At Imperial we are committed to encouraging engagement with science across the whole of society and we are especially keen to nurture the innate curiosity of young people.

The opening of the Invention Rooms at our White City campus, and launch of new programmes at the bespoke Makerspace facility, highlight how we’ve expanded our reach into local communities and schools this year, as well as how we’ve broadened the types of skills training we can offer. I’ve been incredibly impressed with the degree of ingenuity on show and by how confidently pupils present their work at community showcase events to peers, family, friends, and the public. Meanwhile, the science-based curriculum activities in the Reach Out Lab in South Kensington continue to support pupils at primary and secondary level in developing crucial experimental skills and in preparing for University. We have undoubtedly met some of the inventors and scientists of the future over the past twelve months!

But we aspire to do more and continually update and modify our offer. Over the next year we will be focussing not only on outreach programmes for local pupils, but also on new ways to involve pupils from across the UK and increasing the number of underrepresented participants who enrol at the College. None of this would be possible without the excellence and commitment of our staff and students to whom I am extremely thankful. It’s heartening to see more and more former outreach participants joining us on degree courses, but it is truly inspiring that they give up their free time to become mentors on the very programmes that helped them get to Imperial. These are the students who are the College’s very best role models and who will continue to make our campuses increasingly diverse, inclusive and vibrant.

Professor Maggie Dallman
Vice President (International) and Associate Provost (Academic Partnerships)
This year has been about innovation and evolution.

The new Makerspace has been a place of great innovation as pupils took part in the Maker Challenge series – creating new ways of helping with environmental issues and designing and building technology to help with everyday life.

In South Kensington, we have been working hard at developing our curriculum STEM sessions, bringing schools into the Wohl Reach Out Lab and providing support across the primary and secondary science spectrum.

Our long-term STEM cohort programmes have grown in strength leading to the highest ever intake of participants to Imperial in September 2017. This has demonstrated that not only are our tailored programmes supporting pupils with their exam and course work, but that they are also preparing them for that crucial next step into Higher Education and all that this entails. Soft skills are just as important as curriculum support and we help our programme participants in Years 12 and 13 perform well at interview or write a strong personal statement.

We are constantly evolving our programmes and courses, using feedback from teachers and participants to improve what we offer and to provide the right levels of support where they are most needed.

Finally, our superb new bright green Outreach Van has been out and about on the road this year, taking STEM out to schools far and wide. Our ever-popular inflatable planetarium has enthralled and delighted pupils of all ages across the country, allowing them to explore space and the universe from the comfort of their own school hall. We never tire of that look of amazement on the pupils’ faces and the excited comments they leave us with. One year 5 pupil wrote: "The planetarium was amazing! I was so lost in space that when I walked out at the end, I had no idea where I was..." Immersive science at its best!

Dr Annalisa Alexander
Head of Outreach

Introduction
The Reach Out Makerspace
State-of-the-art educational facility at Imperial’s White City campus

This year saw the opening of the Reach Out Makerspace, a brand new Outreach venture housed within the Invention Rooms at Imperial’s developing White City campus. The Reach Out Makerspace is unique – a dedicated place for young people to access tools, resources, support and skills in an open-ended, constructive learning environment based on innovation and creation.

The Reach Out Makerspace is a bespoke workshop and design studio containing a variety of different tools, materials and technologies including 3D printers, a laser cutter, woodworking machinery, electronics and soldering equipment, hand tools and a variety of materials – all available for participants to use under careful supervision.

This year over 300 participants have taken part in an activity or longer-term programme, such as the Maker Challenge and Schools Challenge Programmes.

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Looking ahead, the Reach Out Makerspace programming will continue to grow, with an added focus on supporting more community initiatives and teacher focused activities.

Outputs from our young participants have included:

» Furnerflip: a multipurpose piece of furniture for small spaces
» Snorzz: a smart cradle for rocking babies to sleep
» Green Steps: electricity generating insoles
» Lumi-Lamp: a smart nightlight that switches off when it senses the user has fallen asleep

More information can be found at www.imperial.ac.uk/schools/reach-out-makerspace

“I learnt a lot from this process. Not just technical skills, but it boosted my confidence as well.”
— Pupils on the Maker Challenge Programme
The Maker Challenge Programme

This exciting and innovative programme launched with its first cohort of participants in September 2017. The Maker Challenge enables young people aged 14-18 to use the Makerspace and learn a variety of new hands-on techniques including woodworking, use of 3D printers and laser cutters, electronics, computer aided design and materials development. The ultimate aim of the programme is to create a group of young makers who have the confidence and skills to take their ideas from inspiration to creation.

The programme takes place over 12 weeks, with participants building on their skills development from week to week. Initially participants begin by learning about the design process and ideation, before beginning their journey with the equipment available to them. The second half of the programme is focused on the participants putting their skills to use by creating and developing a project of their choosing, resulting in a prototype presented to a team of judges at the end of the 12 weeks.

During the Maker Challenge, the participants are given the opportunity to develop a range of other transferable skills including website design, pitching and presentation techniques and business development enabling participants to grow in confidence, improving their decision making and communication skills.

The programme is focused on open-ended learning, with the participants guiding the development of their prototypes according to their interests, supported by a team of dedicated undergraduate student mentors. This year’s Maker Challenge winners won 3D printers, robot kits and tech kits.

"It was an absolute pleasure to participate in the wonderful Maker Challenge. I gained essential skills and met some wonderful people (and had delicious food). IT WAS AWESOME. Thanks a lot." 
Participant, Maker Challenge Programme

Maker Challenge Move Up Programme

This programme launched in spring 2018. Participants who have completed the Maker Challenge are invited back once a month to take part in these weekend sessions. Attendees can use the equipment and materials at no cost, supported by staff and mentors. Attendees have used these sessions to continue to develop their prototypes from the Maker Challenge or to start working on new ideas and designs.

