

High Dimensional Hamilton-Jacobi PDEs

March 9 – June 12, 2020

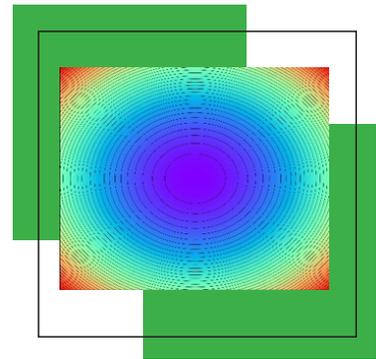
Scientific Overview

Hamilton-Jacobi (HJ) Partial Differential Equations (PDEs) were originally introduced during the 19th century as an alternative way of formulating mechanics. Since then, these PDEs have received a considerable amount of attention as they arise in many scientific areas and real-life applications beyond physics, such as optimal control, stochastic optimal control, random media, probability, random dynamical systems, large deviations theory, mean field games, optimal transport, optimization in imaging sciences and machine learning.

Applications that involve HJ PDEs in a high-dimensional (and possibly infinite-dimensional) setting lead to challenging computational problems. The subject is currently on the verge of becoming central to many new areas of applications, and progress in tackling Hamilton-Jacobi equations could lead to important advances in several fields. The main goal of this long program is to leverage synergy between different fields to advance mathematical theory and algorithms to solve real-life problems.

Long Program Schedule

- Opening Day: March 9, 2020
- High Dimensional Hamilton-Jacobi PDEs Tutorials: March 10-13, 2020
- Workshop I: High Dimensional HJ Methods in Control and Differential Games: March 30 – April 3, 2020
- Workshop II: PDE and Inverse Problem Methods in Machine Learning: April 20-24, 2020
- Workshop III: Mean Field Games and Applications: May 4-8, 2020
- Workshop IV: Stochastic Analysis Related to Hamilton-Jacobi PDEs: May 18-22, 2020
- Culminating Workshop at Lake Arrowhead Conference Center: June 7-12, 2020



Organizers

Jerome Darbon (Brown); Craig Evans (UC Berkeley); Fariba Fahroo (AFOSR); Wilfrid Gangbo (UCLA); Adam Oberman (McGill); Stanley Osher (UCLA); Panagiotis Souganidis (University of Chicago); Claire Tomlin (UC Berkeley)

Participation

This long program will involve senior and junior researchers from several communities relevant to this program. You may apply for financial support to participate in the entire fourteen-week program, or a portion of it. We prefer participants who stay for the entire program. Applications will be accepted through **November 29, 2019**, but offers may be made up to one year before the start date. We urge you to apply early. Mathematicians and scientists at all levels who are interested in this area of research are encouraged to apply for funding. Supporting the careers of women and minority researchers is an important component of IPAM's mission and we welcome their applications. More information and an application is available online.

