1139-35-269 **David Jerison*** (jerison@math.mit.edu), Room 2-272, Department of Mathematics, MIT, Cambridge, MA 02139. *Localization of eigenfunctions via an effective potential.*

We discuss joint work with Douglas Arnold, Guy David, Marcel Filoche and Svitlana Mayboroda. Consider the Neumann boundary value problem for the operator

$$L\,u = -\mathrm{div}(A\nabla u) + Vu$$

on a Lipschitz domain Ω and, more generally, on a manifold with or without boundary. The eigenfunctions of L are often localized, as a result of disorder of the potential V, the matrix of coefficients A, irregularities of the boundary, or all of the above. In earlier work, Filoche and Mayboroda introduced the function u solving $Lu = 1$, and showed numerically that it strongly reflects this localization. Here, we deepen the connection between the eigenfunctions and this *landscape* function u by proving that its reciprocal $1/u$ acts as an *effective potential*. The effective potential governs the exponential decay of the eigenfunctions of the system and delivers information on the distribution of eigenvalues near the bottom of the spectrum. (Received February 13, 2018)