

Sciences at Univ



Dr Andrew Bell, Senior Tutor: Hello and welcome to the University College, Oxford, Virtual Open Day. My name's Andrew Bell, I'm the Senior Tutor here at Univ and, as Senior Tutor, I have a general responsibility for all academic matters including teaching, learning and undergraduate admissions. I'm very sorry not to be able to welcome you in person, I wish that I could. And my thoughts go out to everyone who is struggling as a result of the pandemic.

I'm particularly aware of the challenges faced by students and by their teachers, their parents and their carers and I wish you all the very best. Thanks for taking the time to find out a bit more about the College and the University today and I hope very much that you find the resources we've made available to you helpful.

In a moment you're going to hear from some of our tutors who are going to talk about teaching and learning in their subjects. We've not got every subject represented because, well, we've got a lot of subjects on offer but nonetheless I hope that those who you do hear from will be able to give you a meaningful sense of what it's like to be a student here. We've got a lot of courses and of course they've all got their own subject specialities but they've got a few things in common with each other. They're all of them wide-ranging, they're all of them fast moving, they're all of them introduce students to new materials, which they're very unlikely to have encountered before. And all of them are concerned with questions, with problems, with analyses and with techniques and so this means that we're very interested in a student's individual engagement with and individual response to their course. All of the tutors whom you're going to hear from teach in small groups a lot of the time. They teach in a very discursive way and students engage very actively with the material that they're studying. This is what we call the tutorial system and it's one of the things that makes an Oxford education so special. I hope very much that as a result of what you hear today you decide you'd like to find out more and I'd be absolutely delighted if you decided you wanted to study with us.

Our students come from a wide range of backgrounds. They're all very different people and they have their own individual reasons to be here. But I think there's one thing that they all have in common. They take their subjects very seriously and they all take themselves seriously. If that sounds like you, I'd be really delighted if you decided you wanted to apply. In any case, I hope very much that you have fun exploring the courses that we've got on offer and I really hope that this gives you some interesting things to think about and some things to follow up on in the future. Good luck!

Professor Nick Yeung, Tutor in Psychology: Hi, my name is Nick Yeung and I'm the psychology tutor at Univ. I teach psychology students who are doing the degree in Experimental Psychology but also who are doing the Psychology jointly with Philosophy and Linguistics and also students taking psychology courses as part of their degree in biomedical sciences — quite a range of different students with different backgrounds and interests.

My lectures are mostly on cognitive psychology, so the psychology of human thinking with a particular focus on learning and memory. And I do tutorial alongside those and the general introduction to the psychology course and our tutorials in psychology tend to be quite tightly linked to the lecture courses so the way we typically run our course is that there's a handful of lectures at the start of the week for each course that will introduce the topic and give some of the research background. Then we'll have a tutorial at the end of the week where in between the students will

have attended the lectures and read some textbook chapters and some research articles during the week and then written an essay that we then discuss in the tutorial at the end of the week.

Dr Martin Galpin, Tutor in Mathematics for Chemistry: My name's Martin Galpin and at Univ I'm one of the chemistry tutors and I specifically teach the maths course for the first year chemists. I'm also a lecturer in the Chemistry Department. I give lectures in maths to all the 180 or so students we take a year in the department. And I'm also the Deputy Director of Studies for the Chemistry Department as well.

So, at Univ I have a tutorial with my students once a week. We have a problem sheet that looks something like this and it's covering the material that the students have been shown in lectures. The first few problems are making sure the students have really understood the basics. Those problems look quite similar to examples the students have been shown in lectures. And then what we try and do is develop the problem-solving skills by showing them and getting them to work out problems that they've not seen before and helping them through that process. To the point that near the end of the sheet there's usually quite a nice challenging fun question at the end, which really pushes the students beyond their comfort zone. And that's the ones, the questions the students really learn the most from in fact.

So, it takes about three hours or so for the students to do each of these sheets. We ask the students when they start off make sure you start off doing it by yourself because you're the one who's going to have to do the exam at the end of the day. But the great thing about the college system is that the students have their friends around them who are doing the same work and they know those other students very well so all of the students can kind of help each other get through it and give them hints and all that sort of thing, which makes a real difference and the students definitely benefit a lot from talking to their friends and we strongly encourage them to do that.

When we come to the tutorials, the students hand their work in then they come along the next day. I have maybe three students at a time, I sit there with the paper and a pen, I act as the scribe. They tell me what they want to cover, they tell me what questions they got stuck on then I can go round and talk to each student individually and point out the bits they got wrong maybe the bits they didn't quite understand, that sort of thing. Then what we try and do is we have a bit more of discussion about the bigger picture. I try and get them to think about the different ways in which we can connect aspects of the subject together to really make sure they understand how this material is really working.

The best thing is when the students come along and they have their own questions to ask. We can answer those we can really target the tutorial to exactly what the students want to cover. And sometimes, and this is the really great bit, they come along and they ask me a question I don't know the answer to immediately. So we can then sit down with a pen and paper and we have a bit of a discussion and try to figure it out between us. And that's really really good fun.

So, the tutorials are fantastic for teaching the material obviously the course material. The other thing they do really well is develop the students' problem-solving skills and their communication skills and for that the tutorial system is really really really unique.

