Supernova explosions are among the most violent events to occur in galaxies and drive powerful shock waves into the surrounding medium. These supernova remnants are powerful sources of non-thermal radiation and are widely believed to be the sources of the Galactic Cosmic Rays. Current theories about the acceleration of galactic cosmic rays do have some problems, in particular with the maximum particle energies (which were just a bit too low) and the extent of the predicted shock precursors (which appear to be too large). Recently it was realised that magnetic field amplification in shocks could remove many of these problems. One of the simplest ideas for amplifying the magnetic field is the notion that the field can be wound-up by post-shock turbulence which can be driven by, for example, a non-uniform density distribution in the medium surrounding the supernova. In the first phase of this project we will perform simulations of shocks moving into a medium with a random density distribution and determine the resulting amplification of the magnetic field. Since this process is inevitable it represents in some sense the minimum possible field amplification. It is therefore important to quantify it and understand it before moving on to more complicated processes. More challenging, and potentially even more interesting is the idea that turbulence (and thus field amplification) could be driven upstream in the shock precursor by a mechanism similar to the acoustic instability studied by Drury and Falle. This will be investigated in a second phase of the project.