

**Speaker:** Jeff Hoffstein

**Title:** Theta functions on the  $n$ -fold metaplectic cover of  $GL(2)$  and the non-vanishing at the center of the critical strip of symmetric cube  $L$ -series.

**Abstract:** The well known Jacobi theta function has relatively unexplored generalizations to corresponding functions on the  $n$ -fold cover of  $GL(r)$ . I will describe how, in joint work with Junehyuk Jung and Min Lee, we prove that there are infinitely many Maass-Hecke cusp forms over the field  $\mathbb{Q}(\sqrt{-3})$  such that the corresponding symmetric cube  $L$ -series does not vanish at the center of the critical strip. This is done by using a result of Ginzburg, Jiang and Rallis which shows that if a certain triple product integral involving the cusp form and the cubic theta function on  $\mathbb{Q}(\sqrt{-3})$  does not vanish then the symmetric cube central value does not vanish. We use spectral theory and the properties of the cubic theta function to show that the non-vanishing of this triple product occurs for infinitely many cusp forms. We also formulate a conjecture about the meaning of the absolute value squared of this triple product, which is reminiscent of Watson's identity. In addition, I will discuss some of the remarkable and little understood properties of more general theta functions on the  $n$ -fold cover of  $GL(2)$  with  $n \geq 4$ .