Professor Catherine Pears, Tutor in Biochemistry: Hi, my name is Catherine Pears and I'm the biochemistry tutor at University College. So I teach a number of biochemical topics to Biochemistry and Biomedical Sciences students. I also run a research lab. My particular research interests are in stem cells and how they differentiate into particular cell types so how a stem cell may be turned into a liver cell or a skin cell or whatever and how we might control that.

So practical skills are a really important part of any scientific subject and in Biochemistry we make sure we integrate these skills right the way through the four years of the course. In the first year the students spend a day a week in the lab. They get to see the experiments in advance and answer one or two questions so that they've sort of thought about what they're going to do. Then they spend a fun day in the lab usually working with a partner and having demonstrators to help them out, encourage them through the experiments. After that's over they have to analyse the data and write that up as a short report because data analysis and clear presentation of data are important skills for any scientist.

Those skills are really built on in the second and third years when the students spend longer periods of time in the lab and increasingly design their own experiments so they're asked a particular question that they have to address thinking about the controls and the experiments that they need to set up to answer that particular question and really that's leading up to the fourth year when the students spend, currently, 23 weeks full-time in the lab really focusing on a single research project so this is real genuine research nobody knows what the answer is, there is no answer and so the students are designing experiments and thinking about how their work will integrate with other work that's going on in the research group in order to answer a particular question. And again, this is written up and presented as part of their sort of final year examinations.

So, as well as learning lots of skills such as the presentation skills and data analysis the students are learning to work as a team, which is very important to work with others to answer a question and they're also having a lot of fun and so the experimental design and classes are good fun. You get to meet a lot of people, other Biochemistry students obviously but also the demonstrators and interact with people in the research labs and just enjoy spending time doing experiments as well as learning these different skills.

Dr Marina Filip, Tutor in Physics: Hello everyone, my name is Malina Filip. I am an Associate Professor in Condensed Matter Physics and I'm also a Tutorial Fellow in Physics here at Univ. I will be teaching first year electricity and magnetism tutorials next year and also third year condensed matter physics tutorials.

Apart from teaching, my job has a large element of research. My research field is called first principles computational material modelling. What I am interested in is understanding the properties of materials, which are very useful for applications such as solar cells or LED. The catch is that I actually don't perform any experiments in my research so what I actually do is I use computer codes and high-performance supercomputers to solve very complex quantum mechanical problems that allows me to predict how a material interacts with light, how it interacts for example with an external electric or magnetic field. And so, I use these predications to either compare with experiments that have been performed by my colleagues or if those experiments have not yet been performed or indeed if the materials that I'm looking at don't even exist and what I do is try to direct future experiments towards interesting phenomena or interesting new materials.

Professor Nick Yeung, Tutor in Psychology: So, aside from my teaching in the psychology degree at Univ, I spend the other half of my time doing research. And my research is into the psychology of human learning and human decision-making and so I look at topics like how do people come to decisions and how do they evaluate the decisions to know whether they are good or bad ones. Some of that work, some of that research is quite conceptual and technical so I do human brain imaging recordings mostly with EEG and I build computer models of how people make decisions and how they learn but some of the work is also quite applied. So, for example, I'm currently doing a project with some people at the hospital looking at how we can improve medical training and some other research working with computer scientists looking at how we can help people to work effectively with artificial intelligence systems that are becoming increasingly important in the modern world.

And my research definitely interacts with the way I teach and informs the way I teach. So I think that aside from the kind of specific details of the content that you learn in a university course the most important general thing that we teach in university and that universities are for is teaching students, people, how to think about problems, difficult problems where the answer is not known. And fundamentally that's what research is about thinking about a difficult problem where we don't know what the answer is yet and we don't even know how to think about what the answer might be or how we might go about finding the answer.

And so in my research, in my job as a researcher I think about how to analyse a difficult problem, how to break it down into answerable steps and think about how each of those parts of a problem might be addressed and understood using the techniques and methods that we've got available. And fundamentally that's what we can then teach our students is how to kind of go through that process of going through a difficult problem that maybe nobody knows the answer to and nobody even knows how to go about finding the answer and address that so rather than taking a problem where the answer is known and walking our students through the solution to that problem it's really about taking difficult questions, the most difficult questions that are there, actually, understanding the human mind and the brain is perhaps the most difficult problem there is out there and thinking about how we might address that incredibly difficult problem using a range of different techniques looking at how those processes develop from childhood through to the end of life, how we can understand it in terms of brain activity, how we can understand it in terms of the brain as a computer and so on. All different methods and how the system might kind of be affected in illness and disease and where there's effective brain damage. And so we can use all of these different techniques so in psychology but more generally thinking about how we can address and understand difficult problems and that for me is a fundamental aspect of a university education. That's what I practice in my research and what I bring to my teaching.

Dr Andrew Bell: Thank you very much indeed for taking the time to find out more about Oxford and about Univ. I hope that you find the materials that we've made available to you helpful and that you enjoy exploring what it might be like to be a student here. Remember you can take part in the online Q&A, you can take a virtual walk around the College, you can read more about our courses and about their entry requirements and of course you're very welcome to email us if you have any remaining questions. We'd love to hear from you. For now, I wish you the best in your future academic career and I'd be absolutely delighted if you decided you wanted to study with us in the future. Good luck!