



UK CENTRE FOR

**bioscience**



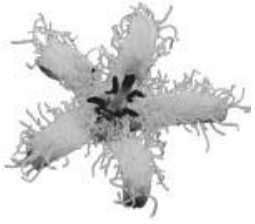
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# UK Centre for Bioscience

**Dr Stephen Maw**  
**Academic Advisor**

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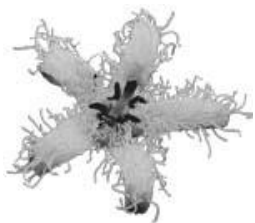
*Supporting teaching in higher education to improve student learning across the Biosciences*



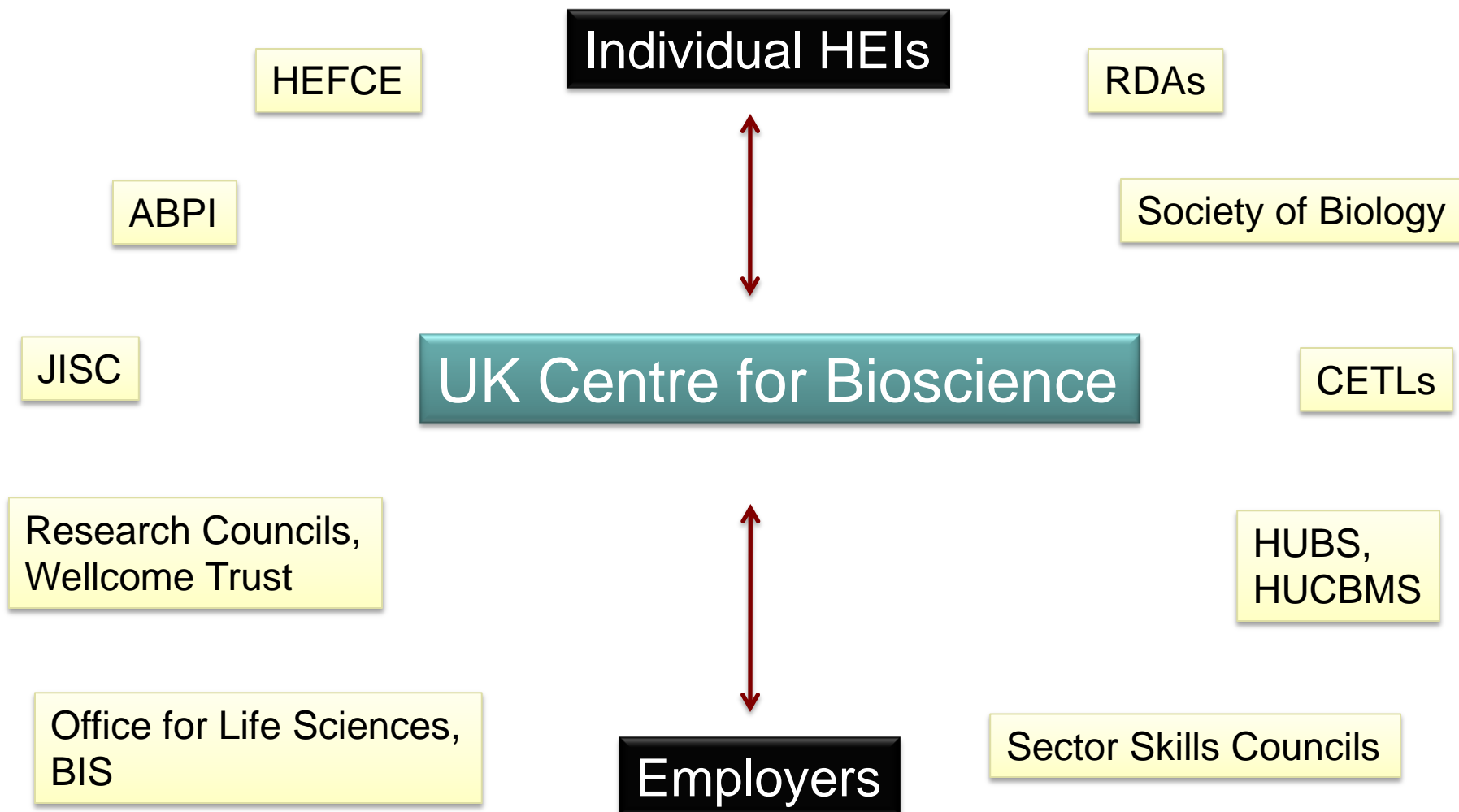
# Background

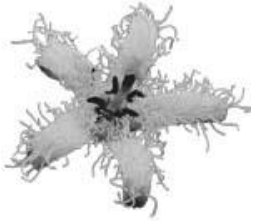
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- Practical work is one of the Centre's key priorities
  - Dealing with empirical subjects
  - Clearly benefits of learning by doing
  - Subject-specific
  - Under threat
    - Unit of resource
    - Timetabling
    - Encroachment of Generic skills



# National Bioscience Skills Resource and Network

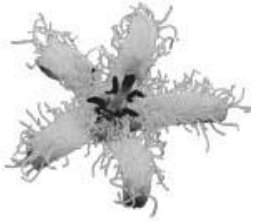




# Background II

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- Opportunities
  - Technological advances
  - Industrial voices
  - Room for improvement



# Background III

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- Challenging questions
  - Limited unit of resource: which practicals and to whom?
