1154-90-133 **Jon Lee*** (jonxlee@umich.edu). *Aspects of Symmetry for Sparse Reflexive Generalized Inverses.* A generalized inverse of a real matrix A is a matrix H that satisfies the Moore-Penrose (M-P) property AHA=A. If H also satisfies the M-P property, HAH=H, it is reflexive. When A is symmetric, we may desire a symmetric H; while generally such a restriction on H may not lead to a 1-norm minimizing reflexive generalized inverse. Letting the rank of A be r, and seeking a 1-norm minimizing symmetric reflexive generalized inverse H, we give: a closed form when r=1 and when r=2 and A is non-negative; an approximation algorithm for general r. Additionally, our symmetric reflexive generalized inverse is structured and has guaranteed sparsity. H is ah-symmetric if AH is symmetric, and ha-symmetric if HA is symmetric. Seeking a 1-norm minimizing ah-symmetric (or ha-symmetric) reflexive generalized inverse H, we give: a closed form when r=1 and when r=2 and A satisfies a technical condition; an approximation algorithm for general r. Additionally, our ah-symmetric (ha-symmetric) reflexive generalized inverse is structured and has better guaranteed sparsity than obtained via linear programming. This is joint work with Marcia Fampa and Luze Xu. (Received August 13, 2019)