

# Talk to US

## Sub-Project Programmes 2014



UNIVERSITY OF  
**Southampton**

‘I know now that researchers are working to improve our everyday lives’

‘Ordinary people train to become doctors, nurses or researchers, anyone can use a microscope.’

# Talk to US

- The aim of this RCUK funded programme of study is to familiarise pupils and teachers with cutting edge research in 6 areas.

## We can offer you;

- Planned and resourced, curriculum based introductory lessons.
- Visits to your school from researchers to help in lessons or after school activities.
- A free pupils visit day to the university to meet our researchers.
- Cover (for one teacher) and travel costs.
- Planned and resourced follow up project.
- Free CPD based on the subject of area of the sub-project and possibilities for masters linked action research.
- Invitation to the end of year celebration event where pupils showcase their work to parents, teachers, researchers and other pupils involved in the project.
- All programmes of study are flexible and can be tailored to suit your specific needs.

In order to assess the impact of this approach, participants (pupils, researchers and teachers) will be required to fill out questionnaires before and after involvement in the project. Some participants will also be asked to take part in focus group interviews.

## Introductory lessons:

The series of introductory lessons are curriculum based and individual lessons can be chosen based on the programme selected for the visit to the university. They include the structure of DNA, evolution, Lie detectors and the autonomic nervous system and the nature of research.

## The University visit:

### Morning session

Two practical lab based sessions run simultaneously.

- Electrophoresis of DNA
- EEG and 'lie detectors'

Each is led by a senior academic and focuses on some of the techniques used in biological research. Pupils will work alongside early career researchers who will show them how to use the equipment and interpret their results. Approximately 15 pupils per session.

### Afternoon session

Teachers can choose between

#### Meet the researcher

In an informal setting, some of the researchers the pupils have worked with during the morning session will lead small group discussions about their specific area of study. Pupils are encouraged before the session to think about any questions they may want to ask.

#### Evolution workshop

Pupils will use the centres extensive collection of animal skulls to look at natural selection and convergent and divergent evolution.

## The project:

Researchers bring *C.elegans*, a model nematode, into school and discuss how it is used with pupils. Pupils can carry out their own simple experiments using the worm to look at a variety of issues from the effects of alcohol to food security. Pupils present their work in the form of a poster to exhibit at the annual showcase.



## Introductory lessons:

Professor Liz Adam, the newly appointed Professor of Imaging Science has been found dead, lying in a pool of blood in the corridor of the Biomedical imaging Unit at Southampton Medical School. Neither Prof. Adam, nor her recent promotion were popular with certain members of the Medical School and initial investigations have revealed several possible suspects.....

Pupils are introduced to the scenario and can choose to watch video evidence in the form of suspect statements or role playing the main suspects themselves. Comparisons can also be drawn between the technology available to 'real' pathologists and forensic scientists and that shown on television shows such as NCIS.

## The Hospital visit:

### Morning session

Pupils will be split into groups led by a member of BIU staff and researchers who use the facility. Each group will focus on a different aspect of the case (ballistics, fingerprinting on different surfaces, forensic document analysis and hair and fur analysis) and use microscopy and other imaging techniques to analyse evidence from the crime scene.

Pupils will also be given a tour of the pathology labs to see how patient samples are collected, treated and analysed.

### Afternoon session

The pupils will hold their own case conferences in small groups with a view to sharing their evidence and solving the case

## The project:

Back in the classroom pupils continue their discussions about the evidence and present their findings to each other. They can also share their expertise in the techniques they used at the hospital and research the uses and limitations of these in solving real crimes. Pupils present their work in the form of a poster to exhibit at the annual showcase.

## Chemistry

# Introductory lessons:

The technique of crystallography is used in many of the research areas in chemistry, including those that the university visit will focus on. In this introductory lesson, pupils look at how the technique works, how it was discovered and what some of its applications may be.

## The University visit:

### Morning or afternoon session

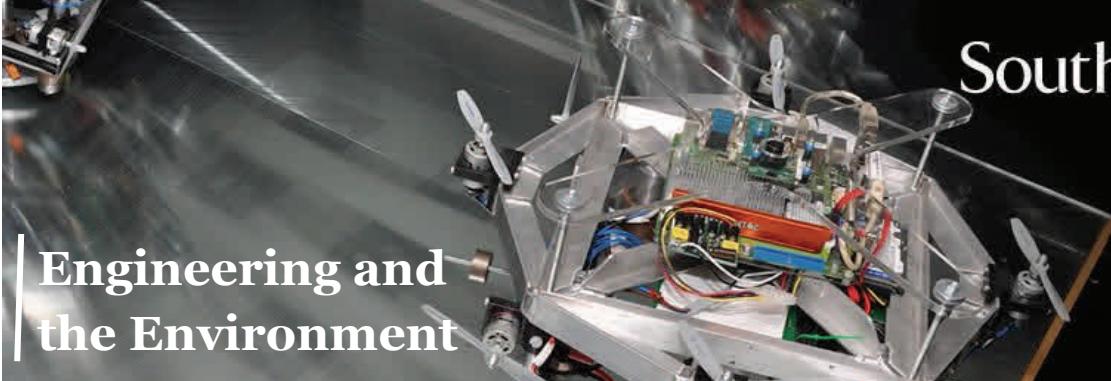
Pupils are given an introduction to Chemistry in one of the departments lecture theatres before heading up to the laboratories for a circus of hands on activities. Early Careers researchers lead each of the three activities which are based on their current research.

