



Heads of University Biosciences

# HUBS Spring Meeting 2012

## Meeting Report

9-10<sup>th</sup> May 2012

Chicheley Hall, Buckinghamshire

Organised by Prof. Jane Lewis, University of Westminster  
Dr Hilary MacQueen, The Open University  
and Dr Eva Sharpe, Society of Biology.

A Special Interest Group of the Society of Biology, Charles Darwin House, 12 Roger Street, London, WC1N 2JU  
Tel: +44 (0)20 7685 2550 [hubs@societyofbiology.org](mailto:hubs@societyofbiology.org) [www.societyofbiology.org/hubs](http://www.societyofbiology.org/hubs)

## Session 1 - Higher Education: a changing landscape

Chaired by Dr Hilary MacQueen, Open University

**Dr Jenny Koenig**

**Dean at Lucy Cavendish College Cambridge**

*[Biomaths: the maths landscape of biology at Higher Education](#)*

Dr Koenig presented data from her report on the mathematics landscape within bioscience undergraduate and postgraduate UK higher education<sup>1</sup>. Reports show that bioscience graduates are lacking basic maths skills and the ability to apply these skills<sup>2</sup> but there is also a wider need to raise maths at all levels, including higher end interdisciplinary biomaths skills<sup>3</sup>.

A survey of 36 Higher Education Institutions (HEIs) carried out in 2011 found an enormous range of entry qualifications for Biological Sciences degree programmes, from those where the majority of students had A2 level maths to those where the majority of students had GCSE maths at Grade C or less. Jenny listed the mathematical subjects that will not have been covered by those who have not taken AS or A2 level maths, and those that won't have been covered if a student has less than a Grade C at GCSE. As science A levels now have little maths content in them, there is no opportunity for students to catch up with this maths through alternative routes.

Jenny then went on to look at the mathematical content of undergraduate degrees, and described the range in the maths covered in the surveyed institutions, and different methods of teaching maths which were used, including diagnostic testing, e-learning and embedding maths into biology teaching. A quarter of biology degrees did not contain maths that progressed beyond AS level, and many undergraduate teachers felt that biology degrees did not need to cover more maths. Reasons ranged from avoiding hard topics for fear of negatively affecting student survey results and having to balance maths content with biology content.

When postgraduate supervisors were asked about the capabilities of recent graduates who start as PhD students, most found them somewhat prepared with maths and statistical ability but around 20 % said they were not. Overwhelmingly, 97% PG supervisors felt that a lack of mathematical knowledge, skill or confidence is preventing bioscientists from becoming involved in interdisciplinary teams using quantitative, integrated or computational approaches.

Recommendations that came out of the project included that HEIs should have greater entrance requirements for math, such as a minimum of grade B at GCSE level; that there

---

<sup>1</sup> A survey of the mathematics landscape within bioscience undergraduate and postgraduate UK higher education (2011) [http://www.bioscience.heacademy.ac.uk/ftp/reports/biomaths\\_landscape.pdf](http://www.bioscience.heacademy.ac.uk/ftp/reports/biomaths_landscape.pdf)

<sup>2</sup> Skills needs for biomedical research, ABPI (2008) <http://www.abpi.org.uk/our-work/library/industry/Pages/skills-biomedical-research.aspx>

<sup>3</sup> BBSRC Strategic Plan 2010-15 <http://www.bbsrc.ac.uk/nmsruntime/saveasdialog.aspx?IID=3719&SID=6953>

should be an increased maths content in science A levels; that maths should be taught in a more applied manner; and that HE staff should be supported to develop new approaches to teaching Biomaths.

### **Group discussion topics**

The group discussed how the maths curriculum at A level has changed since many current lecturers had studied in secondary education and that better understanding of what was covered in A levels was needed, as well as more pedagogy around biologists teaching maths. The OeRbital project<sup>4</sup> collated resources for Biomaths teaching that could be used at A level and higher education.

The group discussed whether similar issues around maths content were apparent in chemistry and physics A levels and Jenny cited a recent SCORE<sup>5</sup> report which suggested this is the case across the sciences.

The group felt that one problem was that A level maths was felt to be aimed at mathematicians rather than scientists. The group felt that maths teaching for biologists needed to be more applied and subject oriented, with options to study topics of interest. The group debated the idea of a new A level focused on 'Maths for Scientists' or adding more maths into science A levels.

The group felt that the large class sizes of first year university classes make it harder to teach maths, and that many maths topics could be taught in Biology A level when there are smaller class sizes.

The group discussed making maths AS or A level mandatory as an entry requirement for studying biology at higher education. Some felt hesitant about increasing entry requirements for fear of limiting recruitment, and widening participation issues.

