

1106-41-1102      **Laurent Demanet\*** (demanet@gmail.com). *Matrix probing and some of its applications.*

Matrix probing is a method of recovering a structured matrix from its applications to a few random vectors. Probing is a useful tool to produce semi-analytical, efficient expansions of the kernel of integral operators that stem in various ways from linear nonuniform-coefficient PDE. I will first explain the setting in which probing is provably successful, then cover two applications in numerical analysis: 1) preconditioning of the so-called wave-equation hessian, and 2) representation of the exterior Dirichlet-to-Neumann map for the Helmholtz equation, which encodes an exact absorbing boundary condition. Joint work with Jiawei Chiu and Rosalie Belanger-Rioux. (Received September 10, 2014)