1106-62-356 **Xavier Pennec*** (xavier.pennec@inria.fr), Inria Sophia-Antipolis, Asclepiosteam, 2004 Route des lucioles, BP93, 06902 Sophia-Antipolis, France. *Riemannian and affine Structures for Geometric Statistics in Computational Anatomy.*

Computational anatomy is an emerging discipline at the interface of geometry, statistics and medicine that aims at analyzing and modeling the biological variability of the organs shapes at the population level. To reach this goal, one needs to design a consistent statistical framework on manifolds and Lie groups. The geometric structure considered so far was that of Riemannian geometry, for instance with (right) invariant metrics on groups of deformations. In parallel, efficient image processing methods based on diffeomorphisms parameterized by stationary velocity fields (SVF) have been developed with a great success from the practical point of view but with less theoretical support.

In this talk, I will detail the Riemannian framework for geometric statistics and partially extend if to affine connection spaces and more particularly to Lie groups provided with the canonical Cartan-Schouten connection (a non-metric connection). In finite dimension, this provides strong theoretical bases for the use of one-parameter subgroups. The generalization to infinite dimensions would grounds the SVF-framework. From the practical point of view, we show that it leads to quite simple and very efficient models of atrophy of the brain in Alzheimer's disease. (Received August 25, 2014)