The Department of Mathematics presents
A Mathematics Colloquium
October 27, 4:00–4:50pm
Bond Hall 217

Speaker: Richard Gardner (WWU)
Title: Symmetrization

Abstract: The idea of symmetrization—taking a subset of Euclidean space (for example) and replacing it by one which preserves some quantitative aspect of the set but which is symmetric in some sense—is both prevalent and important in mathematics. The most famous example is Steiner symmetrization, introduced by Jakob Steiner around 1838 in his attempt to prove the isoperimetric inequality (the inequality which essentially explains why soap bubbles are spheres rather than some other shape). Steiner symmetrization is still a very widely used tool in geometry, but it and other types of symmetrization are of vital significance in analysis, PDE’s, and mathematical physics as well.

The talk focuses on symmetrization processes that associate to a given set one that is symmetric with respect to a subspace. In the first phase of an ongoing joint project with Gabriele Bianchi and Paolo Gronchi of the University of Florence, we consider various properties of an arbitrary symmetrization, the relations between these properties, and which properties characterize Steiner symmetrization. Several other well-known symmetrizations, such as Minkowski symmetrization and central symmetrization, will also be discussed. After briefly summarizing these results, we shall discuss the second phase, in which we attempt to understand the convergence of iterated symmetrals.

Refreshments provided by Prof. Berget