Lecture 17 Outline:

1. Review: PCA

2. Review: Sparse PCA

3. Intro: Functional PCA

4. Non-Negative Matrix Factorization.
   (a) Decompose a matrix into two non-negative factors.
   (b) Interpretations & Applications - Archetypal analysis, soft clustering.
   (c) Continuous data optimization problem & algorithm.
   (d) Count data optimization problem & algorithm.
   (e) Properties.

5. Independent Components Analysis.
   (a) Decompose a matrix into a set of independent source signals and a mixing matrix.
   (b) Interpretations & Applications - blind source separation, denoising.
   (c) Algorithms - Entropy vs. Negentropy.
   (d) Properties.

6. Multi-Dimensional Scaling.
   (a) Represent distances between points in a lower dimensional space.
   (b) Stress functions.
   (c) Properties.

7. Real data example: Digits.

8. Comparative Strengths & Weaknesses: PCA, SPCA, ICA, NMF, MDS.