  - What are we teaching (LO)? niche skills?
  - Repetition reinforcement; learning by mistakes
  - Where's the inspiration?



# Activities

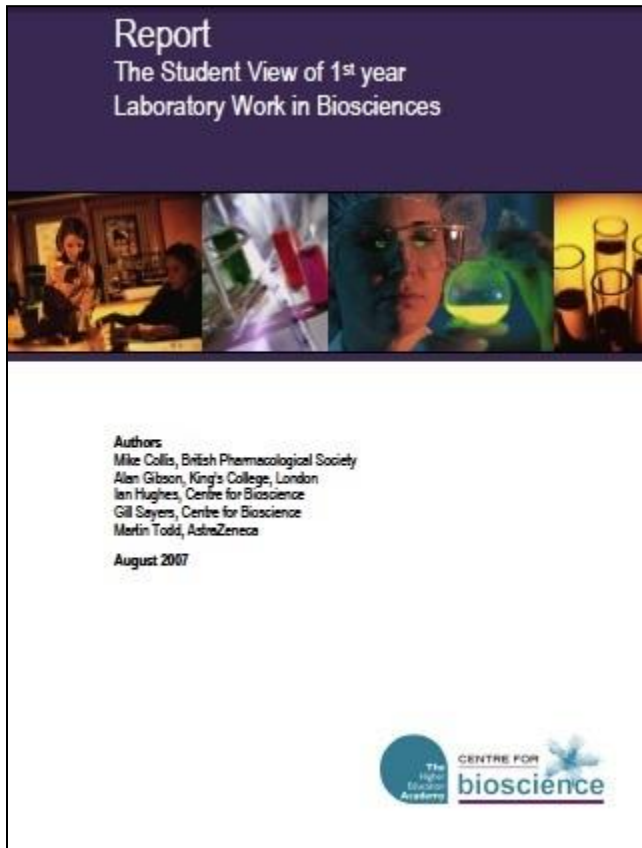
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To support practical teaching and further inform debate we've

- Pressed for strengthening of the Biosciences Benchmark statement
- Undertaken surveys
- Organised events
- OER project
- Produced reports and publications



# 1<sup>st</sup> Year Practical



- Survey of 9 UK universities
- Staff and Student views
- Replace repetitive, boring practicals with challenging enquiry-based exercises around the scientific method



# Response

- Centre workshop
- Communication between different stakeholders
- Dynamic Lab/FieldManual
- Awareness raising
- Identification of good elements
- Sharing

**REPORT**  
**1st Year Practicals: Their Role in Developing Future Bioscientists**

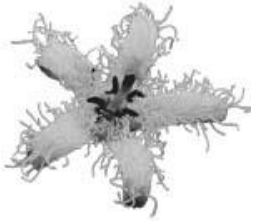
A report of a workshop for invited participants organised by the Centre for Bioscience and sponsored by AstraZeneca Pharmaceuticals and the BBSRC  
Weetwood Hall, University of Leeds, 7-8 April 2008

