Methods of supervised classification seek to segment a data set into classes based on a priori knowledge. Classification techniques are used on a wide range of scientific problems such as handwriting recognition and determining how landscapes change over time. Supervised classification requires the user to provide the set of classes in the data set, as well as a training set for each class. The training set consists of a set of measurements for which its class is known. A classifier is built from the training data, which is then applied to new observations.

The support vector machine (SVM) is a well-known method for supervised classification and is well documented throughout the literature. In constructing an SVM classifier, it is possible to formulate it in such a way that a quadratic minimization problem arises, with both equality and bound constraints. Solving this problem quickly and efficiently has become a large area of research in recent years.

An introduction to classification, with a focus on image data sets, will be presented, followed by a derivation of the SVM classifier that yields the above mentioned optimization problem. Methods to solve the quadratic problem will be discussed and image data sets will be presented to visually demonstrate the SVM classifier and to compare performance of various constrained quadratic solvers, two of which the presenter developed.

Graduate Students are encouraged to attend.