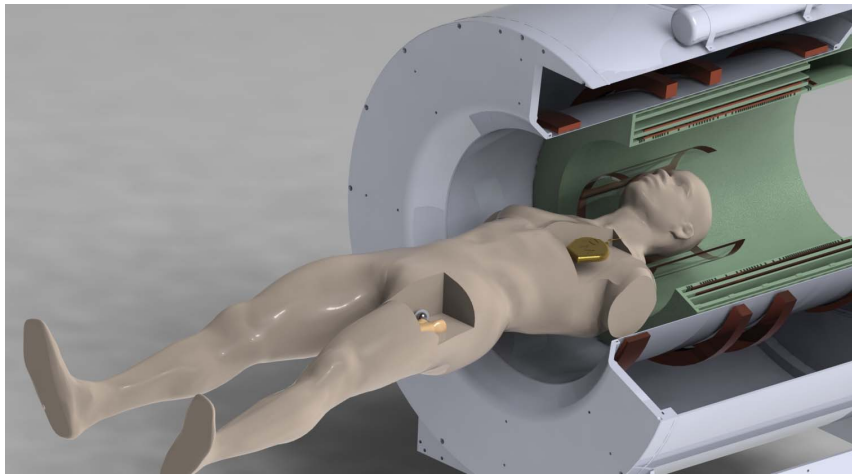


Gradients are complex, expensive and difficult things to design and fabricate. When designing a gradient coil there are many considerations: gradient strength, inductance, image region size, homogeneity, noise, duty cycle, eddy currents, peripheral nerve stimulation and ease of manufacture. An electromagnetic design that effectively takes many of these factors into account is a Boundary Element Method<sup>[1]</sup>, which has been extended to allow great flexibility in design.

The realization of a design demands accurate modeling and CAD, precision machining and assembly and ends when the resultant coil is typically filled with epoxy to hold it all together.

We will look at:

- what we want gradient coils to do in an MR system
- how they are designed
- how they are made
- how well they do their job
- what the current limitations are



[1] M. Poole, R. Bowtell, Concepts Magn. Reson. B. 31B, 162-175 (2007)