



**Advanced
Oxford**

Attract, Retain, Grow

**Building the skills and talent pipeline for
Oxfordshire's innovation ecosystem**





Attract, Retain, Grow – building the skills and talent pipeline for Oxfordshire's innovation ecosystem

Introduction

Access to skills and talent - the acquisition and retention of people - is one of the key drivers of growth and success for any organisation. This issue is a high priority for all members of Advanced Oxford.

This report, its findings and conclusions are based on research undertaken between May and October, 2021. Advanced Oxford has used a mix of quantitative and qualitative techniques to collect, analyse and present data on the Oxfordshire innovation-based labour market.

The research looks across a range of knowledge-based/innovation-based businesses. This research is not sector specific and aims to be representative of Oxfordshire's knowledge economy as a whole, so a range of businesses outside the membership has participated in the qualitative research. This has been supplemented by quantitative data collection and analysis from across the Oxfordshire innovation economy.

The scoping work for this project benefitted from input across Advanced Oxford's membership, followed by further discussion in the spring of 2021, with a group of HR and management professionals, drawn from Advanced Oxford members and a small number of other organisations, including OxLEP skills team, Innovate UK and Oxfordshire Advanced Skills (OAS). Access to skills and talent is impacted by other issues/factors within the business environment, including affordable housing, good transport links and infrastructure. Some concern was expressed that a consideration of these wider topics may detract from key questions around developing and attracting skills, and the timescales to influence and bring about positive change on these issues is much longer. As a consequence, this research has focused on the following issues:

- Hard to fill roles/higher level STEM scientific and technical skills.
- Entry routes to careers, including the role of apprenticeships within the local innovation labour market.
- An examination of the impacts of Brexit on the attraction and retention of talent.
- A forward look to 5 years hence, asking companies to anticipate changing or new areas of skills requirements.

Methodology

The project has deployed a number of different data collection methodologies, based around a key set of questions and data sets. This included

- Vacancy analysis – Twitter, LinkedIn, company job boards
- Analysis of Oxfordshire's innovation related labour market (science and technology roles) using data from job advertisements
- 1:1 interviews
- Survey data collection
- Development of case studies

Next steps

This research provides analysis and evidence relating to existing and future skills and talent requirements, looking at both the short and medium term (to 5 years). It examines areas where companies struggle to find the talent needed and identifies key skills that are in demand across the whole of Oxfordshire's knowledge economy. In addition, the report concludes with a series of recommendations for action.

This report will be shared widely to inform and influence organisations working in skills, innovation and economic policy, skills provision, education, and careers.

The Department for Education (DfE) published the Skills for Jobs white paper in January, 2021 (<https://www.gov.uk/government/publications/skills-for-jobs-lifelong-learning-for-opportunity-and-growth>) which focuses particularly on apprenticeships and higher skills apprenticeships. The white paper identifies the need for employers to work with skills providers to create courses that address local skills needs and this project contains an evidence base that can be used to this purpose. DfE has established a set of 'trail blazer' projects - business-led groups that are piloting the development of Local Skills Improvement Plans, which is part of DfE's proposed Skills Accelerator activity. Trail blazers will pilot methods for engagement with business/employers on skills needs. This project has created an evidence base that could be used in creating a Local Skills Improvement Plan for Oxfordshire.

Advanced Oxford will hold a roundtable meeting with key individuals and organisations in January, 2022 to discuss the findings and recommendations from this work. However, we encourage readers to engage with Advanced Oxford at any time if you would like to discuss the contents of this report, or any aspect of our work.





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Understanding the issues impacting science & technology-focused companies in their quest to attract, retain and grow talent

Introduction

Twenty-six science or technology-based companies participated in the qualitative research element of this study, either through interviews, or by completing an on-line questionnaire, using the same set of questions. In addition, interviews were also undertaken with a small number of other organisations within the Oxfordshire innovation ecosystem, including skills providers and research institutes, referenced where relevant within this chapter. This provides a representative cohort, from which we can draw reliable evidence and robust conclusions. All data was collected between late June and early October 2021.

Participants were drawn from a wide spectrum of knowledge-economy companies operating in various sectors. Firms of different sizes were included in the sample, with company size, in full time equivalents (FTE), ranging from < 10 FTEs to 750 FTEs. Company size relates specifically to the number of individuals working in or for Oxfordshire-based entities, as some research participants also have sites in other parts of the UK. The FTE numbers cited do not distinguish between employed and contracted staff, but most staff are employed, with contractors being used to support projects or to address the greatest skills acquisition challenges.

Most research participants have some form of HR function in house (n=20) and those without tend to be younger companies with HR and recruitment coordinated by operational roles, rather than through an HR professional. A number of companies that we interviewed indicated that they had brought in HR expertise within the last year and this appears to be a key hire when companies reach around 30 FTEs.

The issues examined through this research, and discussed within the chapter are:

- Expectations of growth
- Hard to fill roles
- Experience of Knowledge Transfer Partnerships (KTPs)
- Experience of offering apprenticeships
- Education attainment levels sought by employers
- Geographical factors
- Impact of Brexit on acquisition and retention of talent

- Reasons for turnover
- Impacts of Covid on working practices
- Equality, Diversity and Inclusion issues
- Future skills requirements in five years' time

Details of the questions used can be found on page 23 of this report.

Growth in local jobs

Companies were asked about their expansion strategy/development plans in the next two years, again, focusing on growth in FTE staff numbers. The majority of companies stated that they expected to expand over this period. Larger companies tended to be more modest in their expectations, signalling no or limited growth expectations, whereas smaller companies, typically in the range of 10–50 FTE headcounts, indicated high growth expectations of 100–200%, with some showing ambitions well beyond this range.

As with previous research undertaken by Advanced Oxford, (see *Powering Up for the Green Recovery*ⁱ) drawing inference or conclusions on the overall employment demand in the region from this data is challenging. This is because it is extremely difficult to determine headcounts within companies not participating in the research itself. Nevertheless, it is exciting to see the level of ambition and expectation across the companies participating in this research.

This Advanced Oxford research has taken place at the same time as a consultation has been running on The Oxfordshire Plan 2050ⁱⁱ (referred to hereafter as the Plan). One of the purposes of The Oxfordshire Plan is to consider the level of employment growth and the links to housing need over the Plan period (from now to 2050). There are a number of ways to identify the requirements for job growth figures in the near future, but there is considerable uncertainty later on.

The economic priorities within the Plan draw on strategies developed by OxLEP, specifically, the Local Industrial Strategy, published in 2019, the Economic Strategy and work on Covid recovery. The objectives are to maintain a high level of GVA growth, to secure the retention of young people, and improve access to skills and training.

ⁱ <https://www.advancedoxford.com/green-recovery/>

ⁱⁱ <https://oxfordshireplan.org/>



Shortage of housing

According to the consultation materials, there is evidence to suggest that whilst rates of housing delivery have been rising, jobs growth over the 2010–18 period outpaced growth in housing and labour supply in Oxfordshire. Between 2011–18 the working-age population aged 16–64 increased by just 1% (7,800 persons). A supply-demand imbalance for housing has resulted, contributing to both an increase in house prices and higher net in-commuting into Oxfordshire.

The Plan suggests that there is an option to consider the level of increase in employment using the Oxfordshire Growth Needs Analysis (OGNA) analysis undertaken by Cambridge Econometrics and published in June, 2021. Economic and housing growth would need to be aligned and take into account a range of other factors. The decision on the appropriate level of jobs growth would be taken alongside the final decision on the housing growth figure that will draw on the OGNA scenarios.

Employment (jobs) trajectories for Oxfordshire

	Employment (jobs) at 2018 (baseline)	2030	2040	2050	Net additional employment (jobs), 2018-50	Net additional employment (jobs) p.a., 2018-50
Standard Method (adjusted) economic trajectory	410,066	434,538	464,179	495,555	85,489	2,672
Business as usual economic trajectory	410,066	451,742	490,234	532,517	122,451	3,827
Transformational economic trajectory	410,066	466,804	520,636	581,254	171,188	5,350

(Source: Oxfordshire Growth Needs Analysis – see footnote *iii*)