Proto-Maker Challenge Programme

To encourage younger pupil engagement, The Proto-Maker Challenge was designed for school students aged 11–14 and began this year with a small pilot. School groups from Hammersmith Academy and Westminster Academy took part and the feedback was very positive. We will be running this again in Summer 2019.

Participants gained three days in the Reach Out Makerspace and two after-school sessions in their school, supported by our undergraduate mentors. The programme aims to introduce participants to prototyping and idea development, as well as learning how to use some of the core equipment within the workshop. Based around the concept of future worlds, participants brainstorm ideas that would respond to these imagined futures. They finish the programme using the Reach Out Makerspace to create basic prototypes of their ideas, presenting them to their peers.

Teacher Focused Activities

In addition, the Reach Out Makerspace has hosted a number of teacher focused events including:

» Workshops on constructive learning within the INSPIRE teacher training programme
» Collaborating with the Design Museum, providing a workshop on practical approaches to teaching design and using prototyping as a hands-on learning tool.

The Schools Challenge Programme

This year-long initiative, specifically for Year 9 participants, aims to help participants make informed choices about educational subject options during a crucial time in their lives and for them to make a successful transition from education to employment.

The participants in this hands-on programme work in teams to develop a solution to a real-world challenge, with the aim of making our city a better place to live. The programme is run by the College, and is supported by J.P. Morgan staff mentors and our undergraduate and postgraduate student mentors.

During the programme, participants have the opportunity to prototype their ideas in the Reach Out Makerspace using the equipment available including the laser cutter, 3D printers, and woodworking tools. During the programme, mentors from J.P. Morgan support the teams to design a business plan and develop a pitch to present to judges and guests at the grand finale.

Reach Out Makerspace

15 enthusiastic trained leaders (postgraduates, professionals, and entrepreneurs) supported Makerspace events
20 dedicated Imperial student mentors ran activities at the Makerspace
800+ people attended Invention Rooms
Open Day

By the numbers...

5 cohorts of 84 participants (43 of which were from local target schools)
Proto-Maker Challenge
65 participants across 6 sessions
Move Up
60 participants
Proto-Maker Challenge
150 students from 10 London schools and 100+ mentors from J.P. Morgan and Imperial Schools Challenge

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The Wohl Reach Out Lab
Imperial’s bespoke STEM-focused schools laboratory

The Wohl Reach Out Lab, in the centre of our South Kensington Campus, is central to our curriculum focused Outreach programmes. Used by the Outreach team to host numerous activities and programmes, the lab this year has seen a number of new activities and programmes accommodated, and the team continue to seek ways of engaging with new school audiences to develop programmes of sustained engagement.

The lab is home to our collaborative Westminster Academy programme which commenced in 2014 thanks to a generous donation. This year’s participants have taken part in 36 activity days that are created specifically for the school. As a result of this programme, two school pupils from Westminster Academy who have attended workshops within this programme have enrolled at Imperial for their UG study with the Departments of Life Sciences and Physics.

In addition, 17/18 saw the Wohl Reach Out Lab create a new collaboration with Kingsdale Foundation School, supporting their Maths Scholars Programme. We developed 10 workshop days for participants that included topics such as probability. This collaboration is continuing in this academic year, expanding from Y7–Y11 to include students in Y12/Y13.

The Wohl Reach Out Lab also hosted KS5 science workshops for School 21, bringing some of their students studying A-level sciences to Imperial for the day and covering topics such as PCR of genetically modified foods, Radioactivity, gas laws, spectroscopy and electrochemistry. Feedback from these workshops was positive.

A new collaboration this year saw the Transformation Trust bring five schools to the facility for the day. Pupils took part in Powering Transformation, a one-day workshop supported by DELL. The students were asked to use the latest DELL technology for a team problem solving challenge, to address social issues. With a focus on community activism, topics ranged from bullying and mental health to recycling and energy conservation. Student feedback was extremely positive with 97% saying they would recommend this workshop to other students their age. Following the workshop, 86% of the students said they felt encouraged to stay in education longer.

All of these programmes of activity will continue into 2018/19.

www.imperial.ac.uk/schools/wohl-reach-out-lab

STATS

3,744 participants in Outreach activities at the Reach Out Lab between September 2017 and August 2018
620 participants involved in Reach Out Lab activities as part of the Westminster Academy programme
214 participants in workshops run for the Kingsdale Foundation
139 A-level science students taking part in workshops hosted for School 21
200 pupils took part in Powering Transformation

CASE STUDY

Rayane

Rayane is a Y7 pupil at Westminster Academy who has engaged thoroughly with the opportunities that the Wohl Reach Out Lab has provided him. His teachers have seen the impact of his engagement at school. His science teacher said of his involvement:

“Rayane is extremely engaged in science and often helps out at various open evenings and science events that Westminster Academy hosts. The Reach Out Lab has given him the opportunity to learn about science outside of the curriculum and has motivated him to begin his own after school club where he wants to build rockets. He achieves good grades in science and is working hard in lessons.”

Rayane has been to the Wohl Reach Out Lab three times during his Y7 studies, taking part in an earthworm dissection and two medicine-based events in the last year. When asked what he enjoyed most about the Programme, Rayane said that attending the sessions gave him the opportunity to see what the university experience is like, specifically what medicine has to offer him. He was unaware of the variety of jobs available in hospitals before the careers session he attended.

Rayane also said that he found the experiments he took part in both useful and fun, and that he felt he would have been unable to undertake them at school. When asked whether the sessions he has had at Imperial have helped him with activities at school, Rayane commented on how the knowledge he obtained from his dissection class linked to systems in the body, but also spoke more widely of his aspirations for the future:

“In medicine when I learned about different systems, what I learned in the dissection helped me. It was good to see what it really looked like, I want to attend Imperial because of the great education that goes with being there, and I want to be a surgeon. I hope to attend more days at the Reach Out Lab as I enjoy them so much.”

