



Heads of University Biosciences

**HUBS Spring Meeting
Event Report
8th-9th April 2014
Chicheley Hall**

**Practical Work in the Biosciences for
the 21st Century**

Organised by Dr Sandra Kirk FSB, Nottingham Trent University
Professor Paul Lynch, University of Derby
and Zoë Martin, Society of Biology.

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Day 1

HE Bioscience Teacher of the Year 2014 Finalist presentations

Chaired by Prof Peter Heathcote, Queen Mary University

The [Higher Education Bioscience Teacher of the Year](#) Award seeks to identify the UK's leading bioscience Higher Education (HE) teachers recognising the invaluable role played by teachers in HE. The three finalists presented their case studies form the second round of the 2014 award at the HUBS Spring Meeting. Their presentations are summarised below. Each finalist also produced [written and video case studies](#).

The overall winner of the HE Bioscience Teacher of the Year Award was announced as Dr Nick Freestone at the dinner on the 8th April. The judges were particularly impressed with Dr Freestone's commitment to placing students at the heart of his practice, and providing high-quality feedback. Congratulations to Nick and the other two finalists who all delivered engaging and informative presentations to delegates.

Dr Nick Freestone
Kingston University

[Improving student performance across the ability range](#)
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Dr Freestone explained that assessing your own teaching practice was extremely important for those teaching in HE and gave examples of two teaching interventions he had tested at his institution.

The first intervention looked at the role of iterative feedback in developing essay writing skills in science undergraduates. He described how essay writing was important for "deep" learning and described the strategies he employed to improve student essay writing, including workshops, formative assessment of drafts and summative assessment of final essays. The intervention was found to significantly improve the average grades of students in three out of four years, with students much more likely to fail if they did not attend the workshop.

The second intervention explored stretching the most able students as there is an argument in the literature that these students are not able to achieve their full potential because they benefit from learning from other high achieving peers. Dr Freestone compared the results of higher achieving MPharm students on a more advanced third year optional module when the module contained only high achieving students with their results when the module was not streamed according to ability. The results indicated that more able students were only academically stretched when the advanced module was streamed by achievement and that less able students did not benefit from the module.

Dr Peter Klappa
University of Kent
Providing Effective Feedback
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Dr Klappa explained the methods he used to provide useful feedback to all his students. He described how he had experimented with novel forms of feedback including audio feedback on essays and webcam-oriented feedback. Dr Klappa demonstrated the “Educreations” app which creates a recordable whiteboard to incorporate audio and illustrative feedback that is stored on a server with a link emailed to students. He also highlighted “googleforms” as a tool to use for summative assessment which automate the marks into a spreadsheet, grade the submissions and find out which questions were low scoring with the “Flubaroo” add-on. Finding out the low scoring questions can enable the revision of lectures on that question. The programme can be linked to “educareations” videos and within ten minutes of the submission deadline all the students can receive their grades, find out exactly where they went wrong and have the intervention “educreation” videos delivered. Dr Klappa has produced a [video](#) explaining how he has utilised Google Forms and Flubaroo.

Dr Heather McQueen
University of Edinburgh
PeerWidom: Collaborative online Learning in Biology
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Dr McQueen gave an overview of her experience using PeerWise as a tool to keep students engaged in non-contact learning time. Peerwise is an online student only space where students can earn badges for providing feedback and also rate each other’s questions. Dr McQueen used PeerWise in the Genes and Gene Action course and found that students engaged in it well. Dr McQueen presented findings from a study she had conducted about associations between PeerWise engagement and academic performance on all course components. This study also considered the nature of the questions students used and their enjoyment of the process. The work Dr McQueen presented is currently being considered for publication and so is not described in detail here.