Published June 2008  
ISBN: 978-0-9548751-2-1

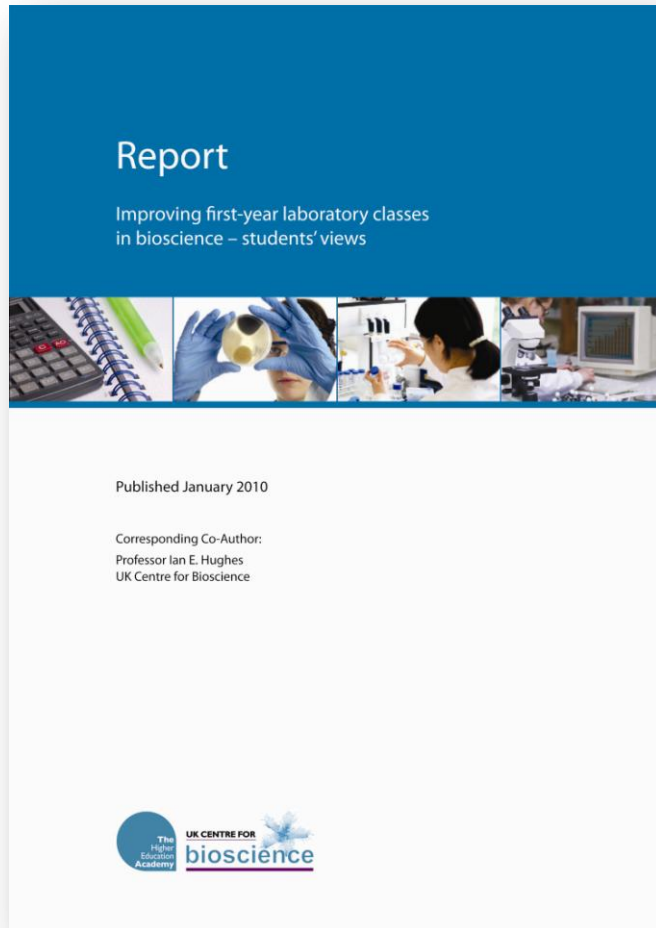
Corresponding co-author:  
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The Higher Learning Academy logo, Centre for Bioscience logo, AstraZeneca logo, and BBSRC logo.

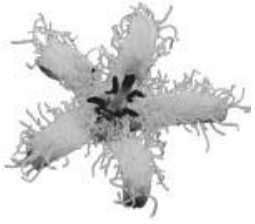




# Commissioned Work



- Survey of student views on good/bad and exciting interesting practicals (1547)
- Australia, England and France
- The work reports remarkable consistency across courses, unis and countries



# Journal Articles

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## Current Trends in Laboratory Class Teaching in University Bioscience Programmes

- exploit computer-based approaches
- encourage enquiry-based learning
- involve students in cutting edge research during scheduled undergraduate laboratory classes

Adams, D. J. (2009) *Bioscience Education*, **13**-3

## Biological fieldwork provision in Higher Education

- Volume of provision not in decline
- Predominantly UK-based
- Tutors were clear about the benefits
- Classification/id skills
- Under threat?

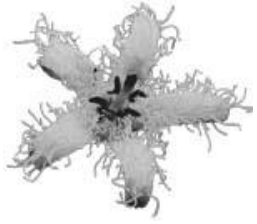
Maw, S.J., Mauchline, A.L. and Park, J.R. (2011) *Bioscience Education*, **17**-1



