Defects determine critical properties of crystalline materials even though they occur at relatively low concentrations. They can interact over long distances through slowly decaying fields whose strength depends on the electronic structure of the core. Thus the study of defects requires electronic resolutions with continuum range. This talk will provide an introduction to density functional theory -- the method of choice in studying electronic structure, and then describe an approach that enables the computation of electronic structure of solids at continuum scales with no a priori ansatz or ad hoc patches.