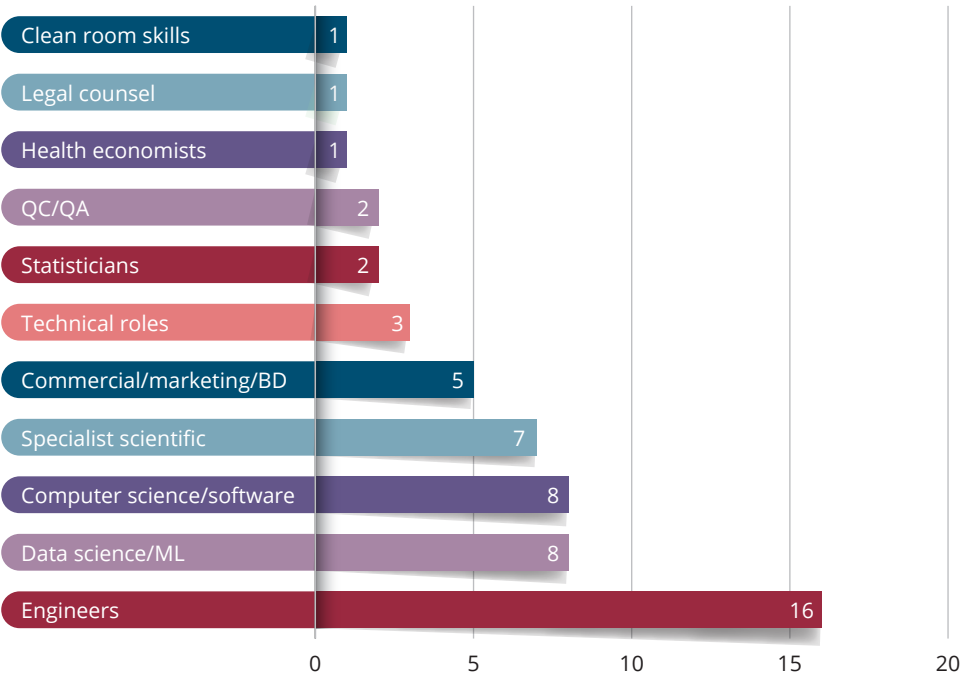
While there is considerable uncertainty in predicting levels of jobs growth, particularly later on in the Plan period (to 2050), the business-as-usual trajectory of 30% growth over the Plan period, and the transformation economic trajectory of 42% growth, appear to be better aligned to the ambitions of our innovation-based companies, notwithstanding that this research has only questioned expectations in the short term.

iii <https://mycouncil.oxford.gov.uk/documents/s60719/>



Companies were asked to identify the roles that they find most challenging to fill at the moment. Respondents could identify as many roles or skill types as was relevant. As might be expected, there were some roles identified that were very specific to the mission and core technological underpinning the company, however there were some clear areas of commonality. In asking the question, the focus was on scientific and technical roles, however some companies cited non-scientific roles that they had also struggled to fill.

Hard to fill roles - Number of times cited



(Chart 1 – companies were invited to detail roles that are difficult to fill, citing as many as are relevant. Roles were grouped into common types)

Hard to fill roles of similar types were grouped for the analysis. Engineer was the most frequently cited role that companies struggled to fill, however, a variety of sub-types of engineers were identified, such as electrical engineer or power-systems engineer. Similarly, computer science and software engineering were the next most common category mentioned, but again, each firm used differing role titles or terminology. Specialist scientific roles encompasses a wide range of roles from physicists to protein biochemist to epidemiologist. It should be noted that each category represents a type of role and does not reflect a particular post to be filled; in most instances companies were referring to types of roles, indicating one post that was either causing difficulty “this role has been open for six months” or groups of roles that create challenges “software engineers get approached every week by recruiters”.

Knowledge Transfer Partnerships (KTPs)

Knowledge Transfer Partnerships are operated and funded by Innovate UK. The scheme was created to help drive innovation and productivity in the UK by providing companies with new skills. Each partnership focuses on a subject where there is no “off the shelf” knowledge available.

Advanced Oxford engaged with Innovate UK in scoping this research. Innovate UK noted that the use and uptake of Knowledge Transfer Partnerships, often referred to as KTPs, (<https://www.ktp-uk.org/>) was low within the region. As a consequence, questions on awareness and use of KTPs were used with the cohort. Twenty-five companies responded to the first question, which related to awareness of the KTP scheme –

“Have you heard of, or are you aware of Knowledge Transfer Partnerships?”

Ten companies responded ‘yes’ to this question, but in at least two cases, when they were asked how they knew about the scheme, they conflated KTPs with another Innovate UK-funded service, the Knowledge Transfer Network, known often as the KTN. Fifteen companies responded that they were unaware of the scheme. A small number (n=3) of the companies had explored establishing a Knowledge Transfer Partnership, with one actively in the process of recruiting an ‘associate’ – the graduate who is appointed to work in the company to undertake the project.

Oxford Brookes University is one of the academic delivery partners for KTPs.

<https://www.brookes.ac.uk/business-and-employers/collaboration-with-business/knowledge-transfer-partnerships/>

With at least 68% of respondents either unaware or unclear about the KTP scheme, it seems clear that there is a need to promote this programme more actively amongst knowledge-based companies within Oxfordshire.

About KTPs

- The Government funded KTP scheme has existed since 1975. It is now operated and funded by Innovate UK. It was created to help drive innovation and productivity in the UK.
- KTPs allow companies to access knowledge held in the UK knowledge base, i.e. higher education and academic research.
- Businesses of all sizes are eligible to participate in the KTP scheme.
- KTP ‘associates’ are jointly recruited by the company and a university; however, they are legally employed by the university (e.g., Oxford Brookes). The associate will spend most of their time at the company, but is supervised by an academic expert at the university partner. Academic partners need to have complementary knowledge to support the KTP.
- KTPs last from 1-3 years.
- The cost of the KTP project is part funded by the scheme. For small and medium-sized enterprises the grant rate is 67% of the project cost, for large companies, 50%.
- To achieve a successful KTP all interests need to be aligned; it is a 3-legged stool and there needs to be a balance of benefits between the company, the university, and the associate.
- There is also a Management KTP scheme, which supports SMEs in improving their management capabilities/restructuring their business. Uptake of this scheme has been far higher in the north of the country than in Oxfordshire.
- It can be difficult to recruit KTP associates in the UK; candidates are mostly recruited from overseas.



Use of apprenticeships

Advanced Oxford was interested to understand the extent to which apprenticeships are used across the Oxfordshire innovation ecosystem, where they are used and what kind of roles are offered as apprenticeships. The research also explored any barriers to the use of apprenticeships.

Nine of the 26 companies questioned currently use, or have previously used, apprenticeships. However, 17 companies do not, or have not, used this route for acquiring talent. Apprenticeships tend to be more common in larger companies. Of the companies using apprenticeships, the average headcount was 406 FTEs, with a range of company size from 45 to 750 FTEs. On the other hand, companies tending not to use apprenticeships tend to be smaller or younger companies. These companies have an average headcount of 45, with range 9 to 206 FTEs.

“Our apprenticeships are held centrally and rotate through the business. Owen Mumford has a strong commitment to developing young people. Our R&D recruits tend to be graduates, so the focus of our apprenticeships is on training engineers. We use three training providers around Oxfordshire, depending on where the recruits live. We are now looking to expand apprenticeships beyond engineering.”

Owen Mumford

Use of apprenticeships?	Yes	No
Companies (n = 26)	9	17
STFC	Yes	-
Average size of company (by FTE number)	406 (not including STFC)	45

(Table 1 – breakdown of companies using apprenticeships as part of their talent acquisition. STFC, also interviewed as part of this research, is a significant provider of apprenticeship training roles)

This aligns with the experience of two of the region’s specialist apprenticeship providers, The Engineering Trust and Oxfordshire Advanced Skills (OAS), both of which reported to Advanced Oxford that they find it difficult to engage with smaller employers and that their relationships tend to be with larger employers.

We also interviewed two of the region’s newest research institutions, The Rosalind Franklin Institute and the Nucleic Acid Therapy Accelerator (NATA), as well as the Science and Technology Facilities Council (STFC), all located on the Harwell Campus.

STFC has a strong tradition of delivering apprenticeships and is developing a proposal to expand their level of apprenticeship training, along with other entry level routes, through plans for a ‘skill factory.’

The Rosalind Franklin Institute is not yet using apprenticeship training programmes, but now the RFI has fully opened, and as it will shortly start paying the apprenticeship levy, it is starting to consider how it will incorporate apprenticeships into its talent strategy. There are opportunities not only for technician type roles, but also for operational and support roles.

NATA is in the early stages of building its scientific and technical team and it is reasonable to expect that it will be some time before it is in a position to consider the use of apprenticeships.

Where companies are not using apprenticeships, two issues were commonly raised when questioned further. The first being organisational capacity. Use of apprenticeships is related to company size and the most common reason for not employing apprenticeships is capacity within the organisation to arrange and supervise training. In addition to this, it is clear that there is a group of companies, again tending to be smaller and younger ones, that do not have sufficient knowledge and information about apprenticeship schemes. As a result, these companies do not know how to get started in exploring this route for bringing talent into their companies. This extends to not being familiar with local skills providers or being aware of support that might be available through organisation like OxLEP. There is clearly a need to raise awareness of apprenticeship routes and how they can be deployed, even if companies are still small, so that they can plan and prepare for apprenticeship training when they reach an appropriate size.

One of the companies interviewed as part of this research was Oxford Biomedica. By the end of 2021, Oxford Biomedica anticipates that 4% of the workforce will be apprentices. The company has been recruiting apprentices for three years and started using apprenticeships when the Advanced Therapies Apprenticeship Community was established, following a recommendation from the Medicines Manufacturing Taskforce. Most apprenticeships are between levels 3 and 5 but the company is also using some level 7 apprenticeships as part of their approach to staff development.

CASE STUDY

Advanced Therapies Apprenticeship Community

The Advanced Therapies Apprenticeship Community (ATAC) has been established to develop the first apprenticeship programme designed specifically to train and upskill individuals to develop, manufacture and deliver these innovative therapies at scale. The purpose of the community is to create a ready supply of skilled talent ranging from manufacturing operatives to technical experts and researchers, to fuel the growth of the UK advanced therapies industry.

