I will discuss fast and deterministic dimensionality reduction techniques for a family of subspace approximation problems. Let $P \subset \mathbb{R}^N$ be a given set of $M$ points. The techniques discussed find an $O(n \log M)$-dimensional subspace that is guaranteed to always contain a near-best fit $n$-dimensional hyperplane $\mathcal{H}$ for $P$ with respect to the cumulative projection error $\left( \sum_{x \in P} \|x - \Pi_{\mathcal{H}}x\|_2^p \right)^{1/p}$, for any chosen $p > 2$. The deterministic algorithm runs in $\tilde{O}(MN^2)$-time, and can be randomized to run in only $\tilde{O}(MNn)$-time while maintaining its error guarantees with high probability. In the case $p = \infty$ the dimensionality reduction techniques can be combined with efficient algorithms for computing the John ellipsoid of a data set in order to produce an $n$-dimensional subspace whose maximum $\ell_2$-distance to any point in the convex hull of $P$ is minimized. The resulting algorithm remains $\tilde{O}(MNn)$-time. (Received February 07, 2014)