Statement of Teaching

It could be argued that today, more so than any other time in human history, science—and particularly the biological sciences—plays a major role in our everyday lives, affecting everything from what we eat and wear down to how we treat disease and even reproduce. Regardless of whether or not our students choose a career in research, providing a basic scientific literacy and grounding in the biological sciences will help them to make informed decisions about how they live their lives.

Within a university context, my teaching consists of two basic building blocks; firstly and most critically, problem solving, and secondly, biological concepts—both classical and cutting-edge. An example of the way I apply this method can be seen within my current role as an educator at the University of Cambridge, where I provide seminars for undergraduates on fluorescent protein technologies. I approach these materials from an historical perspective, taking the students from the initial discovery of the iconic GFP beta-barrel protein from the jellyfish, *Aequorea victoria*, to its ubiquitous use in labs worldwide. As well as introducing the students to a number of core research technologies, this approach enables me to do several other important things: first, to discuss particular problems encountered by the field and examine how these were overcome; second, to show that science often proceeds in a series of small, iterative steps, driven by real people from many backgrounds, just like themselves, and that sometimes, seemingly obscure discoveries can have a world-changing impact if we arm ourselves with the knowledge to recognize their potential. I conclude these lectures with my own published research, providing opportunities to discuss how I personally use the tools described in the seminars to approach scientific problems and relate aspects of the scientific process that cannot be obtained from reading the literature alone.

Unavoidably, many of the concepts we are required to teach in biology, particularly as we go beyond the microscopic level of the cell and into the domain of biochemistry and molecular biology, demand a high level of abstraction. Here, I find that traditional lecturing is greatly enhanced by parallel, hands-on, lab-based learning. Simple projects like cloning a gene into a plasmid or creating a gene-fusion with fluorescent tag and then performing restriction mapping or expressing it in cells helps to take concepts from the abstract to the tangible realm for students.

During my time at Cambridge, I have personally supervised a number of undergraduate and masters students during their lab-based research projects. While some students arrive in my lab with extensive research experience, others have little or none. I tailor their projects, which are always genuine pieces of novel research linked to my own, to the individual needs and abilities of each student. These projects are built around a central question and a set of core techniques, which will be mostly, if not entirely, new to the student. This means that regardless of whether they achieve the original aims of their project, the student leaves my lab having learned how to correctly approach a biological question and engage with it as well as having a new set of skills and techniques that they will feel confident applying in other research environments.

Part of the way I assess my students is led by the notion that scientists must be able to effectively communicate their research, either orally or through publication. As scientists, if we cannot effectively communicate our work we might as well have not done it at all. By assigning essays in the form of a journal article, a short research proposal or even a press release, I am able to assess my students' comprehension of a particular topic and am also able to help them develop the writing skills they need to thrive as scientists and communicate with different audiences, skills that will be of benefit to them whether they continue within the sciences or not. By also providing them with the opportunity to give presentations on science topics, mutually agreed upon by students and myself, I help them build their confidence and develop public speaking skills.

As a component of my teaching and assessment repertoire, I hope to bring with me to [redacted] the Cambridge tutorial system of "supervisions". This student-led method of mentoring is similar to the standard model of tutorials used in universities worldwide but is run in a slightly more democratic style; the Cambridge system allows students (usually in groups of one to three) to call meetings to discuss a topic of their own selection that they want further help to understand or wish to delve more deeply into. The tutor will act as their guide and finally set an assignment on a mutually agreed topic that will be assessed in person at the following supervision, giving students both instant feedback and the opportunity to defend their work and critique that of others. It provides an alternative mode of assessment for students who may not perform as well in formal examinations and allows those who are not yet confident enough to engage during lectures to air their views and have their questions answered.

In addition to participating in the Cell Biology course that I would be required to teach at [redacted], I would be excited to contribute to other pre-existing courses that overlap with my own scientific background. These could include BIOL 4440: General Virology, BIOL 4550: Biotechnology and BIOL 4560: Neurobiology, among others. I feel that my own specialist knowledge would allow me to make a valuable contribution to teaching in these areas.

In summary, I hope to uphold the high teaching standards at [redacted] and apply my own talents and experience to enhance the learning experience for students. I will provide a teaching experience both in the classroom and in the lab that is rich in transferable skills and that will inspire in my students a life-long interest in the biological sciences.