The Reach Out Lab has motivated him to begin his own after school club to build rockets.

"It has really made me confident in presenting something.”
Attendee from Transformation Trust

“I liked that I was introduced to new equipment and I was trusted to work with them even though they are expensive.”
Attendee from Westminster Academy

“I liked the fact we did three different experiments and went into them in a lot of detail. I actually understood where and how these experiments are done in real life and why it is important.”
Attendee from Workshop for School 21

“I really liked being able to go over many different experiments and rather than doing independent work it was all team based and group work.”
Attendee from Workshop for School 21
STEM Potential
Non-residential cohort programme for Years 10–13

354 pupils joined us for STEM Potential in 2017/18, a programme aimed at high-achieving pupils from backgrounds underrepresented in higher education. There are two entry points, at Year 10 and Year 12.

Participants joining us in Year 10 spend two years exploring different STEM fields to gain a better understanding of subjects they may wish to study at A-level. They also attend on-campus taster events for an insight into university life. Depending on GCSE performance, A-level choices, aptitude, and overall commitment to the programme, many participants will progress from the Year 10 to the Year 12 programme.

Year 12 participants embark on a more advanced programme, covering subject-specific workshops relevant to the STEM subjects they are undertaking at A-level. Participants are also paired with a current Imperial undergraduate e-mentor for peer support and information, alongside professional support from the College with their university applications, personal statements and interviews.

STEM Potential events happened over 36 days in 2017/18. Along with talks and practical science activities, these included two week-long non-residential summer schools when year 10 students took part in science activities and talks at Imperial. These participants also experienced learning in Kew Gardens, Royal Museums Greenwich and Bletchley Park. For the first time in the programme, Year 13 participants took part in a residential weekend aimed at preparing them for university applications and life at university.

$\Rightarrow$ www.imperial.ac.uk/schools/stem-potential

**STATS**

- 145 new participants, of which 99% were from low income backgrounds (under £43,000 per annum) and 74% were from families with no prior experience of Higher Education
- 57% of the Year 10 intake qualified for free school meals
- 16 of the STEM Potential Cohort have enrolled at Imperial since 2016
- 29 of the cohort enrolled into Russell Group Universities (2018 academic year)
- 18 former STEM Potential participants are at Imperial

**I was able to start new friendships and experience new and exciting things. What I liked the most was being able to go to a range of places whereby I learnt things that I wouldn’t have thought to be interesting to me.”**

Year 10 STEM Potential Participant

**It was honestly an incredible programme that helped with revision and personal statements. The staff were amazing at explaining concepts we’ve found difficult in school and the past paper resources we got at the end of each session were invaluable.”**

Year 11 STEM Potential Participant

**I loved the programme so much — it has taught me a lot about university life, studying and the progression from GCSE to A-levels to university and further. It really helped with my GCSEs and I hope to continue on this programme and to study maths at Imperial.”**

Year 13 STEM Potential Participant
**Pathways to Medicine**

Non-residential medical outreach programme funded by The Sutton Trust

Over the past year, 60 new participants and 120 continuing participants have participated in Pathways to Medicine, which supports high-achieving students from underprivileged backgrounds in their dream of becoming a doctor.

Now in its fifth year, Pathways to Medicine is a three-year programme that supports participants through Years 11, 12 and 13 to their eventual application to medical school. It aims to address the barriers that some state-school students face in accessing and succeeding in medical study at university, with the goal of making the profession more representative of the population it serves.

60 participants a year embark on this intensive programme, which covers a wide range of subject-specific activities and guidance including work experience in a hospital (often an admissions requirement for medicine courses), mentoring by a current Imperial medical student, a week-long summer school, and many other activities. Further details can be found on the programme website.

**STATS**

- 180 students currently registered on the programme across 3 full cohorts
- 100% of participants would recommend the programme to other pupils
- 98 different non-selective state schools across London from which participants were recruited

*I think it was a great opportunity to understand that behind the doctors who interact with patients there is a whole team of researchers who build the backbone of the whole system.*

Participant, Pathways to Medicine Programme

**Imperial Sutton Scholars**

A coding programme aimed at high-achieving KS3 pupils aged between 11 and 14 from under-represented backgrounds in higher education.

54 new participants joined Imperial Sutton Scholars in 2017–18.

The programme works with 13 targeted state schools, and aims to inspire participants to study STEM subjects through learning about coding, programming and the application of these skills in science and engineering.

**CASE STUDY**

**Sophie**

Sophie applied to the programme whilst studying for her GCSEs at Kingsmead School, Enfield. She has just started the second year of her Medicine degree at Imperial.

“I thoroughly enjoyed my time on the Pathways to Medicine programme, as it gave me so many opportunities that I wouldn’t otherwise have had access to through my school. I was able to use proper lab equipment, practice clinical skills and had the chance to undertake a week of work experience at a hospital.

Furthermore, it was very helpful to receive guidance from current medical students on preparation for entrance exams, personal statements and successful interview techniques. I would highly recommend this programme to anyone interested in pursuing medicine, as the information and advice provided is invaluable.”

**CASE STUDY**

**Guy Khosla**

Guy is a PhD Student in Mechanical Engineering at Imperial and academic leader for ‘Sutton Scholars with Coding’.

“I wanted to get involved in Sutton Scholars with Coding as I have seen first-hand in my experience as an engineer the impact that coding has in all areas of the world. Despite my background being in very stereotypically ‘hands-on’ subject areas, I find myself frequently having to learn new coding languages and techniques to efficiently harness the powers that computers can give us. Furthermore, coding teaches you an extremely logical and useful set of skills to break down problems, which is a genuinely fun activity to be involved in. Learning to code at a young age will give the participants that step up in comparison to their peers in such a booming field.