Responding to recommendations by the Medicine Manufacturing Industry Partnership (MMIP) Advanced Therapies Manufacturing Taskforce, the Cell and Gene Therapy Catapult set up the Advanced Therapies Apprenticeship Community (ATAC) through initial Gatsby funding and the following £1.5 million by the Industrial Strategy Challenge Fund. ATAC started its first cohort of apprenticeships in 2018, with 17 apprenticeships across eight companies, including Oxfordshire-based Replimune and Oxford Biomedica, which recruited technician scientists. ATAC continues to grow and now has over 40 companies within their community and has supported over 200 apprentices across 10 – 12 different roles. Oxford Nanopore, PsiOxus, Adaptimmune, Replimune, Oxford University and Oxford Biomedica are all part of ATAC.

ATAC is part of an end-to-end talent plan that looks to bring skills into the advanced therapies sector beyond apprenticeships. The Advanced Therapies Skills and Training Network (ATSTN)– provides skills



Oxfordshire Apprentice of the Year, 2021 - Emilia Reyes Pabon, a Technician Scientist Apprentice at the Clinical BioManufacturing Facility (CBF), part of the University of Oxford's Jenner Institute.



Oxfordshire Higher Apprentice of the Year Award 2021 - Nathan Jarvis, a Biotechnologist Apprentice at Oxford Biomedica.

development through a single platform to access industry recommended training programmes (licences are free for UK cell and gene therapy professionals), hands-on training through three National Training Centres and a tool to help people explore routes into the advanced therapies and vaccines manufacturing field, the “careers convertor”. In addition to the Oxfordshire companies within the Advanced Therapies Apprenticeship Community, Evox Therapeutics and VMIC have benefitted from the Advanced Therapies Skills and Training Network.

Both ATAC and ATSTN have been developed in collaboration with industry and delivered by the Cell and Gene Therapy Catapult, to ensure the right training is provided. This is supported with funding from BEIS, through the Vaccines Taskforce and Innovate UK.

There is a clear need to look at how SMEs can be informed and educated about the opportunity to deploy apprenticeship training. This extends to thinking about how the organisational capacity issue can be addressed. For example, OAS takes on the organisational 'burden' of training by delivering significant parts of training in their dedicated facility in the Culham Science Centre. On the other hand, there may be opportunity to explore how companies could work together to share the responsibility for training and supervision, although this may create difficulties at the end of the apprenticeship when it is time for the trainee to move into a permanent role.

“We are constantly talking to businesses and organisations about how we can develop apprenticeships to work within a range of small and medium sized companies. Our bespoke approach to apprenticeship delivery allows us to listen to each business and develop a programme that suits them, we don't work on cohorts all having to follow the same programme.”

*Mark Vingoe, CEO,
The Engineering Trust*

While it is positive to see a number of companies using apprenticeships as part of their talent strategy, it was striking that the number of companies that have regular and formalised apprenticeship programmes is small – considerably smaller than the nine that responded positively to the question about use of apprenticeships. In some instances, they are being used for support roles, rather than scientific and technical roles, and other companies have had only limited experience of offering one or two roles over an extended period of time. It is also clear from this research that levels of apprenticeship training have been impacted by Covid, both by contributing to the capacity issue, but also by diverting attention and planning activities away from the development of longer-term training strategies.



CASE STUDY

Oxfordshire Advanced Skills – Apprenticeship training in advanced manufacturing

Oxfordshire Advanced Skills (OAS) is a partnership between the UK Atomic Energy Authority (UKAEA) and the Science & Technology Facilities Council (STFC), both of which have a long tradition of offering apprenticeship training. The purpose-built apprenticeship training facility at Culham Science Centre opened its doors in 2019. Now in its third academic year, OAS has an annual cohort of around 95 learners, with a planned increase to 120 in the near future.

OAS currently delivers advanced manufacturing apprenticeships at levels 3 and 4 to help employers to future-proof their workforces with the technical skills they need now, and in the future, as well as preparing their future leaders. The centre works closely with industry to define further training needs as the team plans for expansion and is now looking to introduce new programmes across areas such as power engineering, space, robotics and nuclear engineering, including fusion, cyber security and data science, as well as a level 4 apprenticeship in space engineering. The training provider and partner is MTC Training, the training arm of the Manufacturing Technology Centre, which itself is part of the High Value Manufacturing Catapult and an expert in supporting industrial innovation.

In common with the experience of other providers, one of the key challenges for OAS is to engage with SMEs to support them to invest both the time and the money in training new talent. They note that larger employers are much more likely to embrace apprenticeship programmes.

Apprentices spend the first year of their level 3 apprenticeship programme onsite at OAS undertaking off-the-job training, before returning to their employer's premises in year two and attending block release sessions at the centre.

This model embeds a solid foundation of professional skills, knowledge and behaviours so that OAS apprentices add value to their employers as soon as they return to site, maximising their impact and accelerating their on-the-job learning. The OAS enrichment programme also supports development of the 'soft skills' apprentices will need for professional and personal success.

The 3,800 square metre building contains labs and workshops specifically designed for training in engineering disciplines including mechanical, electrical, robotics, vacuum, cryogenics, fluid power, and control and instrumentation. Apprentices are trained by proven industry experts who share their first-hand expertise and experiences of working in the sector.

OAS prides itself on the quality of the training on offer and its ability to deliver training contextualised to the needs of the employer. To support this, the team runs a quarterly employers' forum, which is invaluable in helping shape the standards and training for the apprenticeships they deliver. The MTC's Future Skills team has also worked in close partnership with UKAEA and industry to select the new apprenticeship standards that best meet local employers' identified skills plans. Once selected, they then tailored the programme and curricula to most effectively deliver the skills employers will need both now and, in the future, as well as translating the apprenticeship standard into more easily digestible technical definitions for managers.

SMEs at OAS can also access free support and resources to help them embrace innovation, develop their workforce and increase productivity through the SME Support Scheme, a new initiative created through an MTC and Lloyds Bank partnership. The scheme includes funding assistance for the duration of the apprenticeship and additional salary support during their apprentice's first year of employment, enabling more SMEs to experience the benefits of apprenticeships.

In addition, OAS has recently embarked on an awareness and access project to make apprenticeships more inclusive, encourage uptake amongst hard-to-reach groups and to ensure the right support mechanisms are in place to support every learner to succeed, regardless of their particular challenges and barriers.



CASE STUDY

The Engineering Trust – Promoting careers and apprenticeships in engineering

The Engineering Trust is a registered Charity and was established in 1983 by a group of engineering employers based in Oxfordshire. Their goal was to set up an organisation to promote engineering apprenticeships and training. Engineering Trust Training Limited (ETT) is a subsidiary company of The Engineering Trust and has been delivering work-based apprenticeships in Oxfordshire and surrounding counties for over 25 years. ETT is non-profit with any operating surpluses passed onto the Trust to enable it to continue to meet its original charitable purpose. The Engineering Trust also has a role in reaching out to schools to raise awareness of engineering as a career and profession.

ETT currently has around 150 apprentices in training with them who are employed within engineering and manufacturing companies, most of which are small and medium size enterprises (SMEs). ETT offers a bespoke approach to each apprenticeship, working with the employer to identify the best apprenticeship training route in relation to what they want to achieve. This allows them to work with a wide range of companies with apprenticeship options from Level 2 to Level 4.

According to ETT, most levy paying companies have programmes in place to provide apprenticeship training, using the funds they accrue in their levy pot to pay for the training. In their experience however, it is smaller companies, those that might look to provide one or two apprenticeship placements a year, which are not taking advantage of apprenticeship as a training method both for new recruits and existing staff. "Although Oxfordshire has a healthy number of apprentices in training there is still plenty of room for growth" says The Engineering Trust's CEO, Mark Vingoe.

ETT's approach is based on a high level of in-company support both for the apprentice and the employer. They also focus on developing the learner as a rounded employee with the ability to engage with learners who already have prior knowledge, but don't have the skills & experience within a work environment.

"We tend annually, to have more people wanting to do an apprenticeship than there are places available" says Mark "and we are always happy to speak with companies to explore if taking on an apprentice will fit into their business".



CASE STUDY

Harwell Campus – Nurturing future talent

Harwell Campus is a vibrant science and innovation ecosystem, forecast to grow to over 20,000 people over the next decade from the 6,000 people that work there today. To achieve this growth, staff will need to be attracted to current job opportunities, existing staff up-skilled and a strong pipeline of future talent nurtured. Harwell Campus has developed a skills strategy to address these needs through an agreed 'Support-Develop-Ensure' framework.

With over 200 organisations at Harwell Campus, each with their own skills initiatives, the first step has been to bring together the larger organisations to improve communication and share best practice. Now the group charged with delivering the strategy is looking to identify where there is potential for more collaboration and where new initiatives could increase the collective impact.

Harwell Campus offers a broad range of roles and career opportunities across businesses in different sectors and of different sizes. The workforce includes apprentices to PhDs within scientific and technical disciplines and all the supporting roles such as HR, finance and marketing. Companies range from start-ups through SMEs to multinationals, which the Campus actively engages through its Clusters in Space, Health, Energy and Quantum.

