

Department of Mathematics and Statistics Colloquium

*Fixed points on character varieties of the torus*

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**Abstract:** A commonly recurring theme in mathematics is being able to tell if two objects are distinct, up to some equivalence. For example, in an algebraic context we can tell if two groups are different if one is abelian and the other is not. Properties such as these are called invariants. One such invariant of 3-manifolds is the Chern-Simons invariant, which has been widely studied over the last 80 years. When considering a specific class of 3-manifolds called mapping tori, one can instead study the fixed points of the induced automorphism on a character variety of the underlying surface. In this talk, I will describe the fixed-point sets for the character variety associated to various Lie groups, with a focus on how these fixed points change as the choice of  $G$  changes.

Monday, November 30 at 3:10 pm via Zoom

## Department of Mathematics and Statistics Colloquium

# *Regulating the Right to Bear Arms: A Statistical Analysis of Gun Control Policies and Gun Violence in the United States*

**Josie Messina**

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**Abstract:** In recent years, the United States has had increasing rates of gun violence and more frequently occurring mass shootings. While firearm violence is an issue internationally, the United States has arguably the worst gun violence of all developed countries. Gun control policies and their potential effect on gun violence rates have been debated for years; therefore, it is vital to determine which gun control policies would be effective at reducing gun violence rates in the United States. This analysis focuses on evaluating the relationships between gun violence and gun control policies in the United States. Multiple linear regression models were created for state firearm mortality, suicide, robbery, and assault rates in order to determine if gun control policies had a significant effect on reducing violence. Models were created for both 2005 and 2018 in order to see how gun violence rates and gun control policies have changed in past years. The majority of gun control policies in 2005 seemed to be ineffective at preventing gun violence. However, several gun control policies were shown to have a significant negative relationship with firearm mortality and suicide rates in 2018. Implications for future policy and recommendations for future studies are discussed.

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