Impact Report 2019
Oxford and Reading

Promoting social mobility and diversity in STEM
Foreword

Dr Rebecca McKelvey
in2scienceUK Founder and CEO

Our mission is to support all young people, regardless of wealth, to achieve their potential and progress to degrees and careers in the science, technology, engineering and maths (STEM) sector. We know that poverty and social background remain huge barriers to progressing to university and high skilled STEM and research careers. This is worrying as it doesn’t just lead to a waste of talent, it results in a huge under-representation of people from these backgrounds in the sector. Research shows that diverse workforces improve problem solving, innovation and developing a pathway to social mobility for poor communities. Importantly, focusing on diversity will also help to tackle the ever-growing skills shortages impacting the STEM arena, which is crucial to our economy.

The in2scienceUK programme works by leveraging the passion and expertise of researchers and STEM professionals and puts them at the heart of the solution. These inspiring volunteers support the young people we work with by hosting work placements, delivering workshops and skills days and acting as mentors and role models. This year our brilliant volunteers delivered over 4 years worth of mentoring and support hours. They have really made the difference. I would like to thank all of our supporters and volunteers who are committed to our mission and work with our young people year on year.

Stephen Hancock
in2scienceUK Director of Regions

Programme growth

In 2019 we have continued to expand our programme, enabling us to give more young people the opportunity to participate in exciting STEM placements, across the South East, South West and East of England.

This impact report highlights the success of these experiences and the positive impact our volunteer hosts have in providing in2scienceUK students with the knowledge, skills and confidence to pursue careers in STEM.

In 2020, we will be expanding our programme to the Midlands. By 2022 we aim to provide over 1,000 placement opportunities each year in all regions of England and across the UK.
in2scienceUK addresses two critical national challenges: a deficit of STEM skilled workers in the UK and the fact that young people from low-income backgrounds are less likely than their wealthier peers to progress to university and onto STEM careers.

18 year olds from the most advantaged socioeconomic group are **15 times more likely**

to enter a highly selective university compared to the least advantaged group

(UCAS End of Cycle Report, 2018)

**Diversity in STEM**

- Under 10% of life science professionals...
- 15% of academics...
- 6% of doctors...

...are from working class backgrounds

(Social Mobility Commission, 2017)
in2scienceUK creates opportunities for young people from low-income backgrounds to progress to STEM degrees and careers, so that they can achieve their potential and become the next generation of researchers, innovators and pioneers. We work towards a future where young people feel able to pursue STEM careers regardless of their background, and where STEM professionals reflect the diversity of the UK.

Improving access to STEM careers would:

1. **Increase the pipeline of UK STEM**

   There is an annual shortfall of 40,000 STEM skilled workers with the number of future technical jobs forecast to increase (UK Commission for Employment and Skills Report, 2017). Increasing the numbers of disadvantaged students in STEM careers is vital for the UK’s economic competitiveness (Broughton, 2013).

2. **Promote social mobility**
   
   As STEM workers typically earn 20% more than in other fields, getting more young people from low-income backgrounds into these professions promotes social mobility and fights economic inequality (Greenwood et al., 2011).

3. **Build a more diverse workforce**

   Businesses with diverse and inclusive cultures perform better financially, reduce staff turnover, and maintain increased creativity and problem solving capacity (Desvaux et al., 2007; Forbes Insights, 2011).

4. **Increase science capital**

   There are economic, political and social benefits to increasing science capital in all segments of the UK. In this technological age, it is vital that all people have the tools to communicate effectively, assess complex information and distinguish fact from fiction.
in2scienceUK works with students from the most disadvantaged backgrounds and provides them with the skills, knowledge and confidence they need to progress to university and further training on to STEM careers.

We work hard to ensure that students who will most benefit from our programme are offered a place. Students are selected based on their free school meals eligibility, family higher education history and deprivation levels in their local area. We work only with students attending non-selective state schools, and give priority to students with no other opportunities and from backgrounds under-represented in STEM and in their subject of interest.

These demographics are specific to the 2019 Oxford and Reading programme.
in2scienceUK has worked with 39 volunteers to find 44 young people inspiring STEM placements across 19 STEM departments in Oxford and Reading.
Science capital refers to “all of the science-related knowledge, attitudes, experiences and resources that you acquire through life” (Enterprising Science, 2016). The more science capital you have, the likelier you are to pursue science at A-Levels, university and beyond.

