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Estimation and Analysis of Platelet-Analogue Concentration Profiles in Blood Flow, J. Shane Kippenhan*, Joachim H. Nagel, Eugene C. Eckstein, Dept. of Biomedical Engineering, University of Miami, Coral Gables, FL 33124, USA.

Radial concentration profiles of platelet-sized particles in blood flow through small tubes were estimated from groups of observations of particle distances from tube walls. Methods based on the kernel method of probability density estimation allowed easier quantitative characterization of the near-wall peak that often occurs in the distributions; such peaks were difficult to quantify with previous histogram methods. These methods also yielded a higher spatial resolution of the distributions' features.

Additionally, curve fitting of the Fourier transform of the density estimates was used to model the experimental data. This Fourier transform represents the "characteristic function" that describes all moments (mean, variance, etc.) of the data's distribution. Such analytical descriptions of the distributions, based on two or three parameters, enable compact representations of sets of data, thus facilitating the study of the relationship between these parameters and rheological conditions.

The above methods can be applied whenever handling data that consists of lists of numerical observations in one or more dimensions.