

**Talk title:** Higher homotopy normalities in topological groups

**Abstract:** Normal subgroup and its generalization crossed module appear in homotopy theory related to homotopy fiber sequences. Naive homotopy normalities had been introduced by McCarty and James, which are much weaker than the actual normality. To detect the higher obstructions to such normality, we introduce the higher homotopy normalities called  $N_{k(l)}$ -maps.  $N_{k(l)}$ -maps are defined by some complicated higher homotopy structures. But we show that they admit simple fiberwise homotopy theoretic characterization. We also study the higher homotopy normality of the inclusions  $SU(m) \rightarrow SU(n)$ .