

HE Bioscience Teacher of the Year 2016 Application Form

Dr Katharine Hubbard - University of Hull

1. Individual excellence in the development and implementation of teaching bioscience

In not more than 500 words please outline, with evidence (references are not included in the 500 word limit), how the candidate displays individual excellence in the development and implementation of approaches to teaching that have proven successful in promoting bioscience student learning and achievement

Katharine has been the Department's Teaching Associate for just over 2 years, and in this short time had major impact on bioscience teaching both within our Department and across the School of Biological Sciences. Her commitment to teaching and learning is very highly regarded by students, technical and academic staff. This has been recognised by awards from peers and students. For example:

- 1) Recognition for excellence in teaching and learning through the award of a Teaching Excellence Award by the Cambridge University Student Union (CUSU) in 2015. She is the first academic in the School of Biological Sciences to be given the 'Outstanding Lecturer' award, and her nomination statements emphasise her passion for teaching and her support of individual learners. *"Katharine's lectures stood apart in their subject What stands out to me is an ability to place fine details within a wider real-world context. In science it is easy to lose sight of the bigger picture, but these lectures helped me to engage with the material and understand its relevance in the course in a way that others have not."* – CUSU Student award nomination statement
- 2) Student feedback on her teaching is consistently amongst the highest in the School of Biological Sciences, both in terms of feedback scores and comments. She regularly runs supplementary tutorials to support learners with diverse needs. Examples of comments demonstrating her teaching excellence include: *"Dr Hubbard was by far my best lecturer of the year for any module. Her synoptic lecturing style really helped with revision and put much of what we learned in context I honestly wish that some my other lecturers could explain concepts as concisely and clearly as Dr Hubbard."* – 1st year student
- 3) Her commitment to teaching excellence was highlighted in the Department's Learning and Teaching Review of 2015. Several of her innovations were highlighted as case studies in this review as examples of good practice.

In addition, Katharine has made substantive innovations in our teaching, including use of digital resources and introduction of active learning strategies. As part of a student-partnership project she created pre- and post-practical tutorials and explanation videos, which have been viewed over 4000 times in their first year of use. These have been used by other Departments and Faculties, as well as by our own students. She also implemented active learning study skills sessions on our first year courses. A flipped classroom session on academic writing which included student assessment of example work significantly increased confidence of first years in writing essays.

Lastly, Katharine successfully applied for grants to support teaching innovation and widening participation. Funding from the Cambridge University Teaching and Learning Innovation Fund supported a student-partnership project in 2015, leading to the development of new resources to support Departmental teaching. Funding from the Cambridge University Widening Participation Project Fund allowed her to establish the Cambridge Biosciences Experience (<http://cambridgebiosciexperience.com/>), a project working with Year 11 students from low Higher Education participation areas across the country.

2. Involvement in scholarly and professional development activities

In not more than 500 words please describe all scholarly or professional development activities that the candidate has undertaken, which have influenced and enhanced the learning of bioscience students

Katharine embeds a scholarly approach throughout her teaching, and considers it essential for good practice. Scholarly activities are not a requirement of her position within the Department, and there is very little culture of scholarly teaching within the University. Nonetheless, Katharine has made significant contributions in this area. Activities include:

- Publication of an article in F1000research on the role of Teaching-Focussed academics in the biological sciences (Hubbard, Gretton, Jones, & Tallents, 2015). This article highlights both the challenges facing teaching-focussed staff, but also highlights the positive influence that engaging in the Scholarship of Teaching and Learning (SoTL) can have on academic institutions.
- The development of a research project looking at how undergraduate bioscience students read research papers. This project involved surveys and interviews with students, researchers and academic teaching staff to determine differences between student and staff approaches to the literature. The results of this study have been presented at two international conferences (Society for Experimental Biology main meeting; Prague 2015 and Enhancing Student Learning through Innovative Scholarship; Durham 2015). Two research papers are currently being written to share these results with the wider academic community, and the results are already being used to influence teaching activities within the Department.
- Development of a project to improve practical class teaching to first year biology undergraduates. Detailed surveys were sent out to the 2014 cohort of first year biology

students to uncover areas of difficulty in the current practical classes, which identified a number of clear needs relating to preparation for classes, biological calculations and stress levels within the class. Based on the survey results, a student-partnership project was developed to develop new practical class resources, with funding from the University of Cambridge Teaching and Learning Innovation Fund supporting 4 summer students to work on the project. These resources are now being used by the 2015 cohort, and detailed feedback is being collected on their effectiveness. The project was presented to a meeting of the University Directors of Teaching as an example of student-partnership and innovative scholarship, and will be written up for publication once the resources have been fully evaluated.

- Preparation of a commentary article for the *Journal of Biological Education* on the need for innovation in undergraduate bioscience education, and the roles that teaching-focussed academics have in driving innovation. This is due to be published in 2016.

Katharine has also contributed to the Departmental seminar series, using this as an opportunity to introduce the scholarly approach to teaching to the rest of the department and create a culture of good teaching practice.

