1133-53-161 **Nina Miolane*** (ninamio78@gmail.com), 2004 route des lucioles - INRIA, Equipe-projet Asclepios, Batiment Fermat, 06902 Sophia Antipolis, France. *Estimation on manifolds: synchronization of rotations for cryo-electron microscopy.*

Cryo-electron microscopy is an imaging technique that allows to infer the 3D structure of a macromolecule, like a protein, in its native environment. A beam of electrons is transmitted through the protein. This produces several 2D images that are different projections of the protein's 3D structure. In order to reconstruct the protein's 3D structure from these projections, one needs to register these 2D images, i.e. one needs to estimate the 3D rotations that allow to map one onto another. The estimation of this sequence of rotations - also called synchronization of rotations - is a problem of estimation on manifolds. Manifolds are generalizations of vector spaces, on which usual linear statistics need to be redefined. In this talk, we see how the theory of estimation on manifolds allows to tackle the synchronization of rotations, and possibly of other geometric transformations. (Received July 23, 2017)