The Influence of Dielectric Imperfections on the Optical Properties of 1D and 2D Photonic Crystal Structures KARLENE MASKALY, MIT and LANL, W. CRAIG CARTER, MIT, JAMES MAXWELL, RICHARD AVERITT, LANL — Both 1D and 2D photonic crystals have become extremely useful tools in the optics industry due to the presence of wavelength-tunable photonic band gaps. However, little is known about the optical effects of dielectric imperfections, such as interfacial roughness, in the geometry of these structures. We have employed a Finite Difference Time Domain (FDTD) code to explore this problem and gain further insight into the effect of such imperfections on the optical properties of both 1D and 2D photonic crystal geometries. Imperfections that have been explored include: interfacial roughness and surface scratches in 1D photonic crystals, and aspherical holes in 2D photonic crystal structures. We present the effects of these imperfections on the reflectivity of the photonic crystal structures for wavelengths corresponding to the perfect structures’ photonic band gap. We also provide a parameterized fit to quantify the results and aid in tolerance estimations.