

2016

Training PhD graduates to become excellent STEM teachers



Researchers in Schools: A Case Study

Researchers in Schools' approach to teacher training

Researchers in Schools (RIS) is a teacher training and professional development programme exclusive to researchers who have completed a doctorate, designed to attract talented subject specialists into teaching. By training researchers to become highly-effective classroom teachers and future subject leaders in the education sector, The Brilliant Club **aims to increase and disseminate subject expertise, promote research and champion university access** within schools. At the same time, the RIS programme enables trainees to maintain an academic profile by providing time and financial support for research projects.

The RIS programme was created as a result of demand from headteachers, who were keen to attract more subject specialists into their classrooms – and from postgraduate students and researchers for a route into teaching that utilises the skills of researchers. Following the success of the 2014 pilot cohort, who not only qualified as teachers but also delivered a range of academic enhancement activities and undertook research.

RIS partners with a range of companies that seek to address the recognised shortage of young people from under-represented backgrounds progressing into higher education. Our partners recognise the value of inspiring the next generation to take up opportunities in business and to make them aware of what they need to achieve academically. Partners provide excellent classroom materials aligned to their CSR programmes, unique pupil experiences, educational roadshows and more.

Researchers in Schools is run by **The Brilliant Club**, an award-winning charity that works to increase fair access to highly selective universities. Through the Scholars Programme we also recruit and train researchers to work as PhD tutors in non-selective state schools, delivering programmes of university-style tutorials and access trips to universities.

We work in partnership with over 400 schools throughout England and have reached over 10,000 pupils since 2011. The programme is delivered in partnership with universities including Oxford, Cambridge, Warwick and King's College London.



Dr Riccardo Porcari

Science teacher at Challney School for Boys, Luton



I love being a teacher because it allows me to inspire young adults and pass on my passion for science to them. As a researcher in school I am able to keep my own research ongoing, keeping myself updated and nurturing my own passion for the subject. The widening participation focus of the programme allows me to bring new courses to the students and to the school, which is very beneficial for both.



"I haven't had a chance to come by and say thank you for all your help. I have been meaning to for a while, but this afternoon I got an email saying that I have been accepted into the LSE programme! I am so excited and wanted to say a huge thank you as I know that I couldn't have done it without your endless support and help. Thank you for all your time and kindness."

Year 13 Pupil

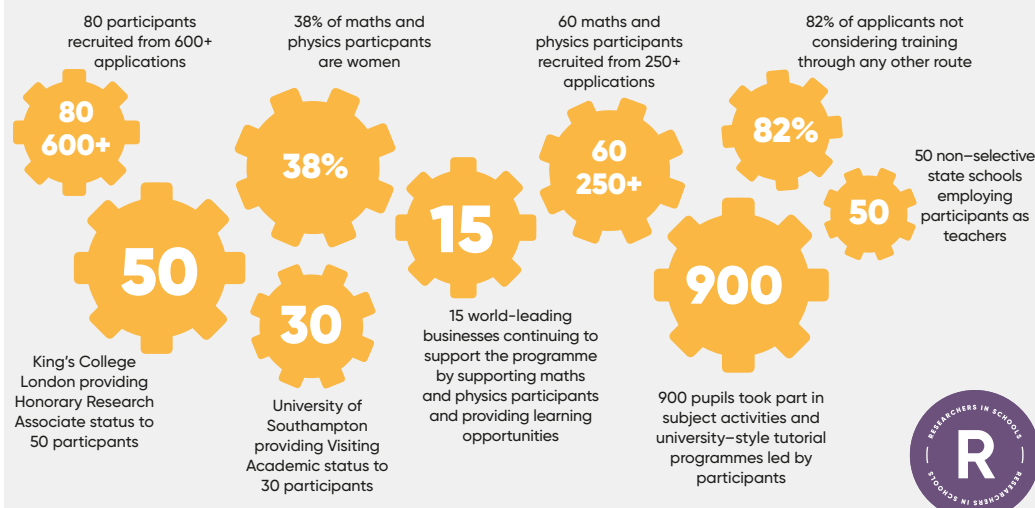
"Each of our RIS trainees will be a great asset in schools next year. Competent in practice they are eager to develop further energy, enthusiasm for pupils' learning, ability to cultivate fruitful learning relationships with pupils, speed of understanding and uptake of ideas and skills. They all, in their different ways, have high motivation and wish to make a difference to the lives of urban young people."

Brian Wakeman, Chiltern Training Group

What is unique about RIS?

- All trainee teachers have a PhD in their subject
- Teachers have one day a week off timetable to pursue the programme aims
- Teachers maintain an academic profile through Honorary Research Associate status with University of Southampton or Kings College London
- Teachers receive a budget to pursue academic research

2015 Cohort



Researchers in Schools – A STEM Solution

In partnership with the Department for Education, RIS has supported over 80 maths and physics PhD graduates to train as teachers since September 2014.

Against a backdrop where only 1 in 4 physics teachers have studied the subject beyond A-Level and where 1 in 5 state schools have no pupils progressing to study further maths or physics at A-Level, Researchers in Schools are placing committed teachers who are passionate about their subject into the classroom.

By placing subject experts in the classroom the programme aims to increase the uptake of maths and physics at both GCSE and A-Level, to raise attainment and to increase the number of pupils progressing on to STEM degrees and careers.