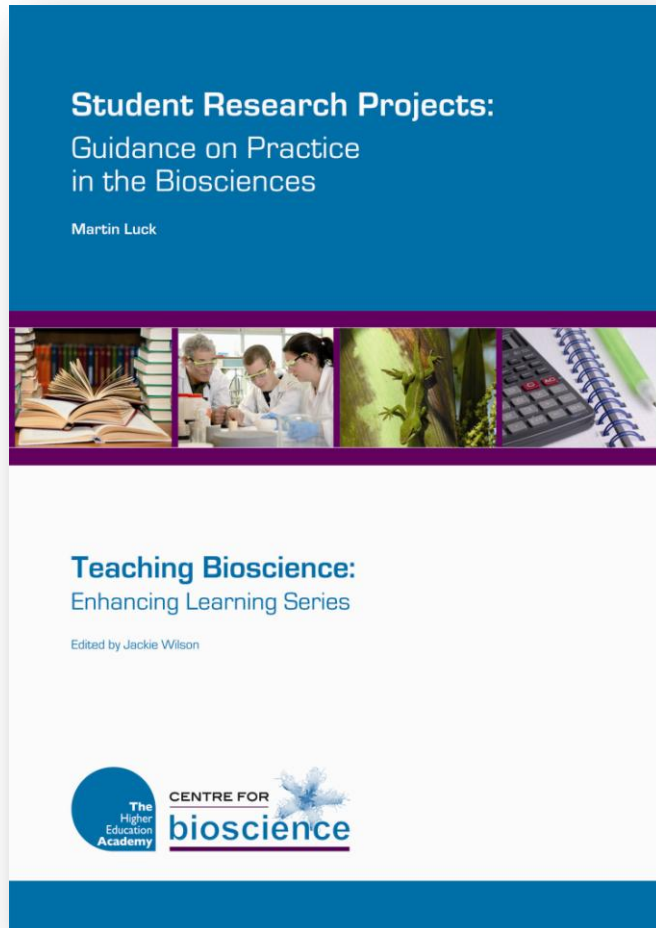
# Problem solving



- Report workshop Dec 2008
- Introduction to the topic
- Series of observations and recommendations
- Case studies



# Student Research Projects



- Outlines pedagogic advantages
- Looks at different forms of FYP
- Assessment
- Bioscience Case Studies



# 'Well-rounded' students

## 21st Century Graduate Skills Short Guide

### Creativity Skills

Prospective employers, government supervisors have indicated repeated problems creatively in laboratory, for undergraduates and postgraduates amount of information from a rapid when asked to solve problems, scientists to find the single correct answer to result there is often very little time approaches to open-ended problem generation of a range of alternative techniques and strategies designed skills in bioscientists.

### Top tips to promote creativity

- encourage *curiosity* – emphasise that major advance in the biosciences often occur because researchers are curious about unusual and unexpected results
- encourage *interdisciplinary collaboration*, both formally (in scheduled sessions) and informally (encouraging students to discuss their ideas, with friends in other disciplines)
- ensure students realise the information you impart is not necessarily written on tablets of stone and it can be a good thing to *challenge assumptions*
- set *open-ended questions* that may have a diverse range of possible solutions

## Report

Developing Problem Solving Skills in Bioscientists



**A report of a workshop for invited participants organised by the UK Centre for Bioscience, Higher Education Academy**

Published August 2009

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UK Centre for Bioscience



Key skills for bioscientists

http://www.bioscience.heacademy.ac.uk/resources/skills.aspx

The Higher Education Academy

UK CENTRE FOR bioscience

10 years supporting teaching in higher education to improve student learning across the Biosciences

Home | Events | Resources & Publications | Funding & Recognition | Networks & Links | News & Information | About us

You are here: Home | resources |

**In this section: Resources**

- A-Z of resources
- ImageBank
- Project reports
- Case studies
- Audit tools
- Resources for New Lecturers
- Pedagogic research resources
- Resource Database

**ImageBank**

**Key skills**

Colleagues will be interested to read recent UK Government agency and other reports that make plain the need for students to acquire a number of key subject-specific and generic skills during Bioscience degree programmes.<sup>1-4</sup> In the UK Centre for Bioscience we have addressed this issue by establishing initiatives, running events and publishing resources that should help develop creative problem solving and practical skills in graduates working in a wide range of workplace settings.

**Practical/Laboratory skills: general**

**The Student View of the First Year Laboratory Work in the Biosciences**

Recently, bioscience students and staff have registered disquiet with current laboratory teaching practice at Level 1 in UK universities.<sup>5-7</sup> Each group agrees that, wherever possible, we should replace lengthy, repetitive, predictable and boring practical classes with challenging enquiry-based exercises that embrace the Scientific Method and encourage students to engage more deeply with course content.

Read more on the Centre's Practical Work in the Biosciences web pages.

**1st Year Practicals: Their Role in Developing Future Bioscientists Report**

This report was a result of an April 2008 workshop involving 32 UK bioscientists from across the UK addressing experiences with practical classes. Visit the Event Report web pages to download the report, view presentations from the day, and copies of practicals and related materials.

**The Centre for Bioscience response**

Following the recommendations from the above reports<sup>5-7</sup> we carried out a detailed review of cutting edge approaches to