

HE Bioscience Teacher of the Year 2020 Application Form

Dr Heather McQueen - University of Edinburgh

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

Dr McQueen is an outstanding, respected teacher who is nominated each year, by our students, for one or more Edinburgh University Student's Association (EUSA) teaching awards, and received the Best in School Feedback Award 2013.

Heather has been teaching at the University of Edinburgh since 1998, with responsibility for teaching and assessment at all four levels of undergraduate learning, and undertakes several leadership roles. These include (1) organising and leading two large 2nd and 3rd year molecular genetics courses, (2) running introductory Freshers' week sessions for all new biology students, (3) Associate Director of Teaching for first year biology teaching and (4) College Academic Misconduct Officer where she takes an educational approach to avoiding the pitfalls of plagiarism. Heather is an enthusiastic innovator in student education and supporter of judicious use of learning technology, having been first to introduce interactive "clicker" lectures within the School, and more recently having championed the introduction of QMP (QuestionMark Perception) online testing and of PeerWise into courses.

PeerWise is an online collaborative learning tool through which students engage both with the course material and with other students to set, analyse and discuss questions. Introduction of PeerWise was one of a raft of successful modernisations made by Heather to our large second year genetics course. Heather has now demonstrated that PeerWise increases student engagement, enjoyment, and markedly improves academic performance in all aspects of this course, consistently over 3 course iterations^{1,2}.

Hand-held voting "clickers" are now widely recognised to improve engagement with the lecturer leading to improved learning outcomes. Heather extended this use to improve engagement and discussion between students during third year practical discussion sessions, and by devising bioethical mini-debates that are now a long-standing integral component of the Molecular Genetics Honours induction programme. For the debates, the clickers permit anonymous before and after voting that introduces an element of class competition, thus sharpening student interest.

Another recent innovation in our large second year genetics course is the establishment of peer assessment and feedback as a means of encouraging students to engage, not only with the production of an answer for assessment, but with how it should have been answered and with work standards required for mark reward. This complements Heathers'

feedback strategy for this course where colour-coded class performance graphs, and generic task feedback are standard on in-course assessments, and students greatly appreciate the model answer vidcast that Heather provides each year to illustrate how to successfully complete the assessed problem.

Since students arriving at University exhibit varied experience with respect to study methods, many of them struggling to comprehend University-level expectations, Heather voluntarily established biology-specific “Freshers’ orientation sessions” which she offers to all new students during Freshers’ week. These sessions involve a variety of games (including a murder mystery) where students rehearse skills such as question formulation and group discussion, hear from previous first year students, and learn about the study skills web page which Heather compiled specifically for Biology students. Evaluation demonstrates >80% enjoyment and usefulness of this event.

1) J. A. Hardy, S. P. Bates, M. M. Casey, K. W. Galloway, R. K. Galloway, A. E. Kay, P. Kirsop, & H. A. McQueen (2013). Student-generated content: Enhancing learning through sharing multiple-choice questions. Submitted to International Journal of Science Education.

2) McQueen, H. A., Shields, C., Higham, J., Simmen, M. W. and Finnegan, D. J. (2013/2014) PeerWise for academic benefits across diverse learning tasks with minimal instructor intervention. In preparation.ck is extremely useful”;

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

In 2004 Dr McQueen successfully completed the Professional Certificate in University Teaching and became a Fellow of the Higher Education Academy. The knowledge acquired while researching for this qualification kick-started and informed her subsequent teaching and teaching-related activities, firmly establishing a student-centred approach for both. Reflection upon effective learning and student benefit has led to Heather’s involvement in many teaching related projects and activities, both within the School of Biological Sciences and more widely, bringing in new ideas by working with staff from other Schools.

One such example was the establishment of a Biology Peer Assisted Learning Scheme (BioPALS). Inspired by work in the School of Physics as well as the Law School, where more experienced students were supporting other students in teaching-related issues (but not teaching assignments), Heather ran a week of Peer assisted learning events for Biology students during our Innovative Learning Week (ILW) in February 2012. Here, PAL experiences from Physics were showcased to our students before training biology student volunteers for trial Peer Assisted learning sessions. The ILW event concluded with student discussions on how to manage and sustain such a project, which led to a group of these students forming a committee to take this forward. BioPALS, now in its second year, runs as a self-sufficient student-led project (with occasional advice or input from Heather), that is greatly appreciated by our first year attendees and where facilitators are now working towards the prestigious Edinburgh Award.

