Cascade Topology Seminar

2 Day Workshop
Scientific Schedule

Friday, July 15

9:00 - 10:00 Tony Elmendorf
Multiplicative structure in algebraic K-theory and stable homotopy

10:30 - 11:30 Keir Lockridge
The Generating Hypothesis in the Derived Category of R-Modules

Abstract In the stable category of spectra $\mathcal{S}$, the generating hypothesis is the following conjecture: If f is a map of finite spectra and $\pi_* f = 0$, then f is null homotopic. Though some progress has been made using the methodology surrounding the Nilpotence Theorem of Devinatz, Hopkins, and Smith, the conjecture remains open. An axiomatic approach to stable homotopy theory has led to the study of other triangulated categories from a homotopy theoretic point of view, and a natural extension of this study is to try to formulate and prove the generating hypothesis in these structurally similar settings. In this talk, we characterize the rings R for which the generating hypothesis is true in the derived category of R-modules.

15:30 - 16:30 Ralph Cohen
Spaces of Graphs and cohomology operations

17:00 - 18:00 John Palmieri
An application of topology to a problem in algebra: A_∞ algebras in ring theory

Abstract A_∞ algebras first arose in homotopy theory in work of Stasheff in the 1960s, and their study has mostly been confined to topology. In the past decade, though, algebraists have started to use them. In this talk, I'll discuss A_∞ algebras from the topological and algebraic points of view. and I'll discuss an application to a classification problem in algebra: the classification of four-dimensional Artin-Schelter regular algebras. (This is a report on joint work with D.-M. Lu, Q.-S. Wu, and J. J. Zhang.)

Saturday, July 16

9:00 - 10:00 Ryan Budney
Topology of spaces of knots in dimension 3

Abstract Let K denote the topological space of C^∞ smooth embeddings of $\mathbb{R}$ in $\mathbb{R}^3$ that restrict to a (fixed) linear inclusion outside of some (fixed) ball. We call K the space of long knots in $\mathbb{R}^3$. I will give a recursive description of the homotopy type of K, component-by-component. The path-components of K are the isotopy classes of long knots. First I'll describe an 'indexing' of these components in terms of finite, labeled, rooted-trees, based on the JSJ-decomposition of 3-manifolds. Via this indexing, the homotopy type of any path-component of K can be described in terms of iterating three elementary bundle operations related to such things as: free little 2-cubes objects from homotopy theory, and 'wreath product constructions' that use natural signed symmetric representations of the isometry groups of certain hyperbolic link complements of a 'brunnian type'.

10:30 - 11:30 Jens von Bergmann
A Non-Rational Variant of Contact Homology