



Global COE 幾何学連続講義

# Aspects of Quantitative Topology



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**May 17th, 19th, 23rd, 2011**

**Room 110, Faculty of Science Building No. 3  
Department of Mathematics, Kyoto University**

**May 17th (Tue) 15:00-16:30**

**Lecture 1. Overview**

I will describe several classical problems of topology (related to homotopy, homeomorphism and isotopy of submanifolds) and discuss some of the issues involved in making these results quantitative. In particular, I plan to discuss the entropy of function spaces and its role in some variational problems, and Lipschitz constants and some remarkable conjectures of Gromov regarding them.

**May 19th (Thu) 10:00-11:30**

**Lecture 2. The bounded category, its extensions, analogues and applications.**

The bounded category of a discrete metric space is a basic object over which to organize  $C^0$  metric measurements; it is at the basis of bounded topology and the theory of bounded propagation speed operators. This lecture will introduce this category, and assert some of the main technical theorems about it (due to Quinn, Ferry-Pedersen, Roe, Yu and others) and describe some of its applications within topology.

**May 23rd (Mon) 13:30-15:00**

**Lecture 3. Rigidity of group actions on aspherical manifolds.**

Topological rigidity is one of the main phenomena in geometric topology: it is a cousin of the Mostow-Margulis theory in differential geometry. This lecture will discuss some topics from among the failure of the equivariant version of the rigidity conjecture, how such problems are related to the Baum-Connes conjecture for groups with torsion, a topological approach to Royden's theorem on the symmetries of the Teichmüller metric, and counterexamples to a conjecture of Conner and Raymond.

**These lectures are based on the joint works with Nabutovsky, Ferry, Cappell, Yan, and/or Farb.**