Degree accreditation update and consultation

Chaired by Prof David Coates, University of Dundee
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Professor Coates updated attendees on the expansion of the Society of Biology Accreditation Programme to cover Bachelors Degrees. He explained that this aims to foster the development of key learning outcomes and recognise the excellence that exists in preparing graduates to contribute to the wider economy, as well as giving them the skills, knowledge and experience to develop as bioscientists. Accreditation does not seek to define a curriculum, or an approach to delivery. It is built on the foundations of the relevant QAA Benchmark Statement(s) as a general description about the broad minimum standards of achievement. It has an outcomes focus on those areas that the Society of Biology believes fully prepare bioscience graduates for their place in the country and the world. The Academic Working Group for Bachelors Degree Accreditation comprises of David Coates (Dundee: Convenor), David Adams (previously Cogent), Julian Mitchell (Portsmouth),

Richard Reece (Manchester), Robert Slater (Hertfordshire) and Simon van Heynigen (Edinburgh). Professor Coates consulted the attendees about the five proposed learning outcomes that the working group currently felt should form the cornerstone of Bachelors Accreditation:

1. A graduating level capstone project
2. The development and use of key skills
3. An appropriate level of mathematics and statistics
4. Demonstration of the acquisition of the technical skills
5. Specific skills and knowledge

He also heard views from attendees about the importance of developing creativity and innovation and how to measure this. Professor Coates advised attendees that he would use the discussions to guide development of the criteria and that there would be further consultation events. There is a consultation event taking place on the 11th June in London.

Day 2

Theme 1: Practical Work Project

[Audit of undergraduate practical work project – an update](#)

Joseph Gray, University of Glasgow

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Dr Gray summarised the main findings from a recent audit of practical provision in UK undergraduate bioscience degrees. The publication of this work is in progress and will be disseminated once finalised. This work is being conducted by Dr Gray and Dr Kevin Coward (University of Oxford) for the Society of Biology, HUBS, the Biochemical Society and the Higher Education Academy. The research conducted so far involved a written questionnaire to collect descriptions, data and opinions. Some of the responses were followed up with telephone interviews to achieve clarification and to probe more deeply on issues that were identified as being particularly important. The study involved 14 HEIs and 23 degree programmes from both pre-92 and post-92 institutions in England, Wales and Scotland. The degree courses were categorised as either Whole Organism or Molecular. It should be noted that the practical provision described does not include fieldwork.

The majority of respondents reported that the quantity and quality of their provision was either good or very good, although it should be noted this was a self-reporting survey. The spread and average hours of practical provision in Year 1 and 2, and for the final year research project was presented. The estimated cumulative lab experience for a degree defined as Molecular was 470 hours and for a degree defined as Whole Organism it was 489 hours. There was an exploration of the nature of the work students were undertaking, with pair working predominating in years 1 and 2 and individual working predominating in the final year research project. Regarding research projects, all institutions offered wet projects with a minority insisting on them. In addition, some HEIs provided quantitative data of funding for lab based research projects. One concern was that students were inadequately prepared from school to undertake practical work. If this preparation worsened there could be problems for institutions. When questioned about barriers to improving practical provision, recurrent concerns related to funding, laboratory space/equipment, staff time, increasing class size, provision of a suitable number of diverse research projects, and tension between competing research and teaching demands. Recurrent themes for improving practical

provision were the need to address the availability of laboratory space and of academic staff, as well as providing online support, summer internships, peer instruction, collaboration between institutions and staff sabbaticals. Exemplars of good practice for different aspects of practical provision were identified at Teesside University, the University of Dundee, the University of Bristol, and Nottingham Trent University. These will be disseminated with the research audit results.

Theme 2: Off-campus learning

Getting students to take the bait in an aquatic ecology module

Rachel Stubbington, Nottingham Trent University

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Dr Stubbington gave an overview of a year 2 Aquatic Ecosystems module which had a 50% coursework element. There was a single coursework element which involved students conducting a river bio monitoring survey using invertebrates to indicate river health. Different field and analysis methods were employed by students before individuals assessed poster presentations were delivered at an e-conference. The survey aims included fostering deep learning and maximising vocational relevance. The modules also included a representative from the Environment Agency delivering a lecturer and accompanying students on the field trip element. Students had to make their own decisions on sampling, characterization of physical environment, and how to analyse their data sets. The posters produced were well presented and defended by students but often exhibited weaknesses when it came to statistical analysis.

