

Researchers in Residence (RinR), funded by Research Councils UK with support from the Wellcome Trust, is a programme enabling researchers to spend time in a school working with young people. The researchers offer an 'added extra' to host schools, giving students an opportunity to experience real-life research and be inspired. Importantly, researchers build on their skill-set by preparing and presenting work to a different audience. RinR is open to all PhD and postdoctoral researchers funded directly or indirectly by one of the seven UK Research Councils or the Wellcome Trust. SGM member Nicola Cumley tells Jane Westwell about her experiences as a researcher in residence.



Nicola in the classroom. Nicola Cumley

Researchers in Residence

After signing up to RinR, I attended a day of training where we learned about the scheme. A researcher who had previously completed a placement shared their experience. We had a go at activities aimed at making us think how to explain our research to a non-specialist. We were also given tips on how to prepare for going into school. Training completed, I was paired up with a school and host teacher, and it was over to me.

PREPARATION, PREPARATION, PREPARATION

The teachers at my allocated school were incredibly helpful and dedicated. Although I had decided to be flexible and let them lead in deciding what I should cover, they sent me the microbiology section of the GCSE syllabus with the instruction that I could cover what I wanted! This was slightly daunting. I had hoped to talk about infectious diseases, but their chosen syllabus focuses on industrial applications of microbes.

All this happened in the space of 3 weeks: from meeting the teacher to standing in front of a class. I set about making some ambitious lesson plans based around every part of the syllabus. Luckily, I decided to revisit the school, discuss my plans with the teacher and observe a lesson. The teacher gave me helpful tips on preparing handouts, splitting the lesson up into activities and how much to prepare for each lesson – she told me that what I had prepared was too complicated and lengthy! I met the technicians who were fantastic; they helped me to organize my practicals, with advice on what would work and what equipment they had. It did get a bit stressful: I didn't know how to pitch the lessons or how much could be covered, and I was keen that the students should learn something relevant to their course, whilst having a bit of fun. The most nerve-wracking thing was that I had 6 lessons with the same class. If it all went wrong on day one, I was going to have a miserable 5 hours over the next few weeks...

THE PLACEMENT

I started each class with a quiz, which the students liked! The questions were a mixture of what we had discussed previously and some which were just a bit silly (from a *Horrible Science* book).

My first session was 'What are microbes?' I had set up stations around the classroom with different microbiological items, and the students had to have a look, read the information, then answer the questions. Items included slides with the malaria parasite and mosquito, bacteria on blood agar plates, mushrooms and, the star of the show, a tapeworm in a jar. I also described the different classes of microbes and, with the aid of Maltesers (viruses), fluffy *E. coli* (bacteria), a balloon (fungus) and a 100 m running track, explained microbial size. The students were fantastic, they all got involved and asked questions. Already my opinion of teenagers was changing – they were very real and very smart people. I covered about a third of what I had prepared, but it worked!

Before the next lesson, they all looked at me expectantly as I arrived. I think they were hoping I was going to continue talking about poo and passing tapeworms, but now we were moving on to more serious science. Session two was 'Microbes are everywhere'. We covered aseptic technique and swabbing benches. In this session I had to demonstrate practical methods – something I had not really thought through. So I was at the front, not able to work the Bunsen burner, in oversized gloves, an apron and safety goggles so scratched I couldn't see a thing! I also realized not everyone understood the scientific terms I was using such as 'broth' and 'agar'.

The third lesson was the most 'experimental', demonstrating what microbes need to grow. I had brought some broth cultures



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that the students incubated under different conditions. I loved it, but I think they found it a bit too complicated. Maybe one day they might remember doing something with bacteria and them needing amino acids to grow!

The next session focused on how bacteria grow. I took some spectrophotometer readings and got the students to plot a graph. Then we discussed how a population grows. Although I didn't think this would be an exciting session, the students seemed to like it and it sparked some interesting discussion about natural selection and microbes' role in the food chain.

