**Undergraduate Mini-Conference**
**Tuesday, July 18, 2017**
**1:00 - 4:00 p.m.**
**CL313**

- 1:00 - 1:20 p.m. **Alexander Nau** - From groups to C*-algebras

  *Abstract:* Important examples of C*-algebras arise from groups in natural ways. I will talk about those called group C*-algebras. If $G$ is a finite group, its left regular representation on the Hilbert space $\ell^2(G)$ will provide group algebra $\mathbb{C}G$ with a unique C-norm, resulting on a finite dimensional C*-algebra that has as many simple components as the number of conjugacy classes of G. In the case of an infinite discrete group G, C*-norms associated to $\mathbb{C}G$ are not necessarily unique, resulting in at least potentially two different C*-algebra structures for $\mathbb{C}G$.

- 1:30 - 1:50 p.m. **Thomas Stanley** - Reality based algebras of small rank

  *Abstract:* A reality-based algebra (RBA) basis is a basis for a $^*$-algebra satisfying associativity, identity, and pseudoinverse properties. Group algebras, adjacency algebras of association schemes and fusion rings are all special types of RBAs. This talk will discuss the requirements for an RBA-basis, as well as distinguish $C$-algebras and table algebras from general RBAs. Classification of rank $2$ and rank $3$ $C$-algebras will be determined from the requirements of an RBA-basis, allowing for enumeration of rank $2$ and $3$ C-Algebras of a given order. Similar classification can be extended to rank $4$ and rank $5$ $C$-Algebras, allowing for their enumeration as well.

- 2:00 - 2:20 p.m. **Eleanor Lekach** - Noncommutative Pontryagin Dualities

  *Abstract:* The Pontryagin Duality Theorem states that for a commutative locally compact group $G$, the evaluation map is an isomorphism between $G$ and its double dual $\widehat{\widehat{G}}$. Nevertheless, this result fails to be true for noncommutative groups. The generalization of this theorem into the noncommutative setting requires the consideration of other objects. One extension, which uses the theory of algebraic locally compact quantum groups, will be the focus of our discussion.

- 2:30 - 2:50 p.m. **Jhermi Pal Mehta** - On Cantor Sets

  *Abstract:* Introduced by Georg Cantor in 1883, the Cantor set is one of the most intriguing sets in mathematics, having many unexpected properties. In this presentation, I will describe some of these properties, as well as their applications to different areas of mathematics such as Set Theory, Topology, Measure Theory, and Functional Analysis. So, welcome to my cantor-esque talk for 20 minutes of intriguing excitement!

- 3:00 - 3:20 p.m. **Michael Chesterton** - Quantum Entanglement Measures

  *Abstract:* We shall introduce the concepts of entanglement and separability along with several axioms required for entanglement detection. My colleague Jason Zerr will follow with a talk concerning a specific type of entanglement measure.

- 3:30 - 3:50 p.m. **Jason Zerr** - An entanglement measure

  *Abstract:* A fundamental problem in Quantum Information is identifying entangled quantum states. In this talk, I will discuss a type of entanglement measure constructed by O. Rudolph. I will also be emphasizing its benefits upon other measures in detecting entangled states, and discussing other generalizations of this construction.

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Mathematics and Statistics