I have seen a big change in the participants since the start of the programme. When we started teaching the programme, we were very hands-on with helping the participants with code and would at regular intervals go through code as a class as we were concerned with the level of attention retention! However, in more recent classes, the participants have developed much better attention spans and are able to independently stay motivated with a project for longer. A Year 8 Scholar said he had always been a listener and follower in group work situations. After the last session, he spoke up and took the lead. Being a Sutton Scholar has boosted his confidence outside the classroom environment.”

Daniel Ford, Teacher, Oaklands School

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Year 9 Engineering Girls Summer School
Engineering-focused non-residential summer school

As part of this scheme a total of 59 Year 9 girls from a state school background took part in a week-long summer school providing taster sessions in seven different engineering disciplines.

This five-day non-residential summer school funded by Imperial’s Faculty of Engineering is aimed at inspiring the next generation of female engineers. By engaging Year 9 pupils, prior to GCSE and A-level selection, there is a greater chance of impacting their subsequent course choices.

Participants begin the week with an introduction to the University and a team-based engineering challenge. Subsequently they take part in two sessions each day comprising a mixture of lecture and practical activities to highlight the breadth of opportunities engineering offers. The week culminates in a presentation where participants present posters detailing their learning throughout the week.

CASE STUDY

Anna

Anna is a pupil from St Patrick’s Academy in Northern Ireland who travelled over to London for a week with her Dad and attended the Year 9 Girls Engineering Summer School.

“The main factor which attracted me to the course was my passion for engineering and all the profession has to offer. In addition, the outstanding reputation that Imperial College London has amongst fellow Universities and employers ensured that I was keen to apply. I have always known that I wished to pursue engineering to degree level, although I have never been sure about which specific branch of engineering would interest me most. I know that after a week at Imperial I would have a much clearer idea. I was also keen to experience University life at the College and interact with current Undergraduate students and other like-minded young people who want to solve real world problems.

I found the ‘materials engineering’ the most enjoyable part of the course as I thought there was a perfect balance between learning theory and practical application. This balance was achieved by learning the theory as we were doing the practical. I also enjoyed the way there were three separate experiments – all completely different, yet all part of the same branch of engineering. The undergraduates helping us carry out the experiments were very willing to answer any questions we had about any aspect of life at the University. The passion they have for engineering was evident and showed why Imperial College London is so highly regarded.

I just want to thank everyone involved in running the course from the bottom of my heart. To have a glimpse of Imperial life was something I thought I only could have imagined. The skills, knowledge, and friends I have gained from the Summer School are something that I will carry with me for the rest of my life. It was certainly a week to remember!”

STATS

59 participants
73% from low-income backgrounds (less than £43k per annum)
46% came from families with no prior experience of Higher Education

→ www.imperial.ac.uk/schools/summer-schools

Year 10 Insights into Science and Engineering Summer School
Residential science and engineering summer school

40 Year 10 students from around the UK had the chance to undertake experiments developed by current researchers at Imperial in this programme which is designed to provide a taste of different STEM subjects.

This residential summer school aims to encourage Year 10 students to continue studying science and engineering subjects through a series of half-day taster sessions, led by Imperial academics and students.

Participants can choose between an engineering or science subject stream, taking part in sessions that combine practicals and workshops in our undergraduate labs supported by student mentors.

The summer school also incorporates a busy social programme, combining trips in London with activities aimed at building teamwork and communication skills. The participants also benefit from staying in halls of residence to provide a full university experience.

STATS

40 participants
100% from low-income backgrounds (less than £43k per annum)
68% came from families with no prior experience of Higher Education

→ www.imperial.ac.uk/schools/summer-schools

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Y12 Engineering Summer School

Four-day residential summer school for Year 12 pupils

30 Year 12 pupils from around the UK experiences university life and explored different engineering disciplines during this summer school.

This four-day residential summer school, funded by Imperial’s Faculty of Engineering, saw participants take part in taster sessions across nine of the engineering disciplines offered at Imperial. In addition to experiencing the academic side of university life, participants developed their social and team building skills through a variety of social activities.

STATS

30 participants
93% from low-income backgrounds (less than £43k per annum)
80% came from families with no prior experience of Higher Education

→ www.imperial.ac.uk/schools/summer-schools

"Amazing lectures — very interesting! Staying at Imperial for a week inspired me to think of applying to a top university like Imperial — the campus and the approachability and hospitality shown by mentors was very encouraging."

Participant, Project STEM

Year 11 Project STEM Summer School

STEM-focused residential summer school

70 Year 11 pupils joined us in summer 2018 for a five-day exploration of real-life challenges in chemistry, biology or physics.

This summer school aims to address the challenge of progressing from GCSE to A-level science, which many pupils report as a substantial jump. Participants work in project groups within their chosen subject strand, undertaking a challenging practical investigation with support from our undergraduate mentors.

Projects are developed in conjunction with Imperial researchers, drawing on up-to-date techniques and equipment to solve problems in a similar way to university research groups, with as much hands-on exposure to labs as possible.

The week culminates in an academic-style conference, giving each project group the chance to present a poster detailing their investigation to their peers, academic leaders and invited guests.

Participants also have the chance to experience broader university life through a series of social activities. There is a focus on team building and development of social skills, and on providing an insight into the type of activities that students who attend university in London have on their doorstep.

STATS

70 participants
100% from low-income backgrounds (less than £43k per annum)
79% came from families with no prior experience of Higher Education

→ www.imperial.ac.uk/schools/summer-schools

"I enjoyed the dissection of a plant in our biology stream the most out of all of the academic activities. I enjoyed our poster activity because it was what we had been working towards all week and at the beginning I did not understand it at all."

Participant, Project STEM

"It’s been great. I’ve had fun building things and getting hands-on experience, and I’ve enjoyed working out why things work the way they do!"

Participant on the Year 12 Engineering Summer School
Year 12 Sutton Trust Summer School

**STEM-focused residential summer school**

179 participants from state school backgrounds got a taste of university life when they joined us in summer 2018.

