1086-05-1116 **Linnea LaMon**, **Audrey Lee-St.John** and **Jessica Sidman*** (jsidman@mtholyoke.edu), Department of Mathematics and Statistics, Mount Holyoke College, South Hadley, MA 01002.

Rigidity in CAD software: from algebra to combinatorics. Preliminary report.

In classical rigidity theory, fixed-length bars are connected to each other at flexible joints, resulting in a system of algebraic equations representing distance constraints between points. The rigidity of such a "bar-and-joint" framework has been studied by passing to the infinitesimal setting where a generic combinatorial analysis is possible. Bar-and-joint rigidity in the plane has a combinatorial characterization due to Laman, but remains challenging to understand in dimension 3. However, the related problem of characterizing the rigidity of a framework in $\mathbf{R}^n$ composed of full-dimensional rigid bodies connected by bars was solved in the 1980s by Tay and White and Whiteley. I will discuss a generalization of the theory of body-and-bar rigidity developed by Haller, Lee-St.John, et al, for structures arising in Computer-Aided Design software in which the set of allowed constraints is enlarged to include consideration of coincidences and angles between bodies. I will present constraint equations, the infinitesimal constraints, and a combinatorial analysis in 2 and 3 dimensions. This is joint work with Audrey Lee-St.John. (Received September 19, 2012)