

Title: **Principal Component Models for Sparse Functional Data**

Author(s): **Gareth James and Trevor Hastie**

Technical Report number (Dept. of Statistics, Stanford Univ.): **204**

Date: **May 1999**

Abstract:

Data often arrives as curves — functions sampled at regular times or frequencies. *Functional principal components* (Ramsay and Silverman, 1997) can be used to describe the modes of variation of these functions.

In many situations we do not get complete measurements of the individual curves. For example, growth curves are sampled functions, consisting of measurements such as bone density at different ages in a child's development. These measurements are often taken at an irregular and sparse set of time points, which can differ widely across individuals.

We develop principal component models for representing the modes of variation of these curves. These models are estimated in a reduced-rank mixed-effects framework.