Friday 13 July 2018 – at 14:00 pm  
Seminar Room “-1” – Department of Mathematics  

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Finding Universal Differentiability Sets in Laakso Spaces  

Abstract:  
Rademacher’s Theorem states that every Lipschitz function is differentiable almost everywhere. The study of the inverse problem, i.e. finding a Lipschitz function that is differentiable at no point of a given null set, led to the definition of universal differentiability sets, UDS for short. Those are sets that contain a point of differentiability for each Lipschitz function.  

The existence of UDS of measure zero is already known for functions $f : \mathbb{R}^n \to \mathbb{R}^m$ with $n > m$ and for some particular classes of Carnot groups, like filiform groups. The goal of this talk is to address the problem in the case of Laakso spaces. They were first introduced as examples of Ahlfors $Q$-regular spaces admitting a weak $(1; 1)$-Poincaré inequality but not embeddable in any Euclidean space $\mathbb{R}^d$ for any $Q > 1$. This talk will try to shed light on Laakso’s work by expanding some of his proofs and by providing examples for the simplest cases. The last part will consist in results and insights aimed to extend the methods used for Carnot groups by Pinamonti and Speight to prove or disprove the existence of a measure zero UDS in the Laakso space.  

The seminar corresponds to the first year Ph.D. exam of the course “Advanced calculus of variations” of Prof. Pinamonti (Trento).  

Supervisor:  
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