Our teachers aim specifically to reach pupils that traditionally would not have considered a STEM career or further education for them, including pupils from lower-income households and young women. Teachers undertake focussed interventions with these under-represented groups. RIS is particularly proud that 38% of our teachers are female, challenging gender stereotypes and providing excellent role models for young women. Our aim to promote female achievement in maths and physics is shared by many of our corporate partners who provide interesting and exciting opportunities to young women.

What RIS has achieved in STEM:



Dr Mauro Mantega
Physics Teacher, Feltham
Community College

“In February 2015 and March 2016, I took 40 pupils to visit Imagination Technologies, many of whom are studying Computer Science for their A-Levels. They learnt all about the company and the roles available for young people in STEM industries – from product design to engineering and beyond. They also had the chance to visit the demo room and get their hands on some of Imagination's latest products. The high definition gaming displays were a big hit! Pupils also visited the lab and were able to see the testing and repair of microprocessors and speak to technicians about the problems that they encounter, and how they work to solve them.”



Anna Haslam
Head of Social
Investment, Shell UK

“Shell has been inspiring young people about science and engineering for over 50 years. The teachers we sponsor have thrown themselves into the opportunities we have provided; from visiting our Upstream operations in Scotland to learn about engineering in action, through to running careers workshops and hands-on activities in the classroom. Ensuring students are taught by inspiring subject-experts, and have access to exciting opportunities like these, will help them fulfil their potential.”



Dr Clara Sousa-Silva
Physics teacher, Highams
Park School, London

“As a researcher I always found outreach really fulfilling but I wanted to have a more active role in education, particularly trying to get girls into science. Through Researchers in Schools I was given the opportunity to work with hundreds of students. Working with them every week, I feel like I'm having a real impact on their education, while being able to continue my astrophysics research. I could then bring this research into the classroom, making students not just observers but participants in modern science.”

Extra-curricular courses delivered by RIS Teachers in 2015/16:

- From Bikes to Cars: Testing Designs using Computational Fluid Dynamics
- Nanorobotics: Locomotion at the Nanoscale
- Solar Cells: Renewable Energy Research and Uptake
- Nuclear Fusion: Can We Harness the Power of Stars?
- Designing Buildings for Climate Change
- Can We Build a Bionic Eye?
- Green Machines – Hydrogen Fuel Cells for the Future's Cars



“I was torn between going into teaching and sticking to research and RIS provided the opportunity...to do both.”

2015 Participant



Case Study:

The Chiltern Training Group & Denbigh High School For Boys

About the School

Denbigh High School For Boys, part of The Chiltern Training Group in Luton, recruited two Researchers in Schools participants in September 2015. Denbigh has a strong national reputation and has been recognised as one of the top 100 non-selective state schools in the country.

With over 41% of pupils on free school meals (only 2% of pupils with FSM go on to secure a place at a highly-selective university) Denbigh High School exceeds the national average of 28.5%. Ofsted reports that Denbigh is effectively closing the gap in attainment between 'disadvantaged' and 'other' pupils though this is not yet at national level.



Why Researchers in Schools?

Despite having a great national reputation Denbigh still struggles to recruit science teachers. In light of this need Denbigh were keen to explore the positive impact Researchers in Schools participants could have in the classroom. Denbigh were particularly keen to use participants' subject knowledge to challenge pupils and to raise the level of debate amongst teaching staff.

Working towards the aims of the programme at Denbigh

1 Increasing Subject Expertise

One year into the programme school mentors are pleased with the progress the teachers are making, they have observed that participants are quick to learn and maintain an excellent subject knowledge. An independent assessor noted that RIS participants maintain a high level understanding of their subject which they are able to impart to pupils and share with peers, helping to spread best practice within the school.

"[My mentee has] never come into the lesson and not been able to answer a question. She always knows her subject area very well."

School Mentor

2 Championing University Access

Participants have advised pupils on potential career paths, what they need to focus on academically and what they can expect at university through their teaching and additional RIS activities. They report seeing a positive impact on the aspirations of pupils with high attainment through these focussed interventions.

"The pupils are not used to talking to people even with degrees, let alone with PhDs. These could well be the only people they've met who have got PhDs, and so if they've got a role model there, it's really, really helpful...to give children from poorer backgrounds that leg-up that they need to get into HE."

Chiltern Training Group Staff

3 Promoting Research and Widening Participation

In addition to teaching duties participants ran further activities aimed at promoting research, widening participation and further supporting subject attainment. Dr Safa Sharaf, a RIS teacher at Denbigh used his background in science to set up the 'Girls in Engineering, Maths and Science' (GEMS) Club. The first year of the programme worked with pupils in year 10 and 12 and focused on his academic subject area 'multiphase flow', the idea that something can be 2 of the 3 usual phases; solid, liquid and gas, at the same time.

Dr Sharaf's GEMS Club was shortlisted by talent 2030 and 5 pupils were taken to the Big Bang Fair at the NEC and on completion of the course all successful pupils attended a 'graduation' at Prudential UK's head office where they heard from staff members about their own academic paths and current careers.

"[Researchers in Schools Participants] have all brought invaluable high level understanding of their subject disciplines that they have been sharing with pupils both in lessons, extra-curricular activities, and with colleagues. Schools are fortunate indeed to have such valuable sources of inspiration for pupils' higher levels of learning, and aspirations for higher education."

Brian Wakeman, Chiltern Training Group

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Multiphase flow has Maths, Physics and Engineering combined and will test (and hopefully motivate!) the student in all of these areas and the challenge will be to apply familiar maths or physics concepts in an unfamiliar setting and to a new subject.

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Dr Safa Sharaf
Physics teacher at Denbigh