This five-day residential programme runs twice each summer, covering a range of different STEM subjects at each session.

Participants take part in a challenging academic programme, covering lectures, lab sessions, and the chance to carry out practical investigations. The week culminates in an afternoon of presentations attended by fellow participants, mentors, academics, and guests where participants present in small groups of two to four detailing the work that they have covered.

Advice on applying for university also forms a core part of the programme, giving participants access to professional support with writing their personal statements, information on student finance and student support and wellbeing at university.

The participants also enjoy a busy social programme undertaking team building and personal development challenges concluding with a formal dinner on the final night.

### STATS

- 179 participants
- 48% were in receipt of free school meals
- 86% would be first generation to apply to university

[www.imperial.ac.uk/schools/summer-schools](http://www.imperial.ac.uk/schools/summer-schools)

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**George**

George was a participant on the Biological Sciences stream of the Year 12 Sutton Trust Summer School. He travelled from Suffolk One Sixth Form College in Ipswich.

“This was one of the most rewarding experiences I have ever had, teaching me a lot about how to study at university, how to manage my time and how to cope with the social demands of meeting loads of new people.

I applied for this course because I wanted a feel for what university life is like at one of the UK’s top institutions and I wanted to gauge what biological sciences is like to study, although the week was at a much higher pace than a normal university timetable. It gave me a great thing to talk about on a personal statement.

I applied in hope, not really expecting to get into the programme because of how competitive it is. I was shocked and delighted when I was accepted onto the programme.

My time at Imperial was absolutely brilliant. The academic sessions were engaging and interesting, the night time activities were excellent, the mentors were brilliant, and the other students were so friendly.

One of the biggest misconceptions I had about Imperial was that it would be full of arrogant people who think they’re too good for other people and wouldn’t be easy to talk to. How wrong I was. Both of my mentors were fantastic. My academic mentor had great subject knowledge and answered questions thoroughly and my pastoral mentor knew lots about Imperial and was very sociable.

I made a lot of friends and will keep in contact with as many as possible as we go through our application process together.

I would very strongly recommend applying for the summer school even if, like me, you’re considering applying for another subject area at university. The skills and experiences you gain far outweigh the knowledge of the subject so whatever you’re doing, you will enjoy it. Thank you to the organisers, teachers, mentors and my fellow students who all made the summer school the best it could be.”

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**Participant, Sutton Trust Summer School**

“I am very thankful for the experience. Before coming, I was almost certain that I would not attend a university in London. After attending, my perception of studying in London, and more specifically Imperial, has changed. The friendly and knowledgeable mentors and academics made the summer school very enjoyable. The wide range of talks on academic life and finance have debunked many myths about university life. I am more confident about applying to university, as well as applying to a university that is away from home. I feel more confident in my personal statement writing skills.”

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“It was very fun! I’m glad it wasn’t solely focused on the subject I had applied for (chemistry) and that there were talks on other aspects of school/university life, like the personal statement presentation — this was very enjoyable and dynamic!”

Participant, Sutton Trust Summer School

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“I liked being able to present what I learned during the summer school to pupils, mentors and professors alike.”

Student, Sutton Trust Summer School
Year 12 Work Experience
Non-residential insight into various departments across Imperial College London

83 Year 12 pupils from London and the surrounding areas took part in a week-long placement in one of six departments across College.

This programme aims to give Year 12 pupils an insight into what a career in various fields of STEM may be like. Participants can choose to apply to Electrical and Electronic Engineering, Life Sciences, Materials Science and Engineering, Mechanical Engineering, National Heart and Lung Institute or Physics.

Throughout their time on this programme, participants get to meet researchers from several research groups as well as taking part in practical activities that are either typical of undergraduate study or are used frequently within research. The week culminates with the participants giving short oral presentations to their peers in the style of a research conference.

STATS
83 participants
93% from low-income backgrounds (less than £43k per annum)
58% came from families with no prior experience of Higher Education

www.imperial.ac.uk/schools/summer-schools

“I really enjoyed the ‘Decision Maker’ activity in the lab. It gave me the opportunity to experience what it feels like to work in the lab as an Electrical and Electronic Engineering student, as well as allowing me to take part in a task that was electronics heavy and even involved aspects of programming and mathematics. The ‘Chips and Brains’ talk by Dr Constandinou and the code breaking session by Mr Thomas Briggs were also particularly interesting to me.”

Participant, Year 12 Work Experience
I found out that antibiotics don’t work against viruses and that people who don’t have asthma have less viruses than people who do have asthma.” Attendee, Imperial Schools Festival Day

"I learned how people with disabilities get exercise and what exercise they can get from bioengineers." Attendee, Imperial Schools Festival Day

Imperial Festival Schools Day

Annual event for young people to engage with some of Imperial’s newest and most exciting research

Imperial Festival Schools Day provides the opportunity for primary school children to meet Imperial researchers and explore some of the activities on offer at the Imperial College Festival before it opens to the general public. This year 300 pupils from nine primary schools were invited to take part in an introductory demonstration lecture provided by Imperial staff member Dr Simon Foster, before making their way over to the main marquee. Over 60 Imperial researchers were on hand to explain their work and demonstrate the science behind it with pupils testing their skills in the ‘Great Pipette Challenge’, attempting physiotherapy techniques, learning about environmental pollutants on human health and playing games using wearable sensors, and much more.

STATS

100% of participating adults (teachers and chaperones) found the day “good” or “excellent”
96% of children enjoyed visiting Imperial
93% of children learnt something new
77% of children were “more interested” in science after their visit to Imperial

→ www.imperial.ac.uk/festival

+300
Number of primary school children who attended a special Schools Day at the Imperial Festival
School Visits Programme
A fully comprehensive service covering all aspects of higher education awareness and application.

The School Visits Programme aims to improve higher education awareness including application and interview advice and guidance.