Advanced critical analysis reading party

Gerald Prescott, University of St. Andrews

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Dr Prescott described a Year 3 Critical Analysis Reading Party module for students studying molecular courses. This is a five day residential trip for students who might not normally get a field trip element to their degree. The trip involved staff research talks, grants writing and research paper workshops, grant review preparation and submission, and grant pitches. The aims were to create a cohesive cohort of students; develop understanding of career options; enhance skills of critically analysing scientific literature and scientific writing; develop understanding of the research grant and research paper process.

There was then a discussion with attendees about the funding of such residential courses, the impact they have on the student experience, and the methods for evaluating their success. The outcomes of these discussions are included in the presentation slides.

Theme 3: Masterclasses

Biotechnology masterclasses: Postgraduates teaching undergraduates

Leanne Smith, University of Birmingham

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Leanne is a PhD student and teaching assistant who started a project allowing undergraduates to volunteer to experience time in a laboratory with postgraduate students. This allows second year undergraduates to sign up online to different masterclasses. This benefits undergraduate students by giving them experience in a real lab that links to their taught modules. Postgraduates also benefit by gaining teaching experience and ownership of the teaching session. Second year undergraduates are targeted as this will encourage them to consider summer projects and start thinking about their summer projects. The

masterclasses were oversubscribed and are limited to two per student showing there was student demand for them.

Theme 4: Supporting students for independent practical projects

Bridging the gap between class practicals and research projects

Francesco Michelangeli, University of Birmingham

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Dr Michelangeli described a Year 3 compulsory 20 credit module, “Experimental design, analysis and interpretation of biochemical data”. The main objectives are for students to develop experimental design skills within a research setting, reinforce practical skills and develop scientific recording and scientific paper writing skills. The main aim is to provide an open-ended “research” practical. The module involves students taking part in drug discovery to identify novel substrates or inhibitors that could act as a cancer treatment. Students work in teams on the four day session for four-five hours each day. At the end of the sessions, students write up a paper of their results. Feedback indicates that the module provides helpful skills for the future, although one drawback of the module is that the feedback is relatively time-consuming for academics.

Team based lab project

Steven Russell, Aston University

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Dr Russell explained that pressures of large student cohorts at Aston University meant that he set up group based final year projects. The group approach was a preferable to having to restrict the wet projects as was the case the previous year. This involved setting up a dedicated laboratory, splitting students into themed teams of 6, and having a dedicated staff member to supervise the day-to-day running of the lab. Benefits of Working in a team included sharing ideas and helping to make shared solutions. Negatives of the group projects included team members working slowly or not contributing. The student feedback was positive with 80% satisfaction but care needs to be taken to ensure projects are diverse enough to stretch students and give them enough individuality.

Extension of research provision to levels 4 and 5

Adrian Hall, Sheffield Hallam University

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Dr Hall gave an overview of the developments made to the undergraduate programme at Sheffield Hallam relating to practical work. Previously level 4 and 5 practical classes and assessment had formed part of their scientific subject modules with additional small credit modules in skills for science and professional development. The level 4 programme changed to a 40 credit “professional and scientific practice 1” module. This new module involved laboratory classes, a self-directed six week project, academic tutorials, and maths taught in context. This was assessed by lab reports, an essay, a project report, a poster session and a portfolio. The Level 5 module was also 40 credits and followed a similar format with additional pre- and post- laboratory tutorials and an oral presentation forming part of the assessment. The restructured programme has been beneficial to engage students in practical work, particularly the six week project element. In addition, mathematics is integrated and relevant to practical work data analysis. Some of the drawbacks are that the new programme is resource intensive and may weaken links between laboratory practice and theoretical knowledge.

