1077-49-2113 **Rick Chartrand*** (`rickc@lanl.gov`). *Splitting algorithms for nonconvex, matrix optimization.*
In this talk we'll look at how large-scale, nonconvex optimization problems can be solved efficiently using a variable splitting approach. We'll apply these methods to the decomposition of a matrix D of high-dimensional data into a sum $D = L + S$, where L is of low rank and S is sparse. This gives us both a robust, low-dimensional model for our data, and a set of possibly large discrepancies from that model, which can contain interesting features. There are close analogies with the field of sparse signal reconstruction (known as *compressive sensing*), and as in that field, we find that a nonconvex optimization problem is able to give us a more useful decomposition.

To solve our nonconvex problems efficiently, we construct a new objective function, a sort of proximal analog of the ℓ^p quasi-norm, where $p < 1$. Our function is designed to make the minimization process computationally very efficient, with the algorithm also being parallelizable. Our featured example will be the decomposition of video. We'll see that L will be the stationary background, and S will contain only the moving objects, a result that is useful for surveillance applications, and that is interesting in that it arises from purely geometric modeling. (Received September 21, 2011)