1068-13-319 **Brett Barwick*** (barwicjb@mailbox.sc.edu). *An Algorithmic Approach to the Quillen-Suslin Theorem over* $\mathbb{Z}[x_1, \ldots, x_n]$. Preliminary report.

In 1976 D. Quillen and A. Suslin independently proved what is now called the Quillen-Suslin Theorem, resolving a famous question posed by J.P. Serre in 1955. The Quillen-Suslin Theorem asserts that every finitely generated projective module P over $k[x_1, \ldots, x_n]$, with k a field, is free. One can extend this result to any polynomial ring where the coefficient ring is a principal ideal domain, and so in particular it holds over $\mathbb{Z}[x_1, \ldots, x_n]$. However, given a presentation of a finitely generated projective $\mathbb{Z}[x_1, \ldots, x_n]$-module by generators and relations it is a nontrivial task to compute a free generating set. The problem of computing such a free generating set is equivalent to the problem of extending an $m \times n$ ($m \leq n$) unimodular matrix over $\mathbb{Z}[x_1, \ldots, x_n]$ to an $n \times n$ invertible matrix over $\mathbb{Z}[x_1, \ldots, x_n]$. This talk aims to give a brief overview of an algorithm presented by Logar-Sturmfels in 1992 which produces such an invertible matrix when the coefficient ring is a field, as well as some issues that arise in generalizing this algorithm to work over the integers. (Received January 20, 2011)