Back to the syllabus for lesson 5, and we talked about different uses of microbes in industry. I had asked them to find uses before the lesson and then list them. The practical element to this was watching how yeast could make bread rise at different temperatures.

The last session on swine flu was a bit more topical. Several schools in the area had recently been closed and there had been a few cases at this school. I showed them the latest HPA and WHO figures and tried to put the disease into context away from the media hype. I then asked them

to make a poster answering one FAQ on flu, including 'What is a pandemic?' and 'Why do you think the West Midlands has more cases of swine flu than elsewhere in the country?' This activity bought out some excellent posters and answers. Once again, I was impressed with their intelligence, enthusiasm and the interest they expressed.

WHAT DID I GAIN FROM THE EXPERIENCE?

The whole experience was really uplifting, but incredibly hard work. I had prepared at least three times more material than could be covered, and trying to organize the equipment needed for each session was really difficult.

It was scary standing up in front of a class knowing you have to keep their attention for the next hour. In the second lesson, the overhead projector was broken so I couldn't use my carefully prepared Powerpoint presentation. Once I had got over the initial panic, I learned it was better to use the board instead, and use Powerpoint for images. This took less preparation time and was less distracting for the students.

I gained a huge respect for teachers. The experience gave me an insight into what a hard and amazing job they do. I was fortunate to work with some great people who inspired me. I also developed a huge respect for teenagers – everyone should go and visit a school to realize that they are not at all like they are reported in the press.

WHAT THE SCHOOL GAINED

It is hard for me to say what the school gained. I think the pupils enjoyed the chance to see different aspects of microbiology and meet someone who is not a teacher. I hope that it might have sparked at least one of them into studying biology further. A similar meeting with a microbiologist encouraged me when I was at school.

WHAT NEXT?

I have now signed up to be a STEM ambassador, a national scheme to encourage people working in science to get involved with schools. I would really recommend the researchers in residence experience to anyone who likes talking about science!

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FURTHER INFORMATION

- www.microbiologyonline.org.uk – SGM education website
- www.sgm.ac.uk – 'Microbiology in the News' and 'Micro Encyclopedia' from the SGM website
- www.researchersinresidence.ac.uk/cms/ – researchers in residence website
- www.hpa.org.uk
- www.fungi4schools.org
- www.cellsalive.com

Dr Gemma Walton from the Department of Food & Nutritional Sciences, University of Reading, is the recipient of the 2010 SGM Outreach Prize. Here she summarizes some of her recent activities. Gemma will deliver her Prize Lecture at the SGM autumn meeting in Nottingham (see enclosed booklet for details).

Filming the 'ranchers' in Colorado. Gemma Walton



More than a gut feeling...

I have always enjoyed outreach activities with school groups visiting the lab – seeing the 'urgh' moment when a class realize that to study the bacteria within the gut we have to use faeces! But more than this, it is when members of the group become interested and enjoy the activities.

In 2007, I helped to organize the department's display stand at the Royal Society Summer Science Exhibition – it was a great opportunity to convey our research and the world of microbes to a wide range of visitors, making for a really enjoyable week.

Thanks to Professor Glenn Gibson, I have been involved with several media activities, including the cowboy-themed (*Blazing Saddles* style) episode of the BBC's *The Truth About Food*. It was an unmissable chance to convey the concepts of prebiotics and probiotics to a wide audience, in a humorous way, in the beautiful setting of Colorado. Of course, it was not all glamour – I was studying the faeces of cowboys on different diets! The ranchers, the film crew and the

Gemma on set. Gideon Bradshaw



presenter, Fiona Bruce, were all really friendly, making it a great experience.

Following this, the CBBC programme *Gastronuts* was making an episode on flatulence. I was quizzed by children and the presenter, Stephan Gates, on the what, why and how of flatulence – while they tried to eat the most flatulence-inducing diet – making for an amusing look at microbiology.

For me the great thing about the area of gut microbiology for science communication is that everyone can relate to it!

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