1079-00-370 **Jasun Gong*** (jasun.gong@aalto.fi), Aalto University, Institute of Mathematics, P.O. Box 11100, 00076Aalto Helsinki, Finland, and **Thomas Bieske** (tbieske@mail.usf.edu), Department of Mathematics & Statistics, University of South Florida, 4202 E Fowler Ave, PHY114, Tampa, FL 33620-5700. *Opening Remarks on Sub-Riemannian Geometry and other Metric Spaces.*

This is an expository talk aimed at a general audience. It is intended as the background material for further presentations in this Special Session.

Our focus will be on sub-Riemannian manifolds, which are spaces equipped with smooth structures yet exhibit rather unique metric properties. In addition to their role in modern geometry, such spaces also arise in control theory and other applications, such as models of human vision.

Specifically we will address basic properties of sub-Riemannian manifolds, such as the Chow-Rashevskii and Ball-Box Theorems, along with several well-known examples such as the (first) Heisenberg group. We will also discuss the connection between these spaces and certain partial differential equations, a subject that will be further explored in later talks.

If time permits, we will also discuss metric spaces in greater generality. Despite the lack of smooth or Euclidean structures, a rich first-order theory of calculus remains valid for a large class of spaces, which leads to interesting problems in geometry. (Received January 18, 2012)