As with many high tech, high skilled sectors, mid-career retention and recruitment especially for engineering is a particular challenge. Demand for early career training opportunities is strong, for example the Science and Technology Facilities Council (STFC) receives an average of 50 applicants



for each of the graduate roles that it advertises across the UK and an average of 30 applicants for apprenticeships. The Satellite Applications Catapult had over 65 applicants for its Space Placements in Industry Scheme for undergraduates that is run in collaboration with the UK Space Agency. Organisations at Harwell Campus are looking to address this, including STFC through its Skills Factory proposal.

"To ensure we have the volume of skilled staff that we need in the future, we need to increase early career training today and explore how we can reskill staff from other sectors. Can the accountancy training model for finance be replicated in the science and technology sector?" asks Joanna Hart, Harwell Space Cluster Development Manager, who has also been tasked with leading implementation of Harwell's skills strategy.

STFC Skills Factory Proposal: Increasing technically trained staff for SMEs across the UK

STFC's proposed Skills Factory would leverage its inspirational large scale facilities to significantly increase early career training opportunities and provide a supportive environment for returners and those looking to reskill. With existing award winning training schemes and direct links to companies through its campuses, the technically trained staff will be ready to support the R&D needs of SMEs across the UK. In addition, all trainees will be asked to contribute 10 days of school and community engagement a year, increasing school and community engagement to 'Ensure' a strong pipeline of future applicants.



Other early-stage career routes into knowledge-economy companies

In addition to use of apprenticeships, we also asked about the use of the Government's Kickstart scheme, internships, work placements, recruitment of post-18 school leavers and entry from further education colleges, not including individuals undertaking apprenticeships.

Do you offer internships, work placements, do you recruit post-18 school leavers or from further- education or from the Kickstart scheme?	Yes (n)	No (n)	Yes (%)	No (%)
Internships	21	5	81%	19%
Work placements (school level)/work experience	13	13	50%	50%
Kickstart	22	3	88%	12%
Post 18 education (school)	22	4	85%	15%
Further education	18	8	69%	31%

(Table 2 – use of internships, work placement, Kickstart and recruitment of post-18 students from schools or further education)

For the purposes of this research, internships were defined as an offer of a placement within a company for an extended period of time, typically for a number of weeks and usually over the summer vacation, but the definition also extended to a formal industrial placement as part of a sandwich degree course. These internships were offered to under-graduate students on a degree course, or post-graduation and often to students undertaking post-graduate study (Masters level or PhD students). On the other hand, work placements were defined as an offer to a pre-degree level student, usually at school, as an opportunity to experience the work environment, either for those looking to study a STEM subject, or as a means of encouraging an interest in STEM.

There was a high-level use of internships, although the method for organising these varied significantly between companies. Not all companies advertise internship opportunities and rely on approaches by individuals or relationships with particular higher education institutes. One company cited the Crankstart scheme as a source of exceptional talent. Again, provision of internships is an area that has been adversely affected by Covid, with many companies indicating that they suspended the offer of internships during the Covid restrictions.

The offer of work placements was less common than the offer of internships. There is no correlation between the size of the company and the willingness to provide work placements. The arrangements for work placements generally appear to be much less formal than the arrangements for internships, although some companies have well established programmes and dedicate resource to this activity. In these cases, there is a clear objective of supporting STEM education and encouraging an interest in STEM-based careers. On the other hand, while companies may be willing to take work placements, these can be restricted to individuals who already have a connection to the company, for example the children of employees.

CASE STUDY

The Learning Lab at Vertex

Vertex, the global biotech company, launched a number of STEM programmes and a new state-of-the-art Learning Lab space at the company's European research site in Milton Park, Oxfordshire in autumn 2021. The lab space and programmes are designed to create fun, hands-on experiences for students to explore science in the real world alongside Vertex scientists and mentors, giving them the skills needed to succeed in a STEM career.

Results from a recent survey conducted by Vertex in the UK found that more than two thirds (38%) of students are more likely to consider studying STEM subjects now than they were before the COVID-19 pandemic. It also found that STEM subjects are among the most popular subjects to study at school.

However, a disparity remains amongst young people; while 58% would be interested in studying a STEM subject at university, boys are still more likely to show an interest than girls. The survey found that fewer than 10% of girls want to study IT, computer science, economics, and engineering. The research also found a stark contrast in students from private and state schools; 90% of privately educated young people said they will study a STEM subject at A-level, compared with 70% of students from state schools. It was also found that 75% of private school respondents plan to study STEM at university, compared with only 57% of state school students.

The Learning Lab programmes are designed to increase representation in STEM and deepen students' understanding of the world of biotech, fostering a lifelong love of science.

To remain committed to inspiring students during the COVID-19 pandemic, the programme has been adapted to launch virtually, with Vertex providing laptops and STEM activity bundles to all students to enable a hands-on learning experience of medicine discovery and development.

The launch of the Learning Lab builds on Vertex's summer internship and school engagement programmes, the previous success of Vertex's 'Work in Science Week' and the long-running commitment to partnering with local leaders, educators, and institutions to advance science education.



CASE STUDY

Science Oxford's STEM Careers Programme – Helping companies engage with future talent and build an understanding of careers in science and tech

Science Oxford, part of The Oxford Trust, aims to inspire and engage young people around Science, Technology, Engineering and Maths (STEM). Science Oxford offers a range of opportunities to secondary school students in Oxfordshire and Buckinghamshire, each with a specific focus on building awareness of STEM career paths, providing context to the students' learning, and introducing them to the skills required to succeed in STEM sectors. Offers to students include:

- Full STEM career days in a school, alongside industry volunteers who deliver hands-on challenges and activities themed around engineering, space, and life sciences; (delivered to students aged 11–14)
- Week-long programmes (usually during school half terms) for selected students to take part in tours, (in person or virtual), have talks from industry professionals and engage in hands on activities. Each week is themed around engineering, coding/ computing, life sciences or climate change; (delivered to students aged 14–15)
- Summer work placements, typically ranging between 1–4 weeks, depending on the availability of the student and placement providers. From 2020 onwards, Science Oxford also offers a virtual summer experience, including two weeks of virtual tours, talks and skills workshops; (delivered to students aged 15–17)

Developing more opportunities for more students

Science Oxford's programmes reach over 1,000 secondary students every year and 40 different companies from across the region are engaged in supporting these programmes.

"There is always more that could be done to reach more students, specifically those with low science capital," says Operations and Impact Manager, Christopher Duff. Science capital is defined as the sum of all the science-related knowledge, attitudes, experiences and resources that an individual builds up through their life.

There is a national requirement by schools to support students in obtaining work experience placements, usually at year 10 (students aged 14–15). Schools following

best practice, as set out by the Government's 'Gatsby Benchmarks', will usually reach out to organisations, such as Science Oxford, who facilitate the logistics, communication and administration for those placements.

28 students participated in STEM Work Experience Placements in 2019, with 64 taking part in the virtual summer experience in 2020.

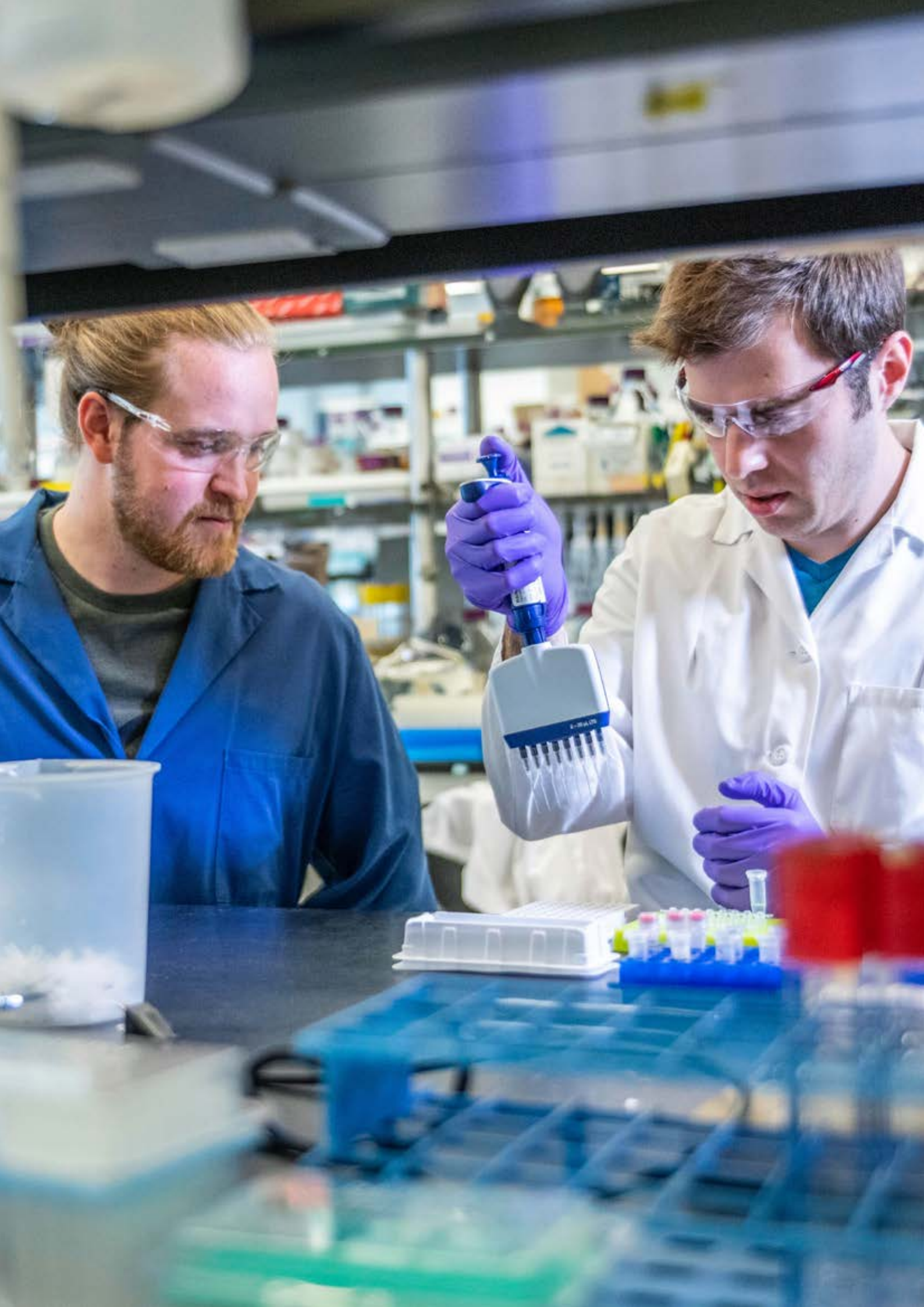
"Demand from students is always high, particularly with restricted placement opportunities, however there is a distinct lack of awareness of the local labour market and current and upcoming job opportunities," notes Christopher. "Science Oxford sits in a unique position as it bridges the gap between STEM employers and schools, and we dedicate our time to building relationships between industry and education. What we have seen from feedback is each interaction a student has with a STEM company or ambassador increases their science capital."

