Prof. Sylvain Cappell **(Courant Institute)**
Not your parents' (or advisors') characteristic classes....

These talks will begin by recalling numerical invariants of manifolds and then introduce generalizations of these to varieties, subvarieties, group actions and singularities of maps. We will then go on to introduce and survey new roles for characteristic classes and new formulae for them in all these settings. These will include various generalizations of characteristic classes to singular varieties, including approaches using intersection homology and other theories, to study invariants and classification problems. Relations to knot theory will be explored and relations to algebraic geometry will be touched on.

Prof. Ronald Fintushel **(Michigan State)**
Life in 4-dimensions

Smooth 4-manifold theory today bears little resemblance to the subject of 30 years ago. I will talk about some of the ideas that have helped to effect the change, high points of the theory, and questions that remain unanswered.

Prof. Rob Ghrist **(University of Pennsylvania)**
Examples of Applied Topology

Prof. Rob Ghrist **(University of Pennsylvania)**
Open Problems in Applied Topology

Prof. Eli Grigsby **(Boston College)**
Double branched covers, Heegaard Floer homology, and applications

Given a knot in S^3, one can construct a new 3-manifold (called the double branched cover of K) by gluing together two copies of the Seifert surface complement in a standard way. The construction is simple, yet (or, perhaps, therefore) surprisingly useful in addressing a variety of questions in low-dimensional topology. I will discuss a couple of ways in which double branched covers have appeared in questions that have interested me during my (short!) mathematical career. I will try to give an idea of how each question motivated the next and what I have (and haven't) learned along the way.

Prof. Matt Hedden **(Michigan State)**
My path through knot theory

Much of my research has, in some way or another, involved the study of knots. Whether for their own sake, the desire to understand their invariants, or for their relationship to three- and four- manifolds, knots have been a central focus of much of my curiousity since shortly after I began my graduate studies. The purpose of this talk is to share some of the questions that I've found interesting in this realm and how I came to study them. I'll also try to discuss some of the answers and the things that helped (or, in certain cases, impeded) me in their pursuit.

Prof. Rob Kirby **(UC Berkeley)**
Comments on graduate education.

Prof. Rob Kirby **(UC Berkeley)**
Broken fibrations for 4-manifolds.

I will discuss the existence and uniqueness theorems for broken fibrations of arbitrary orientable, smooth 4-manifolds over either S^2, B^2, or S^1x I. Existence always holds, and there is a nice set of moves relating different broken fibrations for a given 4-manifold.

Prof. Rafal Komendarczyk **(Tulane University)**
From contact structures to fluid flows.

There is an interesting connection between curl eigenfields and contact topology in dimension 3. This connection has inspired my thesis work and had a great influence on further research during my postdoctoral years. In this talk, I will describe the connection and how it leads to problems in topological hydrodynamics, contact topology and differential geometry, which I am curious about to this day.