Summer Graduate School
Teaching Plan

Overall Title: Phase space methods in exploration seismology

Lecture 1: Concepts and tools
    Physics of the seismic wavefield, ray theory, multidimensional Fourier transforms, phase space of a wavefield, pseudodifferential operators as generalized convolution operators, pseudodifferential operator calculus, Gabor transform, Gabor multipliers, stationary limits.

Lecture 2: Attenuation corrections; Gabor Deconvolution
    Mechanisms and characteristics of seismic attenuation, minimum phase, Wiener's method for the stationary problem, measuring apparent attenuation with the Gabor transform, extending Wiener's method using Gabor theory, examples of Gabor deconvolution, limitations and current research problems.

Lecture 3: Wavefield extrapolation in heterogeneous media: depth migration
    Wavefield extrapolation mathematics, the PSPI idea and its generalization, wavefield marching schemes, shot record depth migration, the Schwarz kernel of the GPSPI operator, compactly supported approximations and instability, a stabilizing Wiener filter, depth migration examples, current research problems.