There is an opportunity to expand the number and range of companies and organisations that engage with students, particularly as Science Oxford can organise, facilitate and administer the brokerage of students from schools into work placements, reducing the time and effort required by each company.



For more information regarding work placements, please see the website: <https://scienceoxford.com/schools/secondary-schools/stem-placements/>

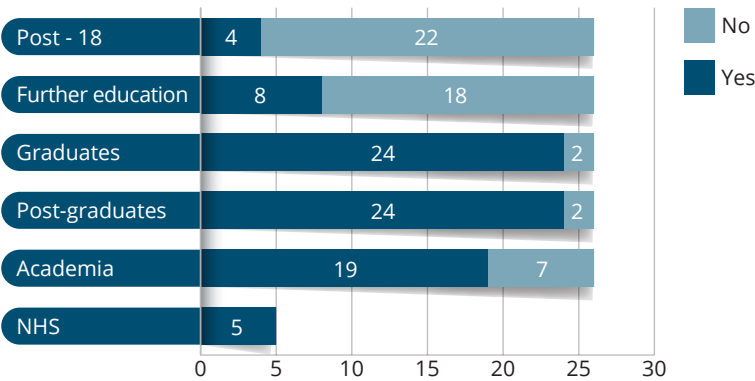
Or contact Head of Education Andrew Kensley at STEMCareers@scienceoxford.com



Educational requirements

Looking at the required educational level of most employees entering into roles within companies participating in this research, the majority employ graduates as a minimum, with many also recruiting talent with post-graduate qualifications – Masters level or often PhDs, often with some post-doctoral experience. As shown in table 2 and chart 2, very few companies recruit talent directly from schools or from further education routes, but where this does happen, it is exclusively into non-scientific support roles.

Entry into companies, education/background



(Chart 2 – educational level sought when recruiting to roles within companies. Where relevant, companies were asked if they recruit from the NHS)

In scoping this research, there was some discussion about the difficulties for candidates with a strong academic background – those having post-doctoral experience, or those with academic appointments – adjusting to industrial/commercial environments. Despite this concern, there is a good flow of academics moving into Oxfordshire-based businesses, with 73% of companies questioned indicating that they have recruited staff with an academic background. Given the issue of adjustment to a commercial setting, companies that recruit from academia were questioned on their experience. It became evident that recruitment processes have been adapted to respond to this issue. Most companies stated that the question of adjustment and alignment to a business environment is thoroughly explored and tested at interview stage.

“We really focused on assessing the level of commercial interest [in academic candidates].”
Noted one respondent

Some of those questioned cited this as an issue even for recruitment of graduate-level staff entering the workforce post study, where the adjustment from an academic environment to a business environment can be challenging for some. Overall, there was a sense that it is becoming easier to manage the transition between settings.

“The transition to industry used to be difficult, but there is more exposure to industry [in academia] so the transition is less difficult.”
Noted another respondent

The research also looked at the movement of staff from the NHS into industry. This question was of greatest relevance to companies with a health or life science focus (n = 12 of the 26 companies participating in the research). Five of these companies (42%) are actively recruiting from the NHS into a range of roles, including clinical roles, but also project management was cited as a skill that was sought and valued.





Understanding geographical factors in relation to the Oxfordshire labour market

“There is a poor understanding between the Oxfordshire ecosystem and the global and local talent that exists within the students at Saïd Business School. This is not the case for other parts of the University of Oxford, for example, the various departments and more traditionally academic degrees have a more direct hiring relationship through the University’s career services department. As such, there is a well-trodden path to London from the Business School: students leave for a worse professional experience, when their dream job is actually here in Oxfordshire.”

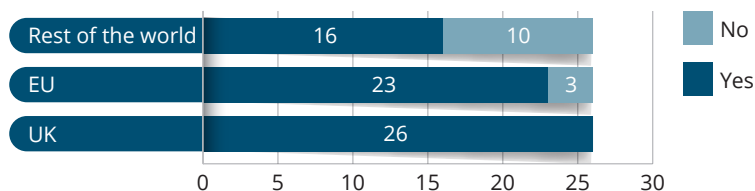
Arctoris

Given the activities and innovation focus of the companies questioned, there was an expectation that talent would be sourced globally for some specialist roles, with a greater focus on the local labour market where the supply of required skills and experience is more readily available. All companies recruit from within the UK. It became evident from the interviews that, while companies are keen to recruit talent from within the local labour market, i.e., Oxfordshire, they struggle to do so and rely on attracting talent from across the UK. This has been facilitated in some organisations by changes in working practices associated with the Covid pandemic. Many companies are willing to accept or offer remote working and this has opened up opportunities to recruit talent, since a relocation to Oxfordshire is no longer a fixed requirement.

Most companies benefitted from freedom of movement within the EU and have a workforce that reflects a mix of nationalities. The majority of research participants still recruit from across Europe. However, many firms have seen the number of applications or interest in the UK as a destination decline significantly, which is creating real difficulties in sourcing the skills and experience required. A significant number of companies (n = 16, 62%) also recruit from the global labour market. Nonetheless amongst the respondents it varies widely from which regions talent is sourced, or indeed, which countries that are seen as attractive or affordable to recruit from. A global search for talent is mostly applied to specialist roles where the overall global supply of skills is small, yet some respondents also indicated the need to look broadly, in geographic terms, because they fail to identify or attract suitably qualified candidates from the UK.

Many companies pride themselves on their international outlook and celebrate the fact that they have a multinational workforce, valuing the talent and diversity that this brings.

From which geographies do you recruit staff?



(Chart 3 – companies source talent from different geographies, although not all recruit outside the UK – the number of companies that actively recruit in different labour markets)

CASE STUDY

The Rosalind Franklin Institute – Attracting talent from a global market

The Rosalind Franklin Institute (Franklin) was founded by ten leading UK Universities in 2018, with £103 million funding from the UK Government. This funding has created novel imaging technologies in microscopy, chemistry, structural biology, and AI. The Franklin operates as a hub and spoke model. The hub is the newly opened Franklin building on the Harwell Campus, while the spokes are the academic teams based in the 10 Universities across the UK. The Franklin will grow to around 220 FTEs over the next 18 months but is currently at around 70 employees. An early focus was on building the operational team and now the Institute is drawing in the scientific team that will run the research activities. Most hires are research assistants and scientists with relatively few technician level staff within the hub, particularly in these early stages, but this is likely to change moving forward.

The key challenge for the Franklin is in filling specialist scientific roles, where they are competing with both academic and scientific institutions to attract the talent. For example, there are only a few experts globally in the field of cryo-microscopy, so the Franklin is competing internationally to attract these scientist to its Oxfordshire base. Lead times to recruit to these roles can be very long and it is not unusual for it to take 6 months to bring someone into the team, and that is after the advertisement being run for several months too.

Whilst there are challenges with attracting talent locally, they have been successful in attracting international applicants. With around 20 incoming staff needing work permits. The Franklin also funds NHS care for inbound international hires, but it has been the restrictions associated with Covid that have proved most challenging in terms of getting people into the UK. In some instances however, the pandemic has had the effect of encouraging UK ex-pats to return to the UK.

