Title: Mathematics of the Faraday cage  
Speaker: Dave Hewett  
Abstract: Everybody has heard of the Faraday cage effect, whereby a wire  
mesh serves to block electric fields and electromagnetic waves.  
Remarkably, despite 180 years having passed since Faraday originally  
reported his experimental results, there does not seem to exist in the  
scientific literature any satisfactory mathematical analysis of how the  
strength of the shielding effect depends on the basic properties of the  
cage, namely the mesh spacing and wire thickness. In this talk I will  
describe some of our recent investigations into this beautiful problem,  
using a range of different mathematical tools including multipole  
expansions, conformal mappings, integral equations and numerical  
quadrature, energy functional minimization, and continuum approximation  
by the method of multiple scales. This is joint work with Jon Chapman  
and Nick Trefethen.