

Curvelets and imaging

Instructor: Hart Smith (University of Washington)

This series of talks will give an introduction to the mathematical theory of curvelet frames, with an emphasis on applications of interest to the seismic imaging problem.

We will start a discussion of the decomposition of phase space behind the notion of curvelets, and explain why curvelets are useful for studying the propagation of waves, as well as for the sparse representation of data with sharply defined wavefronts. We will discuss both the generator point of view (using curvelets to solve the wave equation), as well as the integrated point of view (using curvelets to sparsely approximate wave propagators represented in oscillatory integral form.) We conclude with recent joint work with deHoop and Uhlmann, in which more precise approximations to the action of the wave propagator on a curvelet can be obtained by considering quadratic expansions of the phase

This mini-course will be accompanied by a computer lab involving expansions and representations of functions within a curvelet frame.