These sessions may vary depending on the researchers involved but themes so far have included crystal structure, catalysts and fuel production and the efficacy of different antibacterial agents.

Pupils then return to the lecture theatre to discuss what they have learned and watch a liquid nitrogen demonstration.

## The project:

Pupils carry out their own research into an area of interest from the visit or one set by the teacher. More able pupils plan an investigation to further knowledge in one of the research areas they worked on at the university. Pupils present their work in the form of a poster to exhibit at the annual showcase.



## Engineering and the Environment

# Introductory lessons:

Dragonfly Day aims to inspire **Year 9 female** pupils towards the career and educational options opened up by continued study of STEM subjects post-GCSE.

Introductory work for the day is based on homework tasks.

## The University visit:

### Morning session

Pupils will take part in a series of workshops and talks from the Faculty of Engineering and the Environment. These cover a wide range of engineering topics depending on the researchers involved. Previously, these have included cryogenics, superconductivity and environmental engineering.

Each workshop is led by an inspiring female researchers who will give the pupils an insight into their own research area and introduce the vast scope of modern engineering research.

### Afternoon session

Pupils will have the chance to discuss potential degree courses, engineering options and research directions with a ‘student mentor’. They will also be taken on a guided tour of the engineering facilities (e.g. anechoic acoustic test chamber, wind tunnel, high-energy lab) and the wider Highfield campus to get an insight into life as a university student.

## The project:

Researchers from the University of Southampton will come into your school and lead a session with the female students. This can take place off timetable or as an after school session for enthusiastic pupils. Pupils present their work in the form of a poster to exhibit at the annual showcase.

# Discover your future—Dragonfly Day



## Introductory lessons:

In this series of lessons pupils cover the effect of lifestyle on health and how the choices parents make can affect the health of future generations. The scientific process is also introduced using a number of health related studies as examples.

## The University visit: Morning session

Pupils carry out a circus of activities designed to take various indicator measurements such as blood pressure, grip strength, BMI and lung capacity. The reasons these measurements are important and their potential implications for patients are then discussed.

Pupils also break down their own cheek cells to collect their DNA.

## Afternoon session

### Epigenetics

Pupils use the technique of gel electrophoresis to investigate epigenetics and the idea that a parent's lifestyle choices can affect the health of their offspring.

### Meet the researcher

In an informal setting, medical researchers lead small group discussions about their specific area of study. Pupils will be encouraged before the session to think about any questions they may want to ask.

## The project:

Pupils design their own health related investigation such as 'does drinking coffee make my heart rate faster?' and gather results in small groups. The findings from these investigations are presented in the form of a poster to exhibit at the annual showcase.

**Ocean and Earth Science  
National Oceanography Centre  
Southampton**

## Introductory lessons:

Student Ambassadors and researchers from NOC, Southampton's world leading National Oceanography Centre come into your school to discuss the nature of Oceanography and the diversity of the subjects it covers.

## The University visit:

Classes will be split into two groups and complete one session in the morning and another in the afternoon.

### Sampling on Southampton Water

Pupils will go out onto Southampton Water on one of the centres sampling vessels. They will measure salinity and pH at various points and sample some of the organisms that live in this environment. They will use comparisons of these measures to examine the impact that Fawley Oil Refinery has on the area.

### In the Aquarium

Pupils will look at the huge variety of species in the aquarium and use these to create their own food webs and food chains. They will also look at plankton samples from Southampton Water and carry out plankton counts to assess the health of a particular area.

A short talk will be given in the centres lecture theatre on the impact that oceanography can have in fields such as climate change.

## The project:

Pupils use the data and samples collected to produce a report on the 'health' of Southampton Water. Researchers visit classes to assist with this process. Pupils present their work in the form of a poster to exhibit at the annual showcase.

# Curriculum areas covered:

| Sub Project                | KS3   | KS4  |
|----------------------------|---|--|
| <b>Biological Sciences</b> | Genetics & evolution<br>Relationships in an ecosystem<br>Cells and organisation   | B1, B3, B6, B7 (modern agriculture).   |
| <b>Biomedical Imaging</b>  | Working scientifically<br>Scientific thinking and collaboration<br>Practical and enquiry skills<br>Critical understanding and communication |  |
| <b>Chemistry*</b>          | Particulate nature of matter<br>Pure and impure substances<br>Changes in systems<br>Matter  | C1, C2, C4, C5, P3, B2, B7 (fossil fuels and sustainability).                  |
| <b>Dragonfly*</b>          | Electricity and electromagnetism<br>Relationships in ecosystems<br>Matter   | P3, B3, P7 (sustainable energy).   |
| <b>LifeLab</b>             | Nutrition and digestion<br>Gas exchange systems<br>Health<br>Genetics and evolution   | B1, B2, B5, B7   |
| <b>Oceanography</b>        | Interactions and interdependencies<br>Chemical reactions<br>Earth and atmosphere  | B3, B7 (ecosystems and biodiversity/ fossil fuels and sustainability), C1, C5. |

\* content and therefore curriculum areas covered depend on the specialisms of the researchers involved.

‘I found the things we learnt really got stuck in our heads’

‘I would definitely recommend it to other people because we learnt loads of stuff. It’s not one of those trips where you just go and do lots of writing; it’s one that you can get involved with so it was really good’

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or visit

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research/epsrc.page](http://www.southampton.ac.uk/lifelab/research/epsrc.page)

'Now I know anyone can be a researcher no matter what age. If they just want to do something and they study hard, they're a researcher. So I could be a researcher if I put my mind to it.'