections with the earlier work of Euler on Hydrodynamics around 1750. This connection has recently known a strong revival on many different sides, leading to various non trivial generalizations of the con-cept of optimal transport. Three examples will be covered in the seminar:

(1) Continuous multimarginal optimal transport problems (Euler equations, models of conges-tion, sprays...) and their close relationship with the mean-field game theory introduced by Lasry and Lions about 10 years ago;

(2) Entropic regularization of the mass transport problem (started by Schrödinger in the late 30s) and its recent generalization to Hydrodynamics;

(3) Kinetic formulation of the Euler equations as a model of optimal incompressible transport.

During the week, tutorials on optimal transport, Euler equations and fluid dynamics will be held, starting from a crash course on the very first day.

The seminar takes place at the Mathematical Re-search and Conference Center of the Institute of Mathematics of the Polish Academy of Sciences in Będlewo. Please see the website of the center where you can find basic information (location, travel etc.): **www.impan.pl/en/activities/bedlewo-conference-center/about-center**. In general, travel expenses can not be reim-bursed. The number of participants is restricted to about 30 persons.

Applications including

- full name and address, incl. e-mail address
- short CV and publication list
- present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest
- title, ID and date of the intended seminar

should be sent preferably by e-mail (with attach-ments in pdf format) via **seminars@mfo.de** until 1 September 2023 to:

Mathematisches Forschungsinstitut Oberwolfach
Vice Director
Schwarzwaldstr. 9 – 11
77709 Oberwolfach
Germany

Practical questions (visa etc.) of approved appli-cants can be checked with the Banach Center via **office@impan.pl**.