5005-C1-12 **Patrick J. Wolfe*** (wolfe@stat.harvard.edu), 33 Oxford St., Rm. MD-129, Cambridge, MA 02138. *Bayesian Inference and Sparse Representations in Signal Processing.*

The coupling of high-dimensional geometry with sparse representations represents a confluence of two elegant and powerful notions in applied mathematics. This rich area has yielded a variety of important developments in recent years, with compressive sampling (CS) perhaps foremost among them. To a statistician, CS is about the difference between *data* and *information*. To an engineer, these ideas suggest natural connections to *coding* and *complexity*. However, even more is present than meets the eye; these same notions have a similarly beautiful interpretation in terms of model selection and Bayesian statistical inference, whereby prior knowldge regarding signal sparsity can also be turned to best advantage. In fact, the notion of sparse (and in some cases overcomplete) representations, along with associated algorithms for nonlinear estimation and shrinkage, has long seen wide use in application domains. Here we focus on this aspect of statistical modeling of natural sounds and images, and describe new advances in these areas. By using this viewpoint to describe issues faced by practitioners, such as missing data or more generally incomplete measurements, we attempt to close the loop with signal acquisition and processing under the CS regime. (Received April 03, 2007)