It helps sixth formers make informed choices and effective applications across the HE sector, encouraging pupils to apply in order to fulfil their potential. It also supports parents and teachers in the assistance it provides.

The vast majority of these schools are in the state sector and are selected on the basis that their pupil intake includes those from disadvantaged backgrounds. This year visits to primary schools have also begun to take place.

www.imperial.ac.uk/schools/visits

"Thank you so much for speaking about university at our UCAS event again. Your talk reminds students and parents just how important university is and that going away to university is a good thing in itself. You remind them that it should be a lot of fun — we tend to get stuck on the competitive and anxiety-inducing application process and not spend enough time reminding them just how great those years are."
S Harrowes, Hammersmith Academy

"Thank you for coming to talk to our students today about Personal Statements. You are one of the most engaging public speakers I have ever listened to! The students found it insightful and it really made them think about how their communication on paper is received by the reader."
E Brady, Walthamstow Academy

"The interview skills talk yesterday was brilliant! The students are still raving about your session this morning!"
A Kundi, Drayton Manor High School

223 schools visited

"Thank you so much for working with our students these past two years. They really value what you say and speak about you very warmly. I can say with certainty that you have had a significant impact on their attitudes towards university, and the quality of applications they submit. Thank you too so much for your support and advice, as well as being so easy to work with. You have really enhanced our UCAS programme and my understanding of the system."
C Alexander, St Ignatius College

"A well organised and invaluable experience for students."
Teacher, St Martin in the Fields High School
Primary Schools Engagement
Supporting outstanding education to promoting the teaching of high-quality, exciting science

Primary Hampers and STEM Clubs
This year saw the initial roll out of two new primary focused activities in schools.

A pilot after-school science club took place in Normand Croft Community School (W14) during the summer term. Two PhD students visited the school every Wednesday afternoon for 10 weeks delivering hour long science enrichment sessions for Y5/6 pupils, covering topics such as genetics, light, and forensic techniques. Following the success of the pilot, continued funding has been sourced and the clubs will continue to take place in 2018–19.

2017/18 also saw a small-scale implementation of primary STEM ‘hampers’. Three hampers have been trialled so far: a rock hamper, covering the rock cycle and primary level geology has been delivered to classes of Y3 students; a CSI hamper was delivered for Y5 students, covering forensic techniques such as microscopy, blood testing and fingerprint detection; a fluorescence hamper has been also taken into a school, looking at kitchen cupboard fluorescence, chlorophyll extraction and the effectiveness of sun screen. Content for these primary STEM hampers will continue to develop in the year ahead.

Planetarium
Delivered by Imperial Outreach staff and trained undergraduate Ambassadors, our portable planetarium provides an immersive experience allowing participants to explore the night sky and learn about all the wonders it holds. With the arrival of our new Outreach Van we were able to visit ten primary schools and six secondary schools, including two multiple day events.

In addition to school visits, the planetarium has been an offer at the Science Museum’s Early Bird events which enable families with children who need a quieter environment to enjoy the museum free of the public.

**STATS**

10 weeks the science club at Normand Croft was in session
15–18 attendees per session

Spectroscopy in a Suitcase
Access to modern, portable spectrometers to aid A-level chemistry teaching

The Spectroscopy in a Suitcase (SIAS) scheme, funded by the Royal Society of Chemistry, gives AS and A-level students access to modern, portable spectrometers, which they can use to analyse mystery substances.

Practical workshops provide context for the analytical techniques taught in school, with attendees using Infrared or NMR spectrometers to identify unknown samples. In addition to complementing the study of spectroscopy at AS and A-Level, there is a strong emphasis on encouraging school pupils to consider studying chemistry at university. In 2017–18, 19 trained undergraduate and postgraduate Imperial chemistry students were involved in delivering these workshops, taking the opportunity to practice their science communication and develop transferable skills.

Imperial College London has hosted a SIAS kit since 2012 and during this time over 6,500 school pupils have taken part in a SIAS workshop. Teachers book a free workshop online and the Imperial Outreach Team liaises between the school and the university students who will deliver the session.

**STATS**

49 schools visited
19 Imperial undergraduates and postgraduates involved

Professor Lord Robert Winston
Outreach Academic Champion

Robert Winston, Professor of Science and Society and Emeritus Professor of Fertility Studies, is the man behind the creation of the Wohl Reach Out Lab at Imperial College London. He also speaks at Parliamentary debates on science and has written numerous scientific books for children, winning a total of four Royal Society Young People’s Book Prizes.

His aim is to raise the aspirations and scientific understanding of young people between the ages of 6 and 18 by visiting schools and universities across the UK and overseas to deliver lectures and presentations. His work in the UK has most recently focused on underachieving areas such as Tyneside and Teesside where there is often a lack of desire to go on to higher education. Professor Winston’s talks aim to take science beyond the school curriculum and put it in a wider social context or link it to the humanities.

In addition to speaking to students he has also addressed science teachers in various schools across the UK.

**STATS**

55,000 students of various ages attended events held by Professor Winston

The session was very popular and pupils learnt a lot from it. They enjoyed meeting students from university in a relatively informal setting.”

– Teacher, London Oratory School
The Pimlico Connection
Imperial’s voluntary mentoring and peer-mentoring scheme

Between November 2017 and March 2018 over 80 Imperial student tutors visited 18 local state primary and secondary schools through the Pimlico Connection, helping individuals in schools once per week, providing science and maths tutoring to hundreds of pupils.

The Pimlico Connection was established at Imperial in 1975 and has provided tutors to local schools for over 40 years. The scheme aims to use Imperial students as bright and engaged role models to pupils in local schools, many of whom do not have family members with experience of higher education. The tutoring sessions aim to increase the academic attainment of the pupils whilst improving their understanding of the higher education system. The tutors themselves also benefit from enhancing their communication skills and gaining confidence.

