1106-VN-1067 **Eric J. Landquist*** (elandqui@kutztown.edu), Department of Mathematics, Kutztown University, Kutztown, PA 19530. *The Generalized Steiner Cable-Trench Problem with Application to Error Correction in Vascular Imaging.*

In this talk, we will describe the Cable-Trench Problem (CTP), which is an NP-complete graph-theoretic problem that establishes a continuum between the Minimum Spanning Tree and Shortest Path Tree Problems on a weighted graph. We will then define a natural extension of the CTP, called the Generalized Steiner CTP (GSCTP). In the GSCTP, a given subset of the vertex set of the original graph is required to be in the solution tree and each edge has two weights: a "cable" weight and a "trench" weight. The CTP and GSCTP were motivated by the problem of minimizing the cost to dig trenches and lay dedicated cables to connect buildings to a central hub. However, we will focus on the nontrivial and novel application of the GSCTP to the problem of eliminating false-positive results from micro-CT scans of a blood vessel network (vasculature). The vascular imaging problem requires one to digitally reconstruct the vasculature from a discrete set of points and the radii of the blood vessels at those points. Previous methods required manual correction. However, we will show that modifications to Prim's algorithm efficiently find very good approximations to exact solutions to the GSCTP, thus fully automating the error-correction process in our application to vascular image analysis. (Received September 10, 2014)