Meeting Programme

Programme - Day 1 (Tuesday 8th April)

13:00 – 14:00 Arrival and lunch (Wolfson Centre atrium)

14:00 – 15:30 HE Bioscience Teacher of the Year finalist presentations (Wolfson Hall Two, Wolfson Centre)

- Dr Nicholas Freestone, Kingston University
- Dr Peter Kappa, University of Kent
- Dr Heather McQueen, University of Edinburgh

15:30 – 16:00 Tea and coffee (Wolfson Centre atrium)

16:00 – 17:30 Degree accreditation update and consultation (Wolfson Hall Two, Wolfson Centre)

17:30 – 18:00 AGM (Wolfson Hall Two, Wolfson Centre)

18:00 – 19:00 Poster viewing (Wolfson Hall atrium, Wolfson Centre)

19:30 – Dinner and Presentation of HE Bioscience Teacher of the Year and lecture (Grand Hall)

Programme - Day 2 (Wednesday 9th April)

07:00 - 08:45 Breakfast (Winton Suite)

(All below sessions take place in Wolfson Hall Two/atrium, Wolfson centre)

Theme 1: Practical Work project

08:45 – 09:15 Audit of undergraduate practical work project – an update, Joseph Gray, (University of Glasgow)

Theme 2: Off-campus learning

09:15 – 09:45 Getting students to take the bait in an aquatic ecology module, Rachel Stubbington (Nottingham Trent University)

09:45 – 10:15 Advanced critical analysis reading party, Gerald Prescott (University of St. Andrews)

10:15 – 10:30 General discussion of off-campus learning

10:30 – 11:00 Tea and coffee, Poster viewing

Theme 3: Masterclasses

11:00 – 11:30 Biotechnology masterclasses: Postgraduates teaching undergraduates, Leanne Smith (University of Birmingham_

Theme 4: Supporting students for independent practical projects

11:30 – 11:50 Bridging the gap between class practicals and research projects, Francesco Michelangeli (University of Birmingham)

11:50 – 12:10 Team based lab project, Steven Russell (Aston University)

12:10 – 12:30 Extension of research provision to levels 4 and 5, Adrian Hall (Sheffield Hallam University)

12:30 – 12:45 General discussion of project work

12:45 – 13:00 Round up of the day

13:00 – Lunch

Attendee List

Dr Anthony John Baines FSB	University of Kent
Dr Fiona Benson	Lancaster University
Dr Geoffrey Bosson MSB	Newcastle University
Professor Keith Brennan	University of Manchester
Dr Gus Cameron FSB	University of Bristol
Danny Chamorro	Labster
Dr Mark Clements FSB	University of Westminster
Professor David Coates FSB	University of Dundee
Dr Nicholas Freestone	Kingston University
Dr Maurice Gallagher	University of Edinburgh
Gemma Garrett MSB	Society of Biology
Professor Alastair Goldman	University of Sheffield
Dr Kate Graeme-Cook	University of Hertfordshire
Dr Joseph Gray FSB	University of Glasgow
Professor Jonathan R Green MSB	University of Birmingham
Professor Laura Green	University of Warwick
Dr Alan Gunn MSB	John Moores University
Dr Adrian Hall	Sheffield Hallam University
Professor Peter Heathcote FSB	Queen Mary University of London
Professor Janey Henderson FSB	Teesside University
Professor Philip James CBiol FSB	University of Salford
Professor Keith Jones	University of Southampton
Dr Peter Klappa	University of Kent
Dr Sandra Helen Kirk FSB	Nottingham Trent University
Dr Gillian Knight	University of Derby
Dr Susan Laird	Sheffield Hallam University
Rachel Lambert-Forsyth MSB	Society of Biology
Professor Jane Lewis FSB	University of Westminster
Professor Paul Lynch	University of Derby

Professor Hilary MacQueen FSB
Dr Heather McQueen
Zoë Martin MSB
Professor Gerry Mckenna
Dr Darren Richard Mernagh FSB
Dr Francesco Michelangeli FSB
Dr Adrian Pierotti FSB
Dr Michelle Pinard
Dr Gerald Prescott
Dr Angela Priestman
Dr Jim Ralphs
Professor Graeme Reid FSB
Dr Louise Robinson
Dr Vivien Rolfe
Dr Steven Russell MSB
Dr Graham Scott FSB
Professor Jonathan Scott FSB
Leanne Smith
Dr Rachel Stubbington MSB
Tamara Tjitrowirjo
Dr Jennifer Topping
Dr Ian Turner MSB
Dr Richard Waites
Dr Peter Watkins
Simon Watkins

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