The Franklin is also building its own reputation, in particular as a place for younger, early career scientists to come to build their skills and experience. The Franklin has lots of post-doctoral research opportunities and some of these are offered as joint appointments between the Franklin and another academic institution. The Institute is in the early stages of building its employer brand, so they are hoping that these research opportunities will help to attract candidates who may not know much about the Institute's work yet. The team has seen that the cost of housing and transport links, particularly between Harwell and Oxford city centre, are issues in attracting talent.

"If you are under 30 you want to live in Oxford and commute to site. There is also a need for affordable housing, not just for our students but also for our younger employees."

Another important part of the Franklin's talent strategy is through their PhD training programme, which has been actively recruiting over the last year. The Franklin used anonymised application and shortlisting for their PhD studentship programme and removed all personal questions from the application process, as well as using gender balanced selection panels. The Institute is trying to make their PhDs as accessible as possible for under-represented groups, recognising the variety of experience and the differing support that candidates might receive when applying. Looking forward the team is committed to extending its outreach to ensure the widest level of participation. The team has worked with Leading Routes¹ and welcomed two interns from the HDRUK Black Internship Programme to the Franklin in 2021.

In the long term, the Franklin sees itself supplying skills to industry as well as academia. "We want to build a network of alumni who will change the world but will also come back and collaborate with us – that will be a measure of our success".

¹ <https://leadingroutes.org/bia>

Impacts of Brexit

With such an international outlook, it might be expected that Brexit has impacted the skills and talent pipeline across Oxfordshire's innovation ecosystem. Companies were questioned about any such impacts on their recruitment activities, employee retention, and acquisition of talent.

Companies were asked to rate the impact of Brexit from a skills and talent perspective, where 1 was very negative and 10 was very positive. Not all companies responded to this question, and in all instances, this was where they had no or limited experience to draw upon. Nevertheless, 23 companies responded to this question with a mean response of 3.2, with a range from 1 to 7. Six companies rated the impact at 5, neither negative nor positive. Only one respondent gave a score higher than 5. It is also worth noting that some companies stated that it was difficult to disaggregate the impact of Brexit from the impact of the Covid pandemic and that these two issues have become conflated to create challenges in finding suitable candidates.

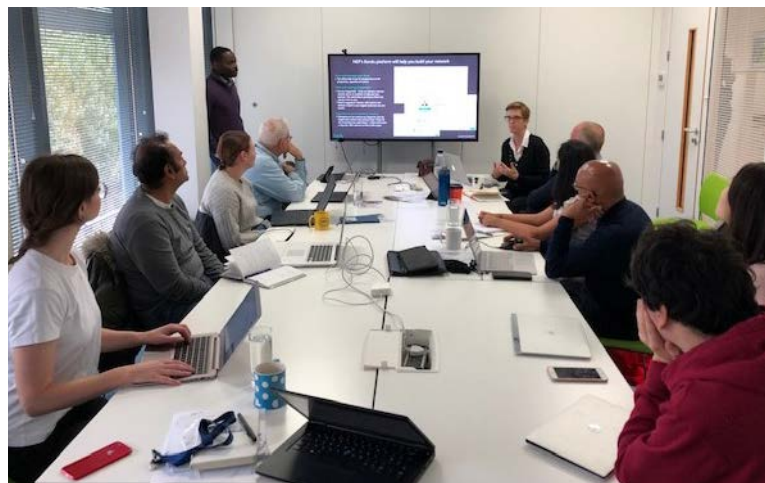
On further questioning, the key impacts of Brexit identified were (i) challenges in acquiring staff, (ii) extended time to recruit, and (iii) additional cost. Regarding this latter point, most comments related to additional costs in acquiring visas and specialist immigration advice, but some companies had also experienced increased costs for relocation and increased salary expectations from candidates. Fewer companies cited difficulties associated with retention of staff and in most instances this concern was averted due to companies being active in the run up to the UK's exit from the EU, ensuring that staff were supported and had the necessary visas and settled status. Only a very small number of companies stated that they had lost staff due to Brexit and a similar number also identified loss of staff due to Covid, where staff members had returned to their country of origin.

Issue cited as a challenge/difficulty as a consequence of Brexit	No. times cited
Acquisition of talent	15
Time to recruit has increased	13
Additional costs of recruitment when compared to pre-Brexit	11
Recruitment is more difficult	11
Retention of existing staff	8

(Table 3 – challenges as a consequence of Brexit, relating to retention and acquisition of staff)

One respondent noted, "Visa applications are costly and also time consuming. I feel Oxford needs an advice centre that businesses can go to obtain help."

Despite this generally negative view of the impacts of Brexit, it is recognised that Brexit has happened, and companies need to move forward working within the new rules and systems. It seems unlikely however, that the need to attract skills and talent from outside the UK resident labour force will decline any time soon.



Reasons for turnover

Turnover rates within companies were not collected, but it was evident that companies are recruiting to replace staff, not just for growth. There was a sense that HR teams are under real pressure and that recruitment is a constant challenge. There is a high-level usage of exit interviews across all of the businesses questioned and as a consequence, there is a good understanding of the reasons driving staff movement and turnover. A range of issues were cited as being the common causes of turnover.

Most frequent reasons given for leaving	No. of companies citing this issue
Career progression/career development	13
Salary increase sought/offered	10
Other issues, including return to study, burn-out, dislike of start-up culture, long hours, relocation, cost of living/housing	15

(Table 4 – mostly frequently cited reason for staff departures)

Smaller organisations can find it difficult to offer career progression within their company as opportunities are fewer and organisational structures are flatter. Nevertheless, there was evidence from interviews that well-funded start-up and growth companies are attracting talent through salary and role title inflation. There was some suggestion from more established companies that title inflation is used to give a sense of career progression, even if this might not be the case.

A number of companies were vocal about the challenges faced from active poaching of staff. It is notable that a variety of channels are used to identify and attract talent, including, in some instance referrals, i.e., existing staff members suggesting or recommending a potential candidate, often with some form of reward for a successful hire. There is also some evidence of staff within particular companies, who are likely to have relevant skills and sector experience, being approached by other employers in the industry. Where these informal approaches take place, it is not only likely to have a negative effect on equality, diversity and inclusion within organisations, but it also creates bad feeling within the company that is on the receiving end. While the need for a buoyant local labour market is seen as a positive attribute for the region, there is also the view that ‘we are all in this together’ and a feeling of resentment that other companies are benefitting from others’ investment in training and developing the workforce.

Nested within the ‘other issues’ category within Table 4, it is notable that cost of living and housing within the region, or a decision to relocate outside Oxfordshire was by far the greatest issue raised.

Impact of Covid on working practices

This research provided an ideal opportunity to explore the extent to which innovation-based businesses have changed working practices or patterns as a result of Covid restrictions. In common with other studies undertaken by Advanced Oxford since March, 2020 (see <https://www.advancedoxford.com/latest-research>), it is evident that companies have adapted in a variety of ways. Companies where employees are involved in laboratory-based research, development, production or manufacturing activities, have continued to operate at sites across Oxfordshire even in the height of restrictions, albeit with appropriate adjustments such as shift patterns, social distancing and PPE. Nevertheless, home, remote, and virtual team working have all been embraced to some degree or other, even in businesses that previously considered themselves to be entirely focused on site-based working. Thirteen of the respondents identified that they had moved to some form of hybrid or flexible working arrangement as the standard way of working. Indeed, many companies have seen this as a positive development and one that allows them to open up job opportunities to a much wider range of talent, with team members being recruited who will never work regularly within the Oxfordshire region. While much greater flexibility is being embraced, work to establish policies and frameworks to support virtual team and remote working is lagging behind in many cases. Notwithstanding, some are seeing the changes

as a chance to create fundamentally different physical work environments, with spaces for collaboration, meeting and mixing spaces now being valued above individual offices.

“There is a very strong sense of purpose within the organisation and a focus on being your authentic self. The Covid pandemic resulted in a need for a more flexible leadership style - there have needed to be shifts in trust and in communication. Better management has been the focus, to allow us to manage teams remotely. Everyone went through leadership training and leading high performing teams training. We have also developed skills in giving and receiving feedback, leading change and personal resilience. We have also put in place coaching for many people too as well as facilitated workshops on our culture and values.”

Enara Bio

Equality, diversity and inclusion issues

In scoping this research, a decision was made not to explore equality, diversity and inclusion (ED&I) issues in depth, in part due to other work that is being undertaken by Advanced Oxford in collaboration with the Centre for Diversity Policy Research and Practice at Oxford Brookes University^{iv}. Nevertheless, the research provided an opportunity to ask some questions about approaches to ED&I. Most companies questioned acknowledged this as a significant issue, with gender diversity in particular being stated as a challenge. This is not to suggest that there was no awareness of other ED&I topics, but gender equality was the issue most frequently cited as the area requiring immediate attention, or where data was being collected on levels of representation. Companies also appear to be active in putting initiatives or activities in place to start addressing the issues, whether it be establishing groups or looking at how job adverts, and job descriptions are written. Nevertheless, it is apparent that the majority of companies participating in this research are very much at the beginning of their work on ED&I and there are many that are yet to put systems and policies in place to actively ensure ED&I is embedded within organisations.

^{iv} <https://www.advancedoxford.com/project/gender-diversity-within-oxfordshires-innovation-ecosystem/>

Skills requirements in five years' time

Having asked about the roles that are most difficult to fill at the moment, the research concluded by asking about the skills that will be needed in five years' time and how this will differ from what is required today.

