1093-65-346 **David Nicholls*** (`davidn@uic.edu`), Department of Math, Stat, and CS, University of Illinois at Chicago, 851 South Morgan Street (MC 249), Chicago, IL 60607, and **David Ambrose**. *Fokas Integral Equations for Layered Media Scattering.*

In this talk we describe a class of Integral Equations to compute Dirichlet-Neumann operators for the Helmholtz equation on periodic domains inspired by the recent work of Fokas and collaborators on novel solution formulas for boundary value problems. These Integral Equations have a number of advantages over standard alternatives including: (i.) ease of implementation (high-order spectral accuracy is realized without sophisticated quadrature rules), (ii.) seamless enforcement of the quasiperiodic boundary conditions (no periodization of the fundamental solution, e.g. via Ewald summation, is required), and (iii.) reduced regularity requirements on the interface profiles (derivatives of the deformations do not appear explicitly in the formulation). We show how these can be efficiently discretized and utilized in the simulation of scattering of linear acoustic waves by periodic layered media which arise in geoscience applications. (Received August 20, 2013)