### **Rachel Lambert-Forsyth**

#### **Head of Education at the Society of Biology**

#### [Society of Biology Degree Accreditation](#)

Reports<sup>6,7</sup> document that employers feel that graduates do not have the right level of skills for employment, particularly in applied skills rather than knowledge. A survey carried out by the Society of Biology<sup>8</sup> found that 45% of employers are not satisfied that they currently recruit graduates at the correct skill level for advertised vacancies, employing post-docs into graduate positions to ensure that employees had the necessary skills. Accreditation will

---

<sup>4</sup> OeRBITAL project [www.bioscience.heacademy.ac.uk/resources/oer/](http://www.bioscience.heacademy.ac.uk/resources/oer/)

<sup>5</sup> Mathematics within A-level science 2010 examinations, SCORE (2012) <http://score-education.org/media/10036/full%20maths.pdf>

<sup>6</sup> Skills needs for biomedical research, ABPI (2008) <http://www.abpi.org.uk/our-work/library/industry/Pages/skills-biomedical-research.aspx>

<sup>7</sup> Life Sciences Blueprint, Office for Life Sciences (2009) - [www.bis.gov.uk/assets/biscore/corporate/docs/life-sciences-blueprint.pdf](http://www.bis.gov.uk/assets/biscore/corporate/docs/life-sciences-blueprint.pdf)

<sup>8</sup> Report of the Society of Biology Industry survey (2010) - <http://www.societyofbiology.org/documents/view/832>

address this by providing an assurance of the level of practical experience provided by a degree.

A period of practice in practical lab or field work is essential to the development of these vital high level skills, by enabling students to apply their knowledge, consolidating theory and enhancing learning. A key emphasis is on research training and a period of practice is essential in the accreditation criteria. The framework for accreditation includes a common criteria which will be applicable for all degree programmes going for accreditation, and then specific criteria for three routes, defined in partnership between the Society of Biology, appropriate Learned Societies and other partners. Accreditation by the Society of Biology is entirely focused on outcomes rather than the mechanism by which those outcomes may be acquired and assessment is through a peer review process. In the pilot this included BSc degree programmes with a Year in Industry or Integrated Masters programme, but the programme will accommodate other degree models in the future if they are able to meet the criteria.

The development of the Accreditation Programme has occurred over a three year period and involved a steering group, several written consultations and stakeholder consultation events, and a pilot culminating in an Awards Ceremony in March 2012. Following the pilot, the universities who received accreditation were asked to develop a case study of the areas that the assessors had listed as best practice. Rachel presented the case study of the University of Bristol's BSc Biochemistry with a Year in Industry

Rachel described the next steps for the Accreditation Programme. Following the evaluation of the pilot and a consultation carried out at the end of 2011, the Society will be developing accreditation in three broad areas: molecular aspects of biology, whole organism biology, and ecology and environmental biology. It will be up to HEIs to decide which pathways their courses are suited for. Some avenues of the biosciences will not suit this approach, particularly those where the skills required for graduate employment are very specific to their area of the biosciences, and may need a more specific approach.

The final criteria will be developed over the summer and the programme will launch at the start of the 2012-113 academic year, allowing students to graduate from accredited programmes in the summer 2013.

Rachel described ways that members of HUBS and their staff could get involved with the programme at this stage: either through helping to develop the criteria, by putting courses forward for accreditation or by acting as an assessor.

### **Group Discussion topics**

Delegates discussed the criteria and how different degree models would fit this. The Society's Degree Accreditation Programme will open to three or four year degrees if they are able to meet the criteria and it is up to the HEI to show how this is achieved. As there is an emphasis on a period of practice, a three year degree course would have to include additional practical work to achieve the necessary outcomes. The SB are currently finalising the criteria around the period of practice and will include further models which could fit with a three year degree such as summer placements.

Delegates asked whether the period of practice had to be approved by the SB, which is not the case. The SB will be looking at whether the HEI has processes in place to ensure that students take on appropriate projects, rather than approving specific project providers.

The group discussed careers options for bioscience students and whether following an accredited degree pathways would be suitable or beneficial for all of them. The Accreditation Programme is aimed at highlighting courses which produced research ready graduates, which not all degree programmes do, and it is not relevant for all students and graduates who may want to go on to do different things. The importance of clear communication about what the Society of Biology's Degree Accreditation programme means for students was highlighted.

Delegates discussed situations where not all of the degree programmes that a particular bioscience department run were accredited, and the implications of this within a department.

### **Panel Discussion: How to create value for money in an era of increased fees**

Panel Members:

- Dr Jorge Tovar-Torres, Royal Holloway, University of London
- Prof Jon Scott, University of Leicester
- Dr Jeremy Pritchard, University of Birmingham

The discussion started with the panel members each discussing a different area key for providing 'value' for students.