91% of tutors would recommend tutoring with the Pimlico Connection to a friend.
70% of tutors felt tutoring made them more employable

www.imperial.ac.uk/schools/pimlico

INSPIRE
Unique STEM Postgraduate Certificate in Education (PGCE) Scheme

This scheme aims to provide postgraduate students with Qualified Teacher Status, helping to address the shortage of well-qualified STEM secondary school teachers in London.

INSPIRE (the Innovative Scheme for Postgraduates in Research and Education) runs over a period of 10 months in partnership with Canterbury Christ Church University, providing an intense training programme for those on the scheme.

It recruits and trains scientists with a PhD and/or Master’s qualification in chemistry, engineering, maths or physics to become inspirational secondary science teachers.

INSPIRE Trainees are equipped with the skills and experience not just to teach, but also to engage and enthuse pupils about science.
Trainees participate in five weeks of science outreach activities, alongside taught sessions and placements in local schools, learning practical skills and demonstration techniques that bring science to life.

11 students graduated with qualified teacher status and PGCE
19 schools had contact with INSPIRE trainee teachers

www.imperial.ac.uk/inspire

Reaching Further
Bringing teachers and researchers together

The School-University Partnerships Initiative originally supported 12 universities to work in partnership with local schools, bringing contemporary and inspirational research to enhance and enrich the curriculum. Imperial was one of these universities and we have been working with teachers to train early career researchers to develop and deliver hands-on activities based on their research. They can then take these into schools to inspire students in STEM subjects and highlight research as a viable career option.

This project was initially funded by Research Councils UK (RCUK) for four years and has been funded by Imperial for the last two years.

23 Early Career Researchers trained
8 activities were developed
3 school hubs now interacting with the research community at Imperial because of RCUK funding

www.imperial.ac.uk/inspire

CASE STUDY

Tank Guney
Tank is an Academic Leader for the Reach Out Lab.

“I have been teaching biology for Outreach for five years. I wanted to do outreach work because I enjoyed the teaching opportunities my department at Imperial had given me. I am also a firm believer that a scientist should be able to communicate complex ideas in a simple, coherent and clear manner to those outside the scientific sphere. I not only wanted to communicate the work that I was doing to the students, but I wanted to show students where basic concepts learned in the classroom could lead them in the future.

Practical workshops at Outreach usually last a day, relating to topics touched on in schools but not fully covered. Examples have included a workshop to identify genes inserted into corn DNA as part of the topic of genetic modification. Leaders add a scientific knowledge to pre-prepared slides provided to them so that the session is taken beyond the normal curriculum. They are aided by 4-5 mentors in the set-up of the experiment who help the participants throughout the day. Mentors ensure the smooth running of the workshops by reinforcing points made by the leader, pushing students to think critically about the work being undertaken and, as they are generally undergraduates, talking to students about their experiences at university. School students can be afraid or confused about how to get through university admissions and it helps to talk to people who have been through the process. Leaders manage the day and have an overall view of the class, but mentors can concentrate on their specific set of students.

I have adapted university practicals for a younger audience, running sessions such as the altitude game which I and a colleague originally developed to teach first-year medical students about altitude sickness. I have adapted this game for 17-18 year olds and have successfully run it at an Outreach summer school as an example of what university teaching involves. Students are given lectures about the biology of mountain sickness, symptoms, and treatments for half a day and have to take notes. For the rest of the day they are plunged into a mountain climbing scenario where they have to use their notes to treat patients who are developing different mountain sickness related illnesses.

Outreach has helped me develop my confidence and communication skills. I have been challenged consistently to explain very complex scientific concepts in a simple way and have had to be creative to gain the interest of pupils, such as using Lego to explain the relevance of genes to a five-year-old.

Engaging scientists and teachers directly in lessons and having the resources on hand to create workshops is where the strength of Outreach lies. None of these workshops would happen without the support of the Outreach team who help put workshops together and provide requested consumables along with a technical team that is on hand during the workshops and lessons. I will continue to participate in outreach throughout the rest of my career.”

Outreach Annual Report 2017–18 | Imperial College London | 31
Accelerate into Maths and Science (AIMS) is an after-school programme for Y12 and Y13 participants, run in collaboration with academics from the Departments of Physics and Chemistry. It aims to give students an insight into how maths is applied across different science disciplines studied at university-level.

Following a launch event at the beginning of January, participants attend ten after school tutoring sessions during the spring term, followed by a further eight tutoring sessions during the autumn term when they are in Y13. Sessions are run by Imperial academics and current undergraduate students. In 2017/18 AIMS was made possible by funds received from Regular Giving at Imperial.

COLLABORATORS
» Departments of Chemistry and Physics, Imperial College London

Advancing Access
Advancing Access is a partnership between Imperial and the other 23 Russell Group Institutions working with schools and colleges. This collaboration aims to help more learners, particularly those from underrepresented groups, to go on to study at leading universities.

Teachers and advisors are provided with information and support to improve their understanding of what these universities are looking for and how the admission process works and by providing high-quality resources to help guide learners who are making their key stage 4, key stage 5 and university choices.

COLLABORATORS » 23 Russell Group Universities

Creative Quarter
Creative Quarter is a day of activities for 13–19 year olds organised in collaboration with Institutions from the Exhibition Road Cultural Group in the autumn term. In 2017 Imperial had around 400 visitors for the day, taking part in lectures and hands-on activities. The aim of the day is for secondary school students to get an insight into creative careers in the Exhibition Road area.

COLLABORATORS » Science Museum, Natural History Museum, V&A, Design Museum, the Royal Society of Sculptors, Royal Albert Hall, Royal College of Music and Goethe-Institut

Collaborative Projects
Engagement with the public and other organisations

Programmes like AIMS are so important. They widen the field of maths and introduce students to more content that we don’t necessarily learn at school.”
Paddington Academy student
Creative Roots

The programme involved 15 schools from the local area.