A second example would be Heather’s involvement in a cross-College project in 2011, known as SGC4L, to share experiences of introducing the online collaborative learning tool PeerWise into Chemistry, Physics and Biology courses. This work led to a considered, reflective and well-informed strategy for firstly integrating PeerWise into a second year genetics course in 2011 and,

with the learning gained from this, to a consistent approach to its introduction into a further four early years biology courses in the current academic year. Heather has now collected and analysed a considerable body of data that confirm and clarify the academic benefits of PeerWise for our students, having been supported by a University Principal's Teaching Award to conduct this research in 2012-2013.

Two further examples of scholarly activity that enhance student learning would be Heather's current involvement in the University-wide Transforming Assessment Pilot, where she is developing and sharing her experiences of using Peer Assessment with second year genetics students, and her Higher Education Academy Teaching Development Grant (TDG), awarded October 2013. The TDG will be used to investigate student use of social media for learning and, with significant student input, will work to provide a tool for good scholarship that can be shared via social media and that aims to educate against copying or plagiarism.

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

As well as the student-centred projects already described, Heather has been sharing bioscience learning with school pupils and teachers since 2007 by establishing and running her own public engagement project, Gene Jury. Gene Jury delivers online resources to school teachers via a lively freely-available project website, and has delivered over 500 bioethical workshops to more than 10,000 children in primary and secondary schools across every region of Scotland, at science festivals and at the science centre "Our Dynamic Earth". Gene Jury also ran a highly interactive school pupil conference at Edinburgh University in 2011.

Heather is keen to share her experiences, ideas and research in order to support colleagues and influence learning and has done so through papers, workshops or presentations, and websites as follows;

Teaching Development publications (including in preparation or submitted):

1. McQueen, H. A., Shields, C., Higham, J., Simmen, M. W. and Finnegan, D. J. (2013/2014) PeerWise for academic benefits across diverse learning tasks with minimal instructor intervention. In preparation.
2. Casey M, S.P. Bates, K.W. Galloway, R.K. Galloway, J.A. Hardy, A.E. Kay, P. Kirsop & H.A. McQueen (2013). Scaffolding Student Engagement via Online Peer Learning. Submitted to International Journal of Science Education.
3. J. A. Hardy, S. P. Bates, M. M. Casey, K. W. Galloway, R. K. Galloway, A. E. Kay, P. Kirsop, & H. A. McQueen (2013). Student-generated content: Enhancing learning through sharing multiple-choice questions. International Journal of Science Education (accepted subject to corrections).
4. McQueen, HA, Stewart F, Keer-Keer S, Wallace-Muller K* (2011). The DNA detective game. Science in School.(19), 30-35. (* nominated author)
5. McQueen H (2011). Gene Jury Pupil Conference Engaging in Modern Genetics. Genetics Society News (65), 26-28.

Teaching Development Presentations, events and invited workshops:

1. December 2013: Co-hosting "Assessment and Feedback" session for PgCAP, University of Edinburgh.
2. June 2013: PTAS Learning and Teaching Forum, University of Edinburgh. Talk entitled "PeerWisdom: Evaluating and boosting biology student benefits from the PeerWise online learning tool" (co-presenter with Dr Cathy Shields).
3. April 2013: HEA STEM Annual Conference 2013, Birmingham. Poster: "PeerWisdom: Evaluating and boosting biology student benefits from the PeerWise online learning tool" (C Shields, presenting) – Winner of best poster prize.

4. February 2013: EUSA “Inspiring Teaching Conference, University of Edinburgh. Workshop on “PeerWise” (co-presenter with Dr Ross Galloway, Physics)
5. December 2011: HEA “Clickers re-loaded” workshop, University of Edinburgh. Talk entitled “Reflective Clicking”
6. November 2010, Learning Teaching Scotland “Developing Global Citizens” Conference, Edinburgh –Gene Jury CPD workshop.
7. 2008, BA CREST/ RinR Schools science project award, University of Dundee - invited judge.

Teaching development websites or webpages authored and maintained (PALs now passed to students):

1. Gene Jury website: <http://www.biology.ed.ac.uk/projects/GeneJury/>
2. Biology PALs: <http://biologypals.weebly.com/index.html>
3. Undergraduate study skills pages:
<https://www.wiki.ed.ac.uk/display/SBSUndergraduateIntranet/Study+skills>
4. School of Biological Sciences public engagement wiki:
<https://www.wiki.ed.ac.uk/display/SBSIntranet/Public+engagement>