Dr Tovar-Torres outlined some of the practical approaches that Royal Holloway, University of London have been taking to ensure student value for money, including improvements to academic, sporting and social facilities, increasing online support and embedding careers advice throughout the curriculum. Increased communication with students and additional student support was also a priority.

Prof Scott followed this with a discussion about the value we place on teaching. With the current changes in the HE landscape with the increased student fees, the Key Information Set (KIS) and the Research Excellence Framework (REF), we should be taking this as an opportunity to ensure that teaching moves up the agenda. There is more to consider than just contact hours – what is happening and who delivers it, class size and the quality of the teaching are all important.

Dr Pritchard spoke on increasing student engagement. Based on their experiences of secondary school, undergraduates are assessment driven and HEIs need to reignite students' passion for science - research is a key way to do this. HEIs need to strategically use researchers early on in the student timetable to engage, and teaching needs to be valued more throughout. HEIs need to be open to removing content to ensure students are able to engage with and understand content, rather than adding more content and assessments, further feeding the assessment driven mentality.

## Group Discussion topics

The group discussed the pathway to promotion for teaching focused staff within HE and how it is harder to reach targets in teaching than in research, particularly as there are not suitable metrics for measuring quality and leadership in teaching. The group also debated whether we actually need as many leaders in teaching as we do in research. The group also discussed employment contracts for research and teaching focused staff and the need to be flexible allowing movement between the two and multiple routes to promotion. Appointment panels are usually made up of researchers and it is vital that teaching staff are included on these panels too.

Many staff are employed based on research measures and yet need to teach. Appropriate staff development opportunities to aid teaching were discussed, and ways to engage with staff new to teaching. The importance of dissemination and promoting new ideas in teaching to others was highlighted - a skill recognised in the criteria of the HE Bioscience Teacher of the Year Award<sup>9</sup>.

In some institutions, management of research and teaching are separate and the group debated whether this arrangement places greater value on learning and teaching or whether it drives the two further apart. The group discussed the REF and the lack of value it places on teaching. The increased student fees and move to a more market based approach should redress this by driving a more teaching focused environment as more money comes in through teaching.

The group discussed the importance of early engagement with students and different models to ensure this, including how best to communicate with and provide good feedback to students, as well as teaching them to learn for themselves. It is vital to teach skills as well as content and to get away from an assessment driven approach to learning. Innovative teaching is not the whole answer; we must ensure there is appropriate assessment as well.

---

<sup>9</sup> <http://www.societyofbiology.org/education/hei/competition>

## Session 2 - Innovation in Teaching and Virtual Learning

Chaired by Prof Jane Lewis, University of Westminster

**Professor David Male and Dr Mark Hirst**  
*The Open University*

*Digital Microscopy and Virtual Experiments*

Session 2 involved two interactive demonstrations of virtual learning tools used by the Open University as preparation for, or alternatives to, laboratory practicals.

Prof Male demonstrated the digital microscope which allows users to operate the microscope virtually by selecting slides, and selecting and focusing lenses, as well as allowing measurements and photo capture functions. Legends provide information about the slides allowing them to be used by independent learners.

This resource will be freely available online from October 2012 as an Open Education Resource (OER) and is suitable for use in both secondary and higher education.

Microscope slides have been provided by a variety of academic and clinical institutions and anyone with interesting slides is urged to discuss adding them to the resource. Future plans involve creating a 3D stereoscopic dissecting microscope controlled by avatars.

Dr Hirst demonstrated several experiments that can be carried out using the virtual laboratory including a UV spectrophotometer, designing a psychological experiment to monitor rapid visual processing, and a water quality test conducted over webcam.

Future plans for the project include refining the tools, developing more tools for the tutors to adapt the resources for their own needs, and developing tracking tools to monitor use.

**Dr Neil Morris**

**University of Leeds**

[Using technology to enhance the quality of the student experience](#)

Dr Neil Morris, winner of the 2012 HE Bioscience Teacher of the Year Award presented extracts from his case study on blended learning. A recent Becta survey of school leavers' technological competencies<sup>10</sup> highlighted the gap between the technological skills that students wish to learn and what is currently taught in HE. Non-engagement with technology by academics is one of the causes. Neil spoke about several examples of how he had used technology to enhance his teaching.

---

<sup>10</sup> National survey of primary and secondary school learners in England (2009-10)  
[http://dera.ioe.ac.uk/1555/1/becta\\_2010\\_htsslearner\\_report.pdf](http://dera.ioe.ac.uk/1555/1/becta_2010_htsslearner_report.pdf)

Examples included audio recordings of lectures and recording one to one feedback and lecture capture including screen shots of slides with synchronised audio and video capture. These tools are particularly useful for non-native English speakers, and surveys show students often watch them multiple times and that the use of these devices has no negative effect on attendance.

