# THURSDAY, APRIL 16
# Lockett 235

## 3:15 – 3:35

### The Wirtinger Presentation of Knot Groups

### Irina Craciun

Knot theory is currently one of the most important fields in topology, and knot groups are a central part of research in this field. Distinguishing between *equivalent* knots is one of the most important problems in knot theory, and knot groups are one of the possible tools we can use to solve this problem. Wilhelm Wirtinger was the first to introduce a presentation for knot groups, in 1905. His result is a powerful tool in knot theory, as it gives an easy method to derive a presentation for the knot group, given any knot diagram. We give a basic introduction to knots, followed by a brief presentation of Wirtinger's result. We will then discuss two of its most important applications in knot theory.

## 3:35 – 3:55

### Cluster Sets: How Bad Can the Discontinuities Be?

### Matthew Dawson

Consider a bounded, differentiable function $g : \mathbb{D} \to \mathbb{C}$, where $\mathbb{D} = \{z \in \mathbb{C} : |z| < 1\}$ is the unit disk in the complex plane. This talk will be concerned with the behavior of $g$ at the boundary of the disk. It can be shown that $g$ has radial limits at almost every point on the boundary of the disk, so we can think of $g$ as a function defined almost everywhere in $\overline{\mathbb{D}}$. Even though $g$ is differentiable on $\mathbb{D}$, it is possible for $g$ to have discontinuities on $\partial\mathbb{D}$. There are restrictions, however, on the type of discontinuity that $g$ can have; it can be shown, for instance, that $g$ cannot have a "jump discontinuity" on $\partial\mathbb{D}$. Cluster sets are a useful tool which can be used to generalize this result. This talk will introduce cluster sets and present one such interesting generalization given by Ricardo Estrada in his 2006 paper "One-sided Cluster Sets of Boundary Values of Analytic Functions."

**3:55 – 4:15**

## The Classification of $G$-Coverings

### Ying Hu

Given a semilocally simply connected, locally path- connected and connected space $X$, we have known that such a space $X$ has a universal covering space. Moreover, there is a one-to-one correspondence between the set of subgroups of $\pi_1(X, x)$ and the sets of connected covering spaces, up to the isomorphism of coverings. In the talk, a special kind of covering space, $G$-covering space, will be introduced, which is induced by a group action and may be disconnected. The main theorem in the talk will give a relation between $G$-coverings of $X$ and the group homomorphisms from $\pi_1(X, x)$ to the group $G$.

**4:15 – 4:35**

## Introduction to knot theory and the Jones Polynomial

### Dennis Hall

Distinguishing knots from one another is a central problem in knot theory. Some of the most useful methods for at least partially solving this so called "knot recoginition problem" are knot invariants, one of which is the knot polynomial. In this talk, we demonstrate the calculation of Kauffman's "bracket polynomial" and show how it may be used to efficiently compute the Jones polynomial for a given link diagram. We will also prove that the bracket polynomial is indeed invariant under Reidemeister moves II and III, as well as cover all needed basic knot theory terminology.