

CONVEX GEOMETRY & OPTIMAL MASS TRANSPORT.

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The purpose of this internship is to study an inverse problem on convex bodies in Euclidean space. It is well-known that many measures can be associated to a convex body, giving information on the shape of the underlying body, sometimes characterising it up to some simple geometric transformations. In this internship, the candidate will make use of optimal mass transport tools to solve the (generalised) Gauss curvature prescription problem for convex bodies. While the approach is somewhat "natural", we are however led to use a cost function which is not standard, thus requiring care and new technics to make classical tools of O.M.T. available. Recently, this approach has been revisited and put in a broader perspective through a concept of "strong c-concavity" that we also suggest to investigate during this internship.

Prerequisites:

Notions on optimal mass transport and convex geometry can save time but are not compulsory to complete the internship.

References:

- J. Bertrand Prescription of Gauss curvature using optimal mass transport, *Geometriae Dedicata* (2016).
- A. Gallouët, Q. Mérigot, and B. Thibert Strong c-concavity and stability in optimal transport, *J.M.P.A.* (2025)

Location & duration: IMT, 4 months.

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