Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

MUΦ
Lehrstuhl X

Workshop

Differential Geometry and Applications

15. Januar 2020

Institute of Mathematics, Chair X, Julius-Maximilians-Universität Würzburg
Emil-Fischer-Straße 40, **Room 40.02.007**, Germany

10:00 - 10:30 Arrival with Coffee & Tea (Room 40.03.003)

10:30 - 11:30 **Fátima Silva Leite**, University Coimbra, Portugal

Least Squares Problems on Riemannian Manifolds

We will give an overview of several methods to generate geometric polynomials and other interpolating curves on non-Euclidean spaces, and present a variational approach to tackle least squares problems on Riemannian manifolds. Challenging problems arising in this context will be highlighted.

11:30 - 12:15 **Marisa Schult**, Julius-Maximilians-Universität Würzburg, Germany

Kähler Reduction for Arbitrary Regular Values and the Shifting Trick

In this talk, we revise the notation for the Marsden-Weinstein Reduction Theorem for symplectic manifolds before expanding the theory to a new type of manifold. We point out important constructions used in this process and finally re-introduce the resulting reduction theory for Kähler manifolds. Even though this reduction procedure is known for both cases it is as yet not clear if a related construction from symplectic geometry, namely the shifting trick, also works in the Kähler situation.

12:15 - 13:30 Lunch in Mensateria

13:30 - 14:30 **Irina Markina**, University of Bergen, Norway

Curves of Constant Curvature

The study of curves in surfaces having constant geodesic curvature is an old problem in differential geometry, whose origin can be traced back to classic works by Bianchi and Darboux. The problem of determining which curves have constant geodesic curvature in the more general setting of manifolds of dimension three or higher is more complicated. In many examples curves of constant geodesic curvature appear as images under Riemannian submersions of so-called normal sub-Riemannian geodesics. We give a characterization of the submersions from a sub-Riemannian manifold to a Riemannian manifold that map normal sub-Riemannian geodesics to curves with constant geodesic curvature. These submersions are precisely the ones for which the curvature operator is parallel in horizontal directions, with respect to any affine connection satisfying certain hypotheses.

14:30 - 15:30 **Knut Hüper**, Julius-Maximilians-Universität Würzburg, Germany

A Lagrangian Approach to Extremal Curves on Stiefel Manifolds

A unified framework for studying extremal curves on Stiefel manifolds is presented. We start with a smooth one-parameter family of pseudo-Riemannian metrics on a product of orthogonal groups acting transitively on Stiefel manifolds. In the next step Euler-Langrange equations for a whole class of extremal curves on Stiefel manifolds are derived. This includes geodesics with respect to different Riemannian metrics, but socalled quasi-geodesics as well. They all can be solved in closed form, meaning that closed form expressions for geodesics are available.

Knut Hüper