



universität  
wien



## DK Seminar

Jan 18, 2017, 14:15 - 15:00  
Vienna University of Technology,  
Freihaus, green area, 4th floor

**Annalisa Iuorio**

Vienna University of Technology

### **Geometric analysis of logarithmic switchback phenomena in Micro-Electro Mechanical Systems (MEMS)**

Micro-Electro Mechanical Systems (MEMS) are defined as very small structures combining electrical and mechanical components on a common substrate to perform several tasks. Electrostatic-elastic devices in particular are characterized by the fact that an elastic membrane is allowed to deflect above a ground plate under the action of an electric potential. They have been mathematically modelled by a parabolic PDE with a particular nonlinear source term that can lead to the touchdown phenomenon. In recent years, a new model depending on a small regularization parameter has been proposed, where considering additional insulating effects allows to avoid singularities. The regularized model presents an interesting feature: the asymptotic expansion of the equilibria presents logarithmic switchback terms.

In this talk, we focus the attention on the analysis of this phenomenon by means of geometric singular perturbation theory and blow-up methods, revealing the interplay between asymptotic expansions and dynamical systems theory: the occurrence of logarithmic switchback is indeed caused by a resonance phenomenon.