The Creative Roots workshop was held in Imperial College London and Royal College of Art White City buildings for local KS2 children from the West London Zone. Led by two artists from the RCA, Rachel Hill (Illustration) and Laura Fava (writing), as well as a biologist from Imperial, Fevziye Hassan, the attendees explored birds, insects, and plants at Hammersmith Park and gathered data on local biodiversity through field trips around White City. This data was then further explored and dissected, and the students used this as a basis for creating their own pieces of work, linked to their local area. Creative Roots was made possible by funds received from Regular Giving at Imperial.

COLLABORATORS
Royal College of Art, West London Zone

School Governors’ Network

There are currently 41 governors and counting...

Being a school governor is an opportunity for staff to further their professional development and a way for the College to engage with and further support schools.

Following the launch of the Imperial School Governors’ Network in December 2016, the College has a growing and active group of staff members, from all areas of the College, who commit time and expertise to support schools.

COLLABORATORS
Imperial staff, Governors for Schools

Sounds of the Universe

180 students from four different schools took part in the workshops.

Taking its cue from a science fiction tag line: “In space no one can hear you scream” the Sounds of the Universe workshops were set up in collaboration between the Royal Albert Hall and Imperial College London. This series of two-hour workshops was delivered to KS3 students, in schools across London and was led by physicists from Imperial College London and musicians from the Royal Albert Hall. Together they used sound to explain some of the fundamental principles of physics.

COLLABORATORS
Royal Albert Hall

We aimed to create new, fun and engaging ways for school children to learn about physics thanks to the medium of music.

Dr Roberto Trotta

“Huge thank you to Imperial College London and Royal College of Art for organising such an amazing three day programme for the West London Zone children!”

West London Zone team member
Reach Out Reporter
Free online topical science resource

Launched in November 2016, Reach Out Reporter is an online primary science news service designed to help teachers integrate the latest science news and topical issues into everyday teaching and learning. Through high-quality films and other resources, it aims to introduce primary school children to wonders of the world.

Reach Out Reporter explores a wide range of science-based stories each week – from hurricane-chasing meteorologists to how space litter is affecting life on earth – and aims to promote cross-curricular learning. Fun facts, answers to curious questions, and animal profiles are also part of Reach Out Reporter.

The service is updated weekly with new content and is available free of charge to all primary school teachers across the UK through the generosity of The Goldsmiths’ Company. The resource can also be used by anyone in the UK, including parents and children outside of the classroom as a tool for home learning.

STATS
17,000+ unique visitors to the site
79% percentage of visitors that return to the site
1,400+ weekly newsletter registrations

AWARDS
» 2017 Education Resources Award for Best Free Educational Resource
» Educational Multimedia Award at the 2017 Learning on Screen Awards

→ www.reachoutreporter.com

“Reach Out Reporter is easily my favourite free resource. For years I had been trying to come up with a sustainable way to keep children up to date with current news from the scientific world that they would understand and be interested in, but it proved to be such a huge task that I did not have much success. Until now, I don’t believe there has been any collection of this sort that allows teachers to quickly and easily share current science news from a trusted and reliable source that is accessible to children.”

Teacher & Science Leader, Greenhill Primary School

Reach Out CPD
Free online science resource

Reach Out CPD is a free online science Continuing Professional Development (CPD) resource for UK primary school teachers, launched in 2014. It has been developed by Imperial College London in partnership with award-winning science teaching resource Tigtag.

This web-based programme provides teachers with resources and ideas to support their teaching and engage primary school children in science.

Reach Out CPD courses support teachers with core subject knowledge, fun practical activities and films featuring Imperial academics and contributors from other leading public science organisations. These experts illuminate some of the latest exciting advances in science and present imaginative ideas to bring science to life in the classroom.

STATS
25,000 registered users in over 10,000 schools across the UK as of October 2018
99% of surveyed users said that they would recommend Reach Out CPD to another teacher
85% of surveyed users said they were able to apply knowledge and skills, acquired from Reach Out CPD, to their teaching
71% of surveyed users thought that their use of Reach Out CPD has had an effect on the attainment of their pupils

→ www.reachoutcpd.com

“...My improved subject knowledge made me a more confident teacher, which in turn improved my teaching and allowed my class to benefit from clearer, more engaging science lessons.”

Teacher and Reach Out CPD user

33,000 Number of hours of CPD delivered
Outreach Staff 2017–18

ANDREW TEBBUTT
Director of Student Recruitment and Outreach

DR ANNALISA ALEXANDER
Head of Outreach

DR MELANIE BOTTRILL
STEM Programmes Manager

SILJE ANDERSEN
Interdisciplinary Programmes Manager

LUKE BACON
Physical Sciences and Engineering Programmes Manager

JANE MARSHALL
Outreach School Visits Programme Manager

DR JENNIFER COOKE
Mentoring and Tutoring Programmes Manager

DR REBECCA HOLLOWAY
Schools Partnership Coordinator (Secondary)

RENEE BOLING
STEM Activities Coordinator (Pre-16)

FAY BLAKE
School Partnership Administrator

JOSE TEIXEIRA-MONTEIRO
STEM Potential Coordinator

DR CLAIRE SWEETENHAM
DR ZAHRA MOHRI (MATERNITY COVER)
Medical Outreach Officer

SIGNE ARIAS
Summer Schools and Activities Coordinator

JING XU
Student Recruitment & Outreach Systems and Data Analyst

SARAH VINCENT
Database Assistant

KATE MULCAHY
Reach Out Makerspace Coordinator

SHREYA KONNUR
Wohl Reach Out Laboratory Technician

CHERELLE ALLEN
Outreach Administrator

RICHARD BROWN
Reach Out Makerspace Technician

JASON HAYNES
Reach Out Makerspace Assistant

TIM LAM
Summer Schools Assistant

AHREUM JUNG
Invention Rooms Associate

LIZ HIDER
Schools’ Challenge Programme Coordinator

⇒ For more information:
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