

**Name:** Professor Chris Hunter      **Job:** Theoretical chemist

**Chris works** on the relationship between a substance's chemical composition and the way in which the chemical works in bonding or reacting with other molecules in chemical and biological systems.

**The job involves** studying the surface features of giant molecules and trying to understand the structure on the molecule's surface. Molecular structures can be studied with X-rays or by giving chemicals a radioactive tag that is traced through the course of one or more reactions. Almost all biochemical reactions work in the presence of a catalysing or speeding-up agent. Theoretical chemists take into account all the evidence that helps them work out exactly how such reactions take place.

**Benefit of the work:** If we know how enzymes (the biological catalysts that speed up chemical reactions in living cells) work, then we can discover points where a chemist could intervene – either to slow the rate at which substances react together – or to speed up the process. This is vital in the treatment of many medical conditions.

### Personal skills or aptitudes:

- Creative understanding
- 3-D imagination and awareness
- Curiosity – the desire or need to know

### Skills Build

#### First steps – moves you can take now

Think about how 3D structures are formed. This kind of work is fun for people who love sculpture, making 3-D models and building in Lego or Meccano. Experiment with all the possible and the impossible shapes – the structures that work and the ones that collapse.

#### Third floor

It's necessary to absorb as much basic scientific knowledge as possible. This is going to be a platform for launch-off to a lifetime doing work you find fascinating. You'll need to study chemistry, physics and maths, because the theoretical concepts in the last two support chemistry. Chemists use software to do their calculations – but, in the end, someone has to check their calculations are within the right order of magnitude.

### Key skills:

- Numeracy – the power of numbers runs through theoretical chemistry
- Problem solving – the work is all about this
- ICT capability is essential also
- Communication – for the times when you have to describe your research results.

#### On to the second level

To progress as a chemist, you need the basic groundwork in place – GCSE in double science, even the three separate sciences, if you can. GCSE maths, design technology and English are also important.

#### Fourth floor

For degree-level study in chemistry, you'll need two good A levels: chemistry with, preferably, maths, plus five GCSEs at grade C or above. Entrants do come through a vocational route – taking a BTEC National Diploma in science or VCE in applied science, but the GCE A level course in chemistry covers more theory – which can be a help. A theoretical chemist usually spends further years studying in a chosen field of interest.



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