

**MATH 80750 - TOPICS IN DIFFERENTIAL GEOMETRY I:
SINGULAR RIEMANNIAN FOLIATIONS**

Term: Spring 2017
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Singular Riemannian foliations are special types of foliations in Riemannian manifolds, which generalize constructions like isometric group actions and Riemannian submersions. Initially introduced for their simple topology and dynamics, they have found fertile ground in Riemannian geometry, especially in connection with non-negative sectional curvature.

Although in general they do not come from symmetries of the ambient manifold, one can nevertheless recover a lot of classical results for isometric group actions in this more general setting (the quotient structure, the infinitesimal structure, invariant theory, ...).

The goal of this course is to introduce singular Riemannian foliations, understand their structure, and see some important applications in the study of manifolds with non-negative sectional curvature, submersions, and group actions.

This course assumes only a basic knowledge in Riemannian geometry (geodesics, geodesic completeness, Jacobi fields, curvature operator). Classes will be on Monday, Wednesday, Friday. The time will be decided together, trying to avoid schedule conflicts.

Possible topics might include:

- Local and global structure of singular Riemannian foliations.
- Structure of foliations along geodesics.
- Open manifolds with non-negative sectional curvature, and Wilking's dual foliation.
- Singular Riemannian foliations in Euclidean spaces, and their algebraic structure.

The basic material will be loosely based on the following sources:

- P. Molino, *Riemannian foliations*, Progress in Mathematics **73**, Birkhäuser Boston (1988).
- D. Gromoll and G. Walschap, *Metric foliations and curvature*, Progress in Mathematics, Birkhäuser, (2009).

For more specific topics, we will pick a selection of papers and preprints.