Young people from low-income backgrounds have lower levels of science capital and lack access to quality careers advice and university application support (Archer and Moore, 2016). They are also more likely to find science difficult to engage with, and may view it as irrelevant to their values or everyday life. This affects their ability to explore and make informed choices about science career paths. **in2scienceUK works to tackle these barriers by enhancing these students’ science capital.**

in2scienceUK’s impact reflects the components of science capital, including engagement with and confidence in STEM, scientific literacy, and the availability of careers advice and role models.
We surveyed students before and after their Oxford & Reading in2scienceUK programmes to assess changes in their science capital.

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<tr>
<th></th>
<th>Before</th>
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<th>After</th>
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<tbody>
<tr>
<td>Met a scientist or engineer</td>
<td>57%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>I know quite a lot about science and/or engineering</td>
<td>34%</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>I have written an essay about a STEM topic</td>
<td>36%</td>
<td></td>
<td>62%</td>
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We surveyed students before and after their Oxford & Reading in2scienceUK programmes to assess changes in their science capital.

### Before

- I feel confident introducing myself to a science or engineering professional in person: 64%
  - Yes: 64%
  - No: 36%
  - Unsure: 0%

- I know where to seek support and advice about the university application process: 41%
  - Yes: 41%
  - No: 36%
  - Unsure: 23%

- I have read an academic STEM research paper: 39%
  - Yes: 39%
  - No: 29%
  - Unsure: 32%

### After

- I feel confident introducing myself to a science or engineering professional in person: 81%
  - Yes: 81%
  - No: 16%
  - Unsure: 3%

- I know where to seek support and advice about the university application process: 70%
  - Yes: 70%
  - No: 20%
  - Unsure: 10%

- I have read an academic STEM research paper: 81%
  - Yes: 81%
  - No: 19%
  - Unsure: 0%
We surveyed students before and after their Oxford & Reading in2scienceUK programmes to assess changes in their science capital.

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<th>Before</th>
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<tbody>
<tr>
<td>I understand the content and structure of a range of STEM degrees</td>
<td>39%</td>
<td>78%</td>
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<tr>
<td>I know someone outside of your school who would give you feedback on your UCAS application</td>
<td>34%</td>
<td>81%</td>
</tr>
<tr>
<td>I know a number of diverse careers I could enter with the degree I am choosing</td>
<td>55%</td>
<td>76%</td>
</tr>
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I understand the content and structure of a range of STEM degrees

- Yes
- No
- Unsure

I know someone outside of your school who would give you feedback on your UCAS application

- Yes
- No
- Unsure

I know a number of diverse careers I could enter with the degree I am choosing

- Yes
- No
- Unsure
Before their in2scienceUK placement, 57% of students had met a scientist or engineer.

After their in2scienceUK placement, 100% of students had met a scientist or engineer.

These students are given the opportunity to engage with science in a wider context.

Students who have met a STEM professional can better understand what a career in science may look like, and gain high-quality, informed, career support.

These experiences with science outside of the classroom can inspire, and allow them to maintain their passion for science in the future.
Public engagement and promoting diversity in STEM is at the heart of what we do. Our inspirational volunteers most of whom are researchers benefit from engaging with young people from a background they might never meet in everyday life. Our public engagement writing, film and image competitions ensure research can be easily disseminated to students, their families and the community.

Kieran Power-Lydon: MRC Brain Network Dynamics Unit, University of Oxford

“I’ll be honest, I thought all researchers would be sat at their desks not talking. But working in this lab has been fantastic!”

Kieran spent his placement with the MRC BNDU and was able to work with Dr Gihan Weerasinge, whose group focuses on Parkinson's disease. Kieran experienced both experimental and theoretical work, as well as gaining experience in computational neuroscience, working on a project in MatLab and learning how it is used to analyse data.

“I was surprised by how approachable the researchers were, and the diversity of the group. The team of scientists is made up of people with different research specialisms, training and perspectives. It was interesting to experience first-hand the collaboration involved in making scientific discoveries, and to get in-depth and understandable answers to my questions.”

“This placement will make my university application unique, the level of experience of research is rare for applicants, and will make me stand out as a candidate. I feel as though I am well-placed to talk about the collaborative nature and reality of modern labs and I also have been able to see and understand the format of research papers.”
Maleehah Ali  
School of Biological Sciences, University of Reading

“I would definitely recommend that anyone even slightly interested in science does a placement with in2scienceUK.”

Before Maleehah started her placement, she had not heard of the field of neuroendocrinology. But during her placement with DeAsia Davis, she investigated the production of the hormone Neuroestrogen and its effects on social behaviour. She analysed the effects of a drug on Neuroestrogen levels in mice and calculated the ratios of types of cells in tissue samples.