3. Supporting colleagues and influencing learning

In not more than 500 words please provide evidence of how the candidate supports colleagues and influences bioscience student learning beyond their department and institution

Katharine has been a significant source of support to colleagues in terms of developing good teaching practice, both within the department and beyond. The reach of her activities is particularly impressive given that she is in the early stages of her career; she has only been in post for 2 years, but is widely regarded as a valuable source of support for teaching. Activities to provide support include:

- Development of an online resource area to support graduates and postdoctoral research staff who teach small groups (tutorials) on our second year undergraduate course 'Plant and Microbial Sciences'. Resources include suggested activities for tutorials, relevant research articles to discuss with students, external resources that may be of use and examples of student essays and best assessment practice. She also meets regularly with graduate and postdoctoral tutors to share good practice and build a community of teaching excellence.
- Sharing teaching innovations with other Departments to encourage innovation and best practice. For example, the online resources Katharine developed for use in our undergraduate practicals have been used as a model for resources now being created by the Department of Biochemistry for both bioscience and medical/veterinary students. She has also presented her resources and innovation projects at University-wide meetings, and has been asked to speak at events for academic staff and librarians to encourage good practice elsewhere.
- The publication of her F1000research article has raised the profile of teaching-focussed

academics considerably and highlighted the valuable role that these individuals can play, thereby supporting the national teaching fellow community. The article was highlighted in the keynote presentation by Dr Abel Nyamapfene at Enhancing Student Learning through Innovative Scholarship (Durham 2015). As a result a number of other academics at other institutions are considering how to better support their teaching-focussed staff, and have consulted with Katharine about the issues raised in the article.

- Katharine writes a blog on teaching and learning in Higher Education (<https://theacademicteacher.wordpress.com/>) which has had nearly 1000 unique visitors from around the world. She also regularly participates in discussions on Learning and Teaching Issues in HE and STEM via social media (e.g. #LTHEchat on Twitter)
- Presentation of her work on how undergraduates read research papers at international conferences has stimulated discussions amongst colleagues at many other institutions on how we can better teach this essential skill.
- Katharine is also contributing to the American Society of Plant Biologists 'Teaching Tools' collection. After winning a competition for Teaching Tool suggestions, she is writing a teaching tool on plant circadian rhythms in collaboration with Dr Antony Dodd (University of Bristol), which will be published in early 2016. The teaching tool collections are widely used around the world, including in developing countries (Williams, Lockhart, & Martin, 2015), so will extend the influence of her teaching significantly.

Katharine runs a Widening Participation project to encourage students from low HE participation areas to study biosciences at university (<http://cambridgebiosciexperience.com/>), thereby encouraging the next generation of bioscientists.

4. Exhibit innovation that has proven to improve their teaching practice to enhance student learning

In not more than 500 words please provide evidence of how the candidate exhibits innovation in their teaching practices to enhance student learning

Katharine is a highly innovative teacher, and is constantly looking for ways to enhance student learning. Her creative and student-centred approach has raised the popularity of plant sciences as a subject choice; student numbers on our 2nd year Plant and Microbial Sciences course have increased ~30% since Katharine joined the department. Examples of innovation include:

- Katharine has obtained funding from the University Teaching and Learning Innovation fund to develop new approaches to bioscience education. This includes the development of new practical class teaching resources, including online pre- and post-practical quizzes and video explanations. These have taken our practicals from laboratory-only classes to blended learning activities, and have also increased the opportunity for students to receive formative feedback on their progress. These resources have been developed in collaboration with 4 undergraduate students in a student-partnership project, the first project of its kind in the University, and have been used by the vast majority of our students. They have served as inspiration for similar projects in other Departments. The project was presented to a meeting of the University Directors of Learning and Teaching in September 2015 as an example of innovative practice.

- Katharine has driven innovation in the teaching of key skills for bioscience undergraduates in our department. For our second year students she has introduced a project report, giving our students an opportunity to write up their class experiments as scientific paper as training for independent research projects in the third year. She has introduced study skills teaching into our first year course, primarily focussing on developing academic essay writing skills. This flipped classroom session uses a number of active learning techniques to encourage students to think about what makes a good essay. It also requires students to grade some example essays to give them insight into the feedback process. This is a completely new approach within Cambridge first year biosciences teaching, and has been demonstrated to increase student understanding and ability to assess the quality of work.
- She has used insights from student feedback questionnaires to design new teaching tools. In response to student concerns about their understanding of biochemical calculations, this year she is trialling the use of 'The Biochemical Calculation Toolkit'. This is an intervention that aims to increase student independence with calculations and to scaffold their own learning. If the intervention is successful she aims to write this up for publication and to share the resources with other institutions.

Katharine has driven the innovative use of our Virtual Learning Environment, encouraging others to use the interactive features rather than using it as a file repository. She has written online tutorials on protein structure, has introduced online quizzes and the use of electronic marking systems.