

**Meeting:** 999, Nashville, Tennessee, SS 2A, Special Session on Wavelets, Frames, and Sampling

999-43-266            **Derek Bruff\*** ([bruff@fas.harvard.edu](mailto:bruff@fas.harvard.edu)), Department of Mathematics, One Oxford Street,  
Cambridge, MA 02138. *Wavelets on Nonuniform Knot Sequences.*

A traditional wavelet basis generated by the shifts and dilations of a single wavelet can be considered to be centered on the knot sequences  $\{a^j\}_{j \in \mathbb{Z}}$ , where  $a^j = \{i2^{-j}\}_{i \in \mathbb{Z}}$ . These knot sequences possess both shift-invariant uniformity, that is, the points in each knot sequence  $a^j$  are uniformly spaced, and scale-invariant uniformity, that is, the knot sequence  $a^{j+1}$  can be constructed in a uniform manner from the knot sequence  $a^j$ . The research presented in this talk develops techniques for constructing generalized wavelet bases centered on nonuniform knot sequences, that is, knot sequences lacking one or both of shift-invariant uniformity and scale-invariant uniformity. It is hoped that representing a given function in terms of a generalized wavelet basis centered on well-chosen knot sequences can yield a better representation of the function than in an equivalent uniform setting. A simple data compression example is presented as evidence supporting this assertion. (Received August 24, 2004)