



**Speaker:** Mark Colarusso  
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Thursday, April 3, 2014  
2:00 PM  
258 Hurley Hall

**Title:** GELFAND-ZEITLIN THEORY: WHERE LINEAR ALGEBRA,  
GEOMETRY, AND REPRESENTATION THEORY MEET

**Abstract:**

For an  $n \times n$  complex matrix  $X$ , we consider the eigenvalues of all the  $i \times i$  submatrices in the top left hand corner of  $X$ . These are known as Ritz values and play an important role in numerical linear algebra. In this talk, we will see how questions about Ritz values naturally lead to a study of the Gelfand-Zeitlin integrable system on the Lie algebra of  $n \times n$  complex matrices  $\mathfrak{gl}(n, \mathbb{C})$ . We will explain our results about the geometric properties of the system and indicate how they answer questions of Parlett and Strang about Ritz values. We will also show how this research provides the foundation for the geometric construction of a certain class of infinite dimensional representations of the Lie algebra  $\mathfrak{gl}(n, \mathbb{C})$  using the theory of quantization.