

Senior Honors Class: Mathematical Wave Dynamics
Spring 2004 — Oliver Bühler & Alexander Barnett
Project areas. March 2, 2004.

1. Resonances of 2D cavities, Kac's problem, 'quantum chaos'
2. Sobolev's problem fo dispersive waves in a tank (aka lake problem)
3. 1D scattering problems, Quantum Mechanics
4. Optical and acoustical black holes
5. Traffic flow, including cellular simulations.
6. Waves on beaches, including storm swell and tsunamis
7. Nonlinear Schrödinger Equation
8. Theoretical (reading) projects on caustics, Fermat's principle, Hamilton-Jacobi, solitons
9. Wave scattering and coherence loss in random media
 - Harvard atom optics group collaboration
 - 2D smooth random potentials, electron flow
10. Sea ice dynamics in 1D using Lagrangian method