



Pacific Institute *for the*  
Mathematical Sciences

## 2015 PIMS Marsden Memorial Lecture

PLEASE NOTE DATE  
CORRECTION!

JUNE 10, 2015

École Polytechnique Fédérale de Lausanne, Switzerland

**Yann Brenier** (École Polytechnique, Paris)

### *From Euler to Born-Infeld, Fluids and Electromagnetism*

This lecture is part of the Centre Interfacultaire Bernoulli Workshop on Classic and Stochastic Geometric Mechanics, June 8-12, 2015  
<http://bernoulli.epfl.ch/prog.php?id=1000000028>

Abstract: As the Euler theory of hydrodynamics (1757), the Born-Infeld theory of electromagnetism (1934) enjoys a simple and beautiful geometric structure. Quite surprisingly, the BI model which is of relativistic nature, shares many features with classical hydro- and magnetohydro-dynamics. In particular, I will discuss its very close connection with Moffatt's topological approach to Euler equations, through the concept of magnetic relaxation.



Successively researcher at INRIA-Rocquencourt and IIMAS-UNAM-México, assistant professor at UCLA, professor at Paris 6 and École Normale Supérieure, YANN BRENIER is currently a senior CNRS researcher at École Polytechnique. Deeply influenced by the works of Arnold, Ebin and Marsden on the geometric interpretation of Euler's equations of hydrodynamics, he introduced the concepts of generalized incompressible flows and polar factorization of maps, which played an important role in the development of optimal transportation theory in connection with partial differential equations and calculus of variations.



Jerrold E Marsden

About this series: This lecture series is dedicated to the memory of Jerrold E Marsden (1942-2010), a world-renowned Canadian applied mathematician. Marsden was the Carl F Braun Professor of Control and Dynamical Systems at Caltech, and prior to that he was at the University of California (Berkeley) for many years. He did extensive research in the areas of geometric mechanics, dynamical systems and control theory. He was one of the original founders in the early 1970's of reduction theory for mechanical systems with symmetry, which remains an active and much studied area of research today.