Yuri S. Ledyaev and **Qiji J. Zhu*** ({ledyaev, ZHU}@wmich.edu), Department of Mathematics, Western Michigan University, Kalamazoo, MI, *Nonsmooth Analysis on Smooth Manifolds*

We study infinitesimal properties of nonsmooth (nondifferentiable) functions on smooth manifolds. The eigenvalue function of a matrix on the manifold of symmetric matrices provides a natural example of such nonsmooth function. In this talk we discuss how to use variational methods to derive subdifferential calculus for lower semicontinuous functions on smooth manifolds and illustrate its applications with selected examples including the calculation of subdifferentials for eigenvalue functions, constrained optimization problems on manifolds, generalized solutions of first-order partial differential equations on manifolds, and a criterion for monotonicity and invariance of functions and sets with respect to solutions of differential inclusions.