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Jeffrey J Langford* (jeff.langford@drake.edu), Des Moines, IA 50311. *Symmetrization of Poisson's Equation with Neumann Boundary Conditions.*

In this talk we prove isoperimetric-type inequalities for solutions of Poisson's equation using rearrangement methods. Specifically, among all functions f with fixed "size", we identify those which admit "biggest" solutions to the Poisson PDE

$$-\Delta u = f \quad \text{in } \Omega, \quad \frac{\partial u}{\partial n} = 0 \quad \text{on } \partial\Omega.$$

Here, we use the term "biggest" to mean those functions which exhibit largest convex means. We prove such isoperimetric-type results when Ω is a spherical shell, a sphere, and a hemisphere. As a corollary, we prove a conjecture of B. Kawohl from the mid 1980s. (Received September 25, 2012)