“Looking forward to five years' time, what differences do you expect to see in the types of skills or talent that you will be looking for? Please identify areas where demand for skills will decrease, or areas where there will be new demands or new skills required.”

Respondents were asked to identify as many skills or role areas as relevant. It was interesting to observe that no company identified skills that would no longer be needed or would disappear. All responses therefore relate to a need to bring in new or additional skills in the categories identified below.

Different or changing skills required in 5 years



(Chart 4 – skills requirements in 5 years' time, where companies identified a changing need, that is an increase or difference in relation to what they currently need)

The term 'Support roles' is used to identify roles such as finance, HR, project management and regulatory affairs. Participants may have identified multiple roles in this area, but only one response per company was included for these type of roles.

The term 'Commercial' is used to identify a range of roles including sales, business development, SaaS sales, marketing, and digital marketing. As with 'Support roles' this was included only once per company, even if a variety of different commercial roles were cited.

As with engineering in the earlier section of this chapter on hard to fill roles, a range of different engineering types were mentioned, but these have been grouped. As with the categories above, respondents may have named different engineering requirements, but this is only counted once as a need for engineering skills.



Comparison of current 'hard to fill' roles with future requirements

There is a good degree of commonality between the current hard to fill roles, as set out in Chart 1 at the beginning of this chapter and the roles that are expected to be in greater demand in 5 years' time.

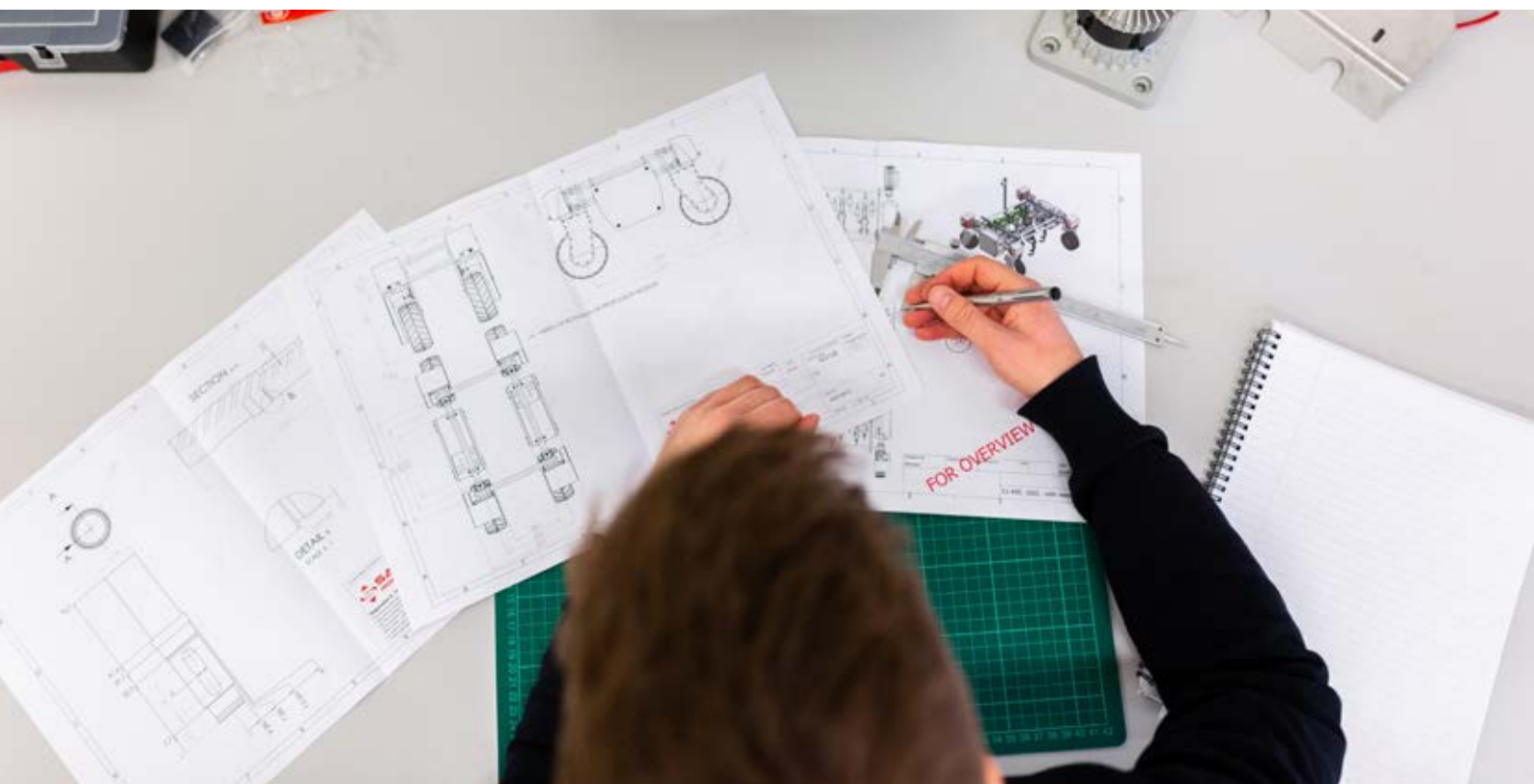
Top ranked skills/role requirements	Hard to fill roles in 2021 (rank)	Anticipated requirements (new or increased demand) in 5 years (rank)
Engineering	1st	3rd
Data science including machine learning, AI and computational roles	2nd (joint)	2nd
Computer science and software	2nd (joint)	4th (joint)
Specialist scientific roles	4th	4th (joint)
Commercial	5th	1st
Support roles	Does not appear	4th (joint)

(Table 5 – companies were asked to identify both roles that they currently find hard to fill, as well as future skill needs in 5 years' time – this table compares the most frequently cited skills/roles across responses to each of these questions, showing commonality across both data sets)

Demand for support roles stands out, in that it does not appear in the hard to fill category, but there is expected growth in demand for these types of roles. It is not surprising, given the growth expectations of companies, that the need for these types of roles is anticipated to increase. However, given that these roles

are currently relatively easy to fill, given that they were not identified as hard to fill, with the exception of occasional very specialist roles such as legal counsel, there may not be a need to swell the number of participants within the labour market in these essential professions. On the other hand, if the expectation is that there will be an increase in the requirement for scientific and technical roles, particularly in engineering science, computer science and software and data science, including skills such as ML, AI, computational skills and bioinformatics, and these roles are already difficult to fill, then Oxfordshire risks a deepening skills shortfall and challenges in identifying suitable candidates in the future. What is more, if companies are already looking outside the UK to fill these roles, unless there is concerted action to develop these skills within the UK, there can be an expectation that businesses will see increased recruitment costs including immigration advice, salary inflation and increasing demand for relocation support and expenses.

While it is apparent that there is still a significant need for new scientific or technical roles within the innovation ecosystem, as many businesses move towards commercialisation, or bring new products and services to market, there is an anticipated demand for commercially capable and competent staff and a need to upskill technical and scientific staff who can support the sales, marketing and growth of commercial companies. This would suggest a need to increase the provision of business skills within the region and a role for accelerators, growth hubs, innovation support and our business schools to reach out and help to build and supply the commercial skills that will be demanded in the future.





Questions used as part of the qualitative data collection

- Does your company expect to grow in the next 2 years?
- Do you have an HR/recruitment function in house?
- What roles do you find the most challenging to fill?
- Do you use or employ apprentices?
- What issues affect the use, or the non-use of apprenticeships, e.g. levy payments, concerns about training providers, organisational capacity to train apprenticeships etc.
- Are you aware of, or do you use, Knowledge Transfer Partnerships (KTPs) (funded by Innovate UK)?
- Tell me about the level of skills you require for scientific and technical roles - describe as many as relevant, e.g. graduates, PhD level, post-docs etc.
- Do you use any of these routes to find/recruit staff?
 - Kickstart
 - Work placements
 - Internships
 - School leavers (post 18)
 - Further education (BTEC, HND, etc)
 - Graduates
 - Post-graduates
 - Academia
 - NHS (for health/life sciences companies)
- If the response to recruiting from academia was 'YES' have you experienced any issues with recruits adjusting to an industry environment?
- Which locations do you typically recruit from?
- How do you rate the effects of Brexit in relation to the acquisition and retention of talent; negative or positive, on a scale, 1 to 10, where 1 is very negative and 10 is very positive?
- How have the following issues been affected by Brexit?
 - Acquisition of talent
 - Retention of staff
 - Recruitment is more or less difficult?
- What costs, if any, (resources, time, money) have changed as a result of Brexit?
- Do you conduct exit interviews when staff leave?
- If the answer is yes, what are common reasons for staff leaving?
- Looking forward to 5 years' time, what differences do you expect to see in the types of skills or talent that you will be looking for? Please identify areas where demand for skills will decrease, or areas where there will be new demands or new skills required. List as many as relevant.
- What have been the effects of Covid 19 on the way you organise work, such as expectations regarding work location or number of days working at site etc?
- Have you any specific measures in place to address equality, diversity and inclusion matters?