Student voting handsets increase interactivity and engagement by stimulating debate, as well as allowing students to feedback anonymously if they do not understand. Interactive student chats can be used during lectures, where students can ask and answer each other's questions displayed on screen during lectures. This innovation has had mixed response from students and staff.

A pilot study where study patterns of ten students who were given tablet devices found that they were used for three and half hours a day for studying, and that student feedback suggests they found the tablet useful and accessed a range of educational resources with it. The use of tablet devices featuring short videos and reference information and diagrams in practical classes was also popular with students. The decrease in paper usage and printing costs balanced the costs of the tablet device to the institution.

Dr Morris finished with a summary that blended learning has become an expectation for students and it can be very effective if implemented in a strategic, evidence based way. Research is available for HEIs thinking of incorporating these methods into their teaching.

### **Group discussion topics**

The group discussed issues around students making their own recordings, health and safety issues around use of technology, issues around interoperability and ensuring resources were suitable for use on different platforms, and how software can be used to track the progress of individual students. The group also shared feedback on other technological apps that they had used.



# Meeting Programme

## Day 1 Wednesday 9th May

12:00 - 14:00	Registration Atrium Chicheley Hall
13:00 - 14:00	Lunch Grand Hall
<b>14:00 – 17:00</b>	<b>Session 1 - Higher Education: a changing landscape</b> Wolfson Lecture Hall One
14:00 - 14:30	Dr Jenny Koenig, Dean at Lucy Cavendish College Cambridge <i>Biomaths: the maths landscape of biology at Higher Education</i>
14:30 - 15:00	Rachel Lambert-Forsyth, Head of Education at the Society of Biology <i>Society of Biology Degree Accreditation</i>
15:00 - 15:30	Tea/Coffee break
15:30 - 16:30	<b>Panel Discussion:</b> <i>How to create value for money in an era of increased fees</i> Panel Members: <ul style="list-style-type: none"><li>• Prof Jon Scott, University of Leicester</li><li>• Dr Jorge Tovar-Torres, Royal Holloway, University of London</li><li>• Dr Jeremy Pritchard, University of Birmingham</li></ul>
16:30 - 17:00	Group discussion
17:00 - 18:00	<b>Annual General Meeting</b> Wolfson Lecture Hall One
19:30 - 23:00	Meeting dinner Grand Hall

**Day 2 Thursday 10th May**

09:00 - 9:30            Tea and Coffee

**09:30 - 11:30            Session 2 - Innovation in Teaching and Virtual Learning**  
Wolfson Lecture Hall One

09:30 - 10:30            Professor David Male, The Open University  
*Digital Microscopy*

10:30 - 11:30            Dr Mark Hirst, The Open University  
*Virtual Experiments*

11:30 - 12:00            Tea/Coffee break

12:00 - 12:30            Dr Neil Morris, University of Leeds  
*Bioscience Teacher of the Year Case Study*

12:30 - 13:00            Group discussion

13:00 - 14:00            Lunch and meeting close  
Grand Hall

## Delegates

Dr. Amanda Bamford	University of Manchester
Prof. Chris Bartholomew	Glasgow Caledonian University
Dr. Mark Clements	University of Westminster
Dr. Steve Crosby	Liverpool John Moores University
Prof. David Coates	The University of Dundee
Dr. Kay Foster	University of Kent
Prof. Peter Heathcote	Queen Mary University of London
Prof. Janey Henderson	Teesside University
Dr. David Hill	University of Wolverhampton
Dr Mark Hirst	The Open University
Dr Jenny Koenig	Lucy Cavendish College, University of Cambridge
Dr. Sandra Kirk	Nottingham Trent University
Dr. Susan Laird	Sheffield Hallam University
Rachel Lambert-Forsyth	Society of Biology
Prof. Jane Lewis	University of Westminster
Prof. Paul Lynch	University of Derby
Dr. Hilary MacQueen	The Open University
Prof David Male	The Open University
Dr. Areles Molleman	University of Hertfordshire
Dr. Kerry Murphy	The Open University
Dr Neil Morris	University of Leeds
Dr. Peter Nicholls	University of Kent
Dr. Angela Priestman	Staffordshire University
Dr Jeremy Pritchard	The University of Birmingham
Prof. Christine Raines	University of Essex
Prof. Graeme Reid	University of Edinburgh
Dr. Payam Rezaie	The Open University
Dr. David Rowley	University of East London
Mr. Garry Scarlett	University of Portsmouth
Prof. Jon Scott	University of Leicester
Dr. Dawn Scott	University of Brighton
Dr Eva Sharpe	Society of Biology
Prof. Judith Smith	University of Salford
Dr. Jorge Tovar-Torres	Royal Holloway University of London
Dr. Peter Watkins	Cardiff Metropolitan University