

My teaching philosophy is based on five principals, which I will discuss in turn here. Following this, I will discuss my commitment to diversity, equality, and inclusivity (dEI) in the classroom and academia more broadly.

Tailored, level-appropriate material

To ensure that the transfer of knowledge is effectively passed on to an audience, I believe that material should be presented in a level and knowledge appropriate way.

My research spans the boundaries of physics, mathematics, and computer science. Often, I present material from one discipline to academics in another. In these instances, I make a concerted effort to understand the audience's background and tailor my presentation accordingly. For example, when talking about category theory to physicists, I ensure to provide an introduction to basic concepts before delving into more complex topics, something which may not be necessary with certain mathematicians or computer scientists.

Actively listening to feedback

To become a better and more effective teacher, it is crucial to actively seek and act on explicit and implicit feedback.

During my PhD, I served as a teaching assistant (TA) for several courses, where I guided students through answers to problem sets. In one course (Gauge Field Theory), a formal feedback mechanisms was lacking, so I created an anonymous Google survey to gather student feedback. As an example, one student's suggestion was to use an overhead projector in-addition of the blackboard for presenting solutions. This was promptly implemented, improving the clarity of my teaching.

During my undergraduate, I took an elective course on 'Teaching in Schools'. The main focus of this course was on spotting and addressing misconceptions in the classroom. During the course I gave a group of students short multiple-choice questionnaires designed specifically to detects misconceptions they may have regarding newton's laws and forces. This provided a valuable implicit form of feedback to the teacher.

Student engagement through active learning

To deepen comprehension and maintain student engagement, I believe in employing active learning techniques, especially in small classroom settings. Active learning not only keeps students engaged but also helps identify areas where they may be struggling, providing an implicit form of feedback (see above).

For example, as a TA during my PhD, I encouraged students to explain concepts at the board themselves. This helped them understand the material better, and help me identify the things they struggled with.

During my undergraduate at Oxford I was heavily involved in organising an outreach program called Oxford Hands-On-Science. This involved going to schools in socio-economically disadvantaged areas to show and teach students about science. During these outreach events we got the students actively involved with demonstrations. For example, when demonstrating the digestive system, I had each student replicate a different part of the digestive system using household items, ensuring every student participated actively.

Fostering a sense of accomplishment:

To cultivate a love of learning, I believe that every student should feel a sense of accomplishment from every course they take. Even if they do not excel in formal assessments, they should leave the course with

a positive experience and no regrets that they took it.

In my future teaching, I plan to achieve this by incorporating small research projects into assignments or long-form coursework, designed at an appropriate level. For example, I discuss in my research plan how I intend to use a project I worked on called HepLean to engage students in active research.

Varied presentation styles

As someone with profound dyslexia, I understand the importance of diverse presentation styles to accommodate different learning needs. I believe it is essential to present information in multiple formats to ensure that all students can engage with the material effectively.

For example, as part of the demonstrations with Oxford Hands-On-Science (discussed above), I would start each demonstration with a discussion to assess prior knowledge, followed by a visual demonstration and then a hands-on experiments. This repetition and variation in presentation helped reinforce the concepts for all students.

DEI

To ensure that academic, and the universities is a fair, inclusive and welcoming place, I have a commitment promoting diversity, equality and inclusivity. Two specific examples illustrate this commitment.

First, through my involvement with Oxford Hands-On-Science, I visited high schools in socio-economically disadvantaged parts of the UK to inspire students who might not otherwise have access to scientific role models. Our goal was to spark an interest in science and technology among these students.

Second, as someone with profound dyslexia, I am acutely aware of the challenges faced by neurodiverse students and academics. To improve accessibility, I have created short videos to accompany some of my academic papers and have actively engaged with the team behind arXiv to discuss accessibility issues in research. For example, I was interviewed as part of the research that led to specific accessibility improvements.

In the classroom, I believe it is vital to establish clear expectations at the start of the course regarding student participation and my role as an instructor. Moreover, during active learning sessions, I aim to ensure that discussions are not dominated by a small subset of students by setting clear ground rules that promote inclusivity.