1166-13-139 **Ashley K. Wheeler*** (awheeler@mtholyoke.edu), 415 Clapp Laboratory, Mount Holyoke College, South Hadley, MA 01075, and **Jessica Sidman** and **Will Traves**. *Geometric equations for matroid varieties.*

Each point x in $\mathrm{Grass}(r,n)$ corresponds to an $r \times n$ matrix A_x which gives rise to a matroid M_x on its columns. Gel'fand, Goresky, MacPherson, and Serganova showed that the sets $\{y \in \mathrm{Grass}(r,n) | M_y = M_x\}$ form a stratification of $\mathrm{Grass}(r,n)$ with many beautiful properties. However, results of Mnëv and Sturmfels show that these strata can be quite complicated, and in particular may have arbitrary singularities. We study the ideals I_x of matroid varieties, the Zariski closures of these strata. We construct several classes of examples based on theorems from projective geometry and describe how the Grassmann-Cayley algebra may be used to derive non-trivial elements of I_x geometrically when the combinatorics of the matroid is sufficiently rich. (Received February 16, 2021)