Name: Professor Mark Chaplain

Job: Mathematical Biologist

Mark works developing models of cancer growth. He applies his knowledge of mathematical theories to develop predictive models. The purpose of these models is to suggest how cancer cells are directed in their movement when spreading through tissues of the body.

The job involves The job involves taking measurements that indicate cancer growth – such as blood vessels multiplying around a tumour or the invasion rate of cancer cells into other tissues. This data can be used to find a mathematical description of what is taking place during the growth of a cancer.

Benefit of the work: When a model for cancer growth is accurate enough to match the real activity of a spreading cancer in a patient - then these mathematical concepts can be used to predict the age of a tumour, or, how rapidly cancerous cells may spread and invade surrounding tissues. This helps with deciding possible courses of treatment for cancer patients.

Think you might be interested? Here are some of the skills you might need.

Personal skills or aptitudes:

- An enjoyment of problems that require imagination for the prediction of possible outcomes.
- A fascination of situations where changing one variable can lead to multiple possible outcomes
- An ability to think in 3-dimensions
- An interest in patterns (especially number patterns).

Key skills:

- Numeracy
- Communication – for describing models in words
- ICT – software can help, letting you see the effect of influencing factors, such as blood pressure on cancer growths
- Problem solving
- Teamwork – you have to work with others, this sort of research relies on cooperation between several experts
- Improving your own learning and performance – making changes in your approach to tackling a problem.

Skills Build

First steps – moves you can take now

Play games! Enjoy number puzzles and games that require imagination and a prediction of possible outcomes, chess is one such game – a Sims computer game, another. Several sports also require predictive skills – golf and snooker, for example. You can build up your broad interest and knowledge base in the sciences reading snips from New Scientist and the Planet Science website. Find out the present limits of knowledge in different research fields and where the gaps are!

On to the second level

Doing maths can give a lot of enjoyment and satisfaction – seeing patterns emerge from figures. A double science background at GCSE is a must – plus English, to explain the data and models to people who don't think in abstract number patterns, but who can see the value of the work. A GCSE in art and design or design technology is also useful.

Third floor

Applied maths and pure maths, studied to A level are top requirements. Add chemistry and biology or physics, or a subject that demonstrates your skill with English language.

Fourth floor

Carrying on studies in maths to degree level can take you into areas of research where there aren't any more answers. Now you reach the think-tanks - the real hothouses of ideas that flow out for proof through practical testing.