# Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 16 October 2019, 4:00 p.m.

## Wave Propagation in Inhomogeneous Media: An Introduction to Generalized Plane Waves

Lise-Marie Imbert-Gerard
University of Maryland College Park

**Abstract.** Trefftz methods rely, in broad terms, on the idea of approximating solutions to PDEs using basis functions which are exact solutions of the Partial Differential Equation (PDE), making explicit use of information about the ambient medium. But wave propagation problems in inhomogeneous media is modeled by PDEs with variable coefficients, and in general no exact solutions are available. Generalized Plane Waves (GPWs) are functions that have been introduced, in the case of the Helmholtz equation with variable coefficients, to address this problem: they are not exact solutions to the PDE but are instead constructed locally as high order approximate solutions. We will discuss the origin, the construction, and the properties of GPWs. The construction process introduces a consistency error, requiring a specific analysis.