1067-Y5-1611 **Patrick J Van Fleet*** (pjvanfleet@stthomas.edu), 2115 Summit Avenue #OSS201, Department of Mathematics, University of St. Thomas, St. Paul, MN 55105. *Wavelets and Lifting.* Preliminary report.

The discrete wavelet transformation is an important tool in applications involving signal processing. Applied to a signal of length N, the discrete wavelet transform returns a length $N/2$ lowpass response and a length $N/2$ highpass response. Due to the sparse nature of the matrix representation of this transformation, fast algorithms exist for its implementation.

A highly efficient way to implement the transformation is through *lifting*. This algorithm, due largely to Wim Sweldens, begins by computing the highpass response and then *lifts* the lowpass response from part of the original data and the highpass response.

For particular lowpass/highpass filter pairs used to construct the transformation, it is straightforward for students to derive the lifting algorithm. For those other cases, Sweldens provides a theorem that describes how the algorithm can be constructed. This derivation requires some knowledge of Fourier series and the Euclidean algorithm. We have found that the implementation of Sweldens' result for some filter pairs leads to a interesting undergraduate project.

In this talk, we will outline the algorithm and describe how it can be formulated as a project for students who have some background in Fourier series and wavelets. (Received September 21, 2010)