“I have asked DeAsia a lot of questions about going to university and the process beyond being an undergraduate. I was worried about being stuck in one field when I chose a course, but it turns out it’s quite flexible until PhD level. She helped a lot in that way and I feel I can ask her questions going forward in my career.”
in2scienceUK works with volunteer STEM researchers in academic settings to provide students with inspirational work placements, giving insights into cutting-edge research and promoting access to universities. Our hosts are key to our impact, providing opportunities as well as being positive role models.

Case Study

Aditi Dahal: Weatherall Institute of Molecular Medicine, University of Oxford

“I was so surprised by the collaboration involved in research, everyone contributes and there are many roles involved in making it all come together in the end.”

Aditi spent her placement shadowing David Fawkner-Corbett at the WIMM. Her placement engaged her in everything from biopsies and separating white and red blood cells, to flow cytometry and computational analysis.

“Being able to work with a varied team, I was able to speak to current researchers about what the University application process was like for them. I also got to understand how they got to where they are today, and what it's like to be doing both clinical work as well as research, which was really interesting for me.”

“I am currently doing my EPQ (Extended Project Qualification), looking at gene therapy for sickle cell anaemia. Being able to speak to a specialist in this field has given me a much better understanding, and taken my project to a new level and direction. I would not have got this experience otherwise.”

This placement has helped Aditi affirm her choice of career, and her goal is to go on to work both in research and practice.
Abi and Gersi were on placement with Dr Alexandra Ramadan at the Department of Physics, University of Oxford. In their placement, they constructed solar cells, layer-by-layer, involving techniques and skills including using a glovebox and spin coating.

“Alex has made the experience exceptional. I know that I am interested in studying particle physics, but now I know what I can do with it as a career.” Abi

Gersi said that the placement had been very beneficial due to the exposure to the realities of research: "The bad side is that sometimes things go wrong or it takes a long time. The good side is how rewarding it is when it works. It makes it all worth it.”

The placements have made both students interested in research in the future and both are pursuing university study: Abi wants to study particle physics and Gersi wants to study chemical engineering.
in2scienceUK works with leading STEM businesses to leverage their employees’ passion and expertise to provide bespoke programmes. Here, employees play a crucial role to deliver life-changing opportunities to students who lack access to these resources through their families and schools.

Amina and Kiara spent their placement at Vitaccess, a digital healthcare research company. Speaking to various members of the team, they learned about software development, user interface and user experience, and healthcare economics, as well as experiencing AI at the Oxford Centre for Innovation.

Both students learned to program in R to validate, present and analyse data and had the opportunity to improve on using Python: “The placement has given me some brilliant ideas for my A-level Computing project. I’ve learned new modules that’ll improve my code, and areas to watch out for that I hadn’t even considered, like user accessibility.” Kiara.

“I didn’t know that digital healthcare existed, and I never thought I’d want to do programming. But after doing this, I’m considering a career in software development.” Amina.

“"I had never considered all the applications of software, like healthcare. It’s something I would really consider going into, and would love to work in a company like this.”

Amina & Kiara : Vitaccess
I really enjoyed my experience and am very grateful for having the opportunity to meet with so many amazing scientists. I also learnt about how important bioinformatics is and how having the skill will improve my employability.

My in2scienceUK experience has completely pushed me out of my comfort zone. Not only did I meet like-minded people, but I also met some inspiring scientists who showed me their passion for science. This programme (from the PhD students, workshops, experiments, presentations, meetings, to other in2scienceUK students) reassured me that research is the kind of STEM career I wish to pursue.

“I believe this programme has helped me gain the knowledge I required to assist me choose a university course. I believe it’s also an excellent place to look at research in practice.”

“The placement was enjoyable and I learnt a lot about cancer biology. It helped me decide that research is the kind of STEM career I wish to pursue.”

“My in2scienceUK experience has completely pushed me out of my comfort zone. Not only did I meet like-minded people, but I also met some inspiring scientists who showed me their passion for science. This programme (from the PhD students, workshops, experiments, presentations, meetings, to other in2scienceUK students) reassured me that research is a career I would enjoy doing.”

The placement has reaffirmed my choice to study chemical engineering at university, and has given me a unique experience. It has entirely changed my view on science: I have learned that there are not always right and wrong or exact answers, and there is a great deal of debate in every field. I would recommend the placement to everyone!

Lucia, on placement at the Department of Earth Sciences, University of Oxford
Impact Report 2016

Empowering students from low-income backgrounds to achieve their potential and progress to STEM degrees and careers, to become the innovators and pioneers of the future

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