How science & technology-focused companies are using their digital channels to promote career opportunities and job vacancies

A sample of 188 innovation-based companies were examined in late May/early June 2021 to determine which channels were being used to promote career opportunities and to advertise vacancies. Companies were drawn from across a wide range of innovation sectors, and all had a presence in Oxfordshire. All businesses were active and, even if small, had come to Advanced Oxford's attention due to some recent activity, typically some form of PR or investment activity. Their websites, Twitter and LinkedIn accounts were examined to determine which companies were advertising roles and, indeed, which were active in using these particular channels. Some companies within the sample were located on Oxfordshire-based science parks or campuses and in some instances were able to use 'campus' websites to advertise their roles; others, as part of the Oxford Science Enterprises portfolio, have access to a dedicated careers platform located on the Oxford Science Enterprises website.

Results from the review of digital channels for advertising jobs and career opportunities

	Yes	No
No. companies advertising at least one role during the study period (end of May, early June 2021)	112 (60%)	76 (40%)
No. companies with a jobs/careers page on their website	134 (71%)	54 (29%)

(Table 6 – based on a sample of 188 innovation-based companies, located in Oxfordshire, the number of companies that were advertising at least one role in May/June 2021 was examined. The use of jobs/careers pages on company websites was also determined)

Of the 188 companies that were examined, 112 (60%) were advertising roles during the research period of May and June, 2021, using one or more of their own channels to promote the career opportunity (note, advertising using recruiters, agencies or other jobs boards was not examined).

While the majority of companies have a company website, a very small number did not, or had a non-functioning website. Where there was no website, companies tended to have a LinkedIn page, administered by the company. Surprisingly, 29% of companies do not use their

websites to promote careers or to advertise jobs. On the whole, where companies have a careers/jobs/'work with us' page within their websites, they are prominent and easy to find. However, in some instances, they are hidden in site maps or require more than one step to locate and navigate to the location from the home page.

	LinkedIn	Twitter
No. of companies using this channel to advertise roles within their company	79 (70% of companies with roles they are seeking to fill use LinkedIn to advertise roles)	21 (19% of companies with roles they are seeking to fill use Twitter to alert candidates to job opportunities)
No. of companies with no presence (administered by the company) on this channel	6	36

(Table 7 – usage of LinkedIn and Twitter as a channel for recruitment, based on a sample of 188 innovation-based companies in Oxfordshire, May/June 2021)

It appears that LinkedIn is a popular channel for advertising roles. There were 70 companies with a LinkedIn page that were not recruiting during the research period (May/June 2021) and it is not possible to determine if these companies use LinkedIn for this purpose. However, it is clear that Twitter is only used by a small number of companies to promote job and career opportunities. As Twitter provides a historical view, it is possible to determine where companies have used Twitter as a channel in the past and the data presented above reflects a low usage across time, typically over the last year.

“LinkedIn is used globally for AI roles. We also use and really value Otta.com. This AI enabled job search system, where you can post jobs and company profiles, matches candidates to jobs. Arctoris has used this system successfully for tech-based and intersectional roles. If you are looking for a tech-based role in an innovative company, I would go to Otta.”

Arctoris

Job portals

Many science and tech companies are based on science parks or campuses, but only a small number, typically larger sites, provide a job portal that tenant companies can use – The Oxford Science Park, the BioEscalator, Milton Park and Harwell are all examples. However, even where campuses and parks provide this facility, it is not routinely used by all companies.

Oxford Science Enterprises provides a careers site (<https://jobs.oxfordscienceenterprises.com>) which provides a facility for some of its portfolio companies to advertise their vacancies. It is currently possible to search for roles within 60 different companies within Oxford Science Enterprises portfolio. However, even if a business is one of the 60 companies listed, this does not mean that their vacancies are always advertised through this channel.

Despite these job boards being free to use, frequent examples were found where companies were not taking advantage of these job posting facilities. In many instances, the provision of a jobs board facility within science parks and campuses is a relatively recent offer to tenants, and it may be for this reason that they seem to be poorly utilised.

“The Oxford Science Park jobs page was reinstated on the website recently – it is completely free for occupiers to use, although not all of them do so. That means it's not comprehensive, and some companies that are recruiting heavily have not asked the Park to post jobs on the website; maybe they don't know about it, or don't want to use that channel. The Oxford Science Park regularly tweets links to the jobs page, highlighting companies that are recruiting and these appear to be very popular posts.”

*Emma Palmer Foster,
The Oxford Science Park*

Creating an Oxfordshire-wide job website for science and technology companies

In scoping this work, Advanced Oxford members (see www.advancedoxford.com/our-members) considered whether it might be useful for there to be an Oxfordshire-wide platform, where job vacancies and career opportunities could be posted. There was a view that this would be a positive way of promoting the vibrant and active job market within the region and could act as a 'one-stop-shop' for individuals looking for job opportunities within Oxfordshire's innovation ecosystem. At the time that this research was initiated, Oxfordshire LEP (OxLEP) commenced

its Connecting Global project. Through Connecting Global, OxLEP is working to create a platform – a range of digital assets – that will:-

- Promote Oxfordshire as a major global hub for innovation and investment by bringing together the entire Oxfordshire offer in one place.
- Connect with similar clusters worldwide raising Oxfordshire's profile as a world-leading innovation ecosystem.
- Provide a virtual showcase for emerging technologies, cutting-edge research and growing companies.
- Attract science and technology talent to the region in a competitive global job market.

This latter point on attracting science and technology talent is intended to be facilitated through a platform for Oxfordshire companies that will allow them to reach out to science and technology talent from within the UK and across the globe.

At the time of writing, it appears that OxLEP may be proposing some form of 'membership' for Oxfordshire-based companies and employers, where members can post current vacancies and showcase their individual workplace culture and values. This would be supplemented by a 'subscriber' community for both active jobseekers and passive candidates who can view which companies are hiring and search for job opportunities. Features of the platform will include a jobs board, alerts, company showcase pages and a searchable recruitment layer embedded within a cluster map, showing the location and detail of companies from across the region.

Advanced Oxford members had the opportunity to participate in a workshop style consultation on the Connecting Global platform in September, 2021 and there was a general view that the talent related features could be helpful. However, at this stage there is no indication whether this will be a free-to-use service funded by OxLEP, or whether it is intended to be a commercial proposition.

Recognising that not all businesses are using the full range of channels available to them to promote their job vacancies and career opportunities, there will need to be a concerted effort to raise awareness of the Connecting Global platform as well as active marketing of the facility to companies in an effort to get them to onboard and use the platform. Given that many companies either choose or neglect to use job boards provided free of charge within localities or through an investor like Oxford Science Enterprises, there is no guarantee that this facility will be successful, and it is unlikely to be widely used if usage is on commercial terms.



A data driven analysis of skills requirements and the Oxfordshire labour market for STEM-related roles

Introduction

Advanced Oxford has undertaken quantitative data analysis to look at science and technology jobs across the region and provide insights on the local labour market for STEM-related jobs. Analysis has been undertaken to examine:

- the numbers of science and technology jobs being advertised by local authority within Oxfordshire
- average salary levels for the most frequently advertised roles within the region
- skills that are being sought across science and technology roles

To support this analysis, Advanced Oxford accessed data sets provided by Adzuna¹. Adzuna is a leading global job search engine, which aims to list every job that is being advertised. As such, Adzuna is able to provide comprehensive and well-structured data on job vacancies. Adzuna works with local and national governments, academia, consultancies and think tanks to provide data, insight, and labour market statistics. Using Adzuna-derived data has allowed Advanced Oxford to undertake robust quantitative data analysis on the Oxfordshire STEM-based labour market to complement the qualitative data collection, presented earlier in this report.

Adzuna collects and analyses data on labour market activity, using data from job adverts. This includes allocating advertised roles to one of 29 standard role categories, assigned through a machine learning model, rather than by industry. As there is no one category that captures STEM-related occupations from the 32,000 job titles within Adzuna's ontology, Advanced Oxford determined that roles within (i) Energy, (ii) IT/Computing/Software, (iii) Engineering and (iv) Scientific/QA categories provided an appropriate proxy for scientific and technology roles. The analysis presented below is based on job adverts falling into one of these four categories.

It should be noted that in addition to the categories outlined above, which have been used as the proxy for STEM-related roles, Adzuna also attributes some roles to a 'Graduate' category. Job postings where the term graduate appears in the title, e.g., 'Graduate Management Trainee: Mechanical Engineering', are allocated to the graduate category rather than, in this case, the engineering category. The number of relevant STEM roles that fall within the graduate category was relatively small – fewer than 10 roles in 2018 across the whole of Oxfordshire – and consequently these roles have been omitted from the analysis, set out below.

Data has also been examined by geographical location. While all data presented relates to the county of Oxfordshire, the analysis further segments the job postings into one of Oxfordshire's five Local Authority areas (Cherwell, Oxford, South Oxfordshire, Vale of the White Horse and West Oxfordshire). Finally, two different time series, June 2018 and 2021, were examined by taking a 'snapshot' of roles advertised from each period. It should be noted that the snapshot does not contain all jobs advertised during the month of June, but a representative set of roles open for recruitment at a single point in the month. Data on role seniority, key skills and average salary levels has also been examined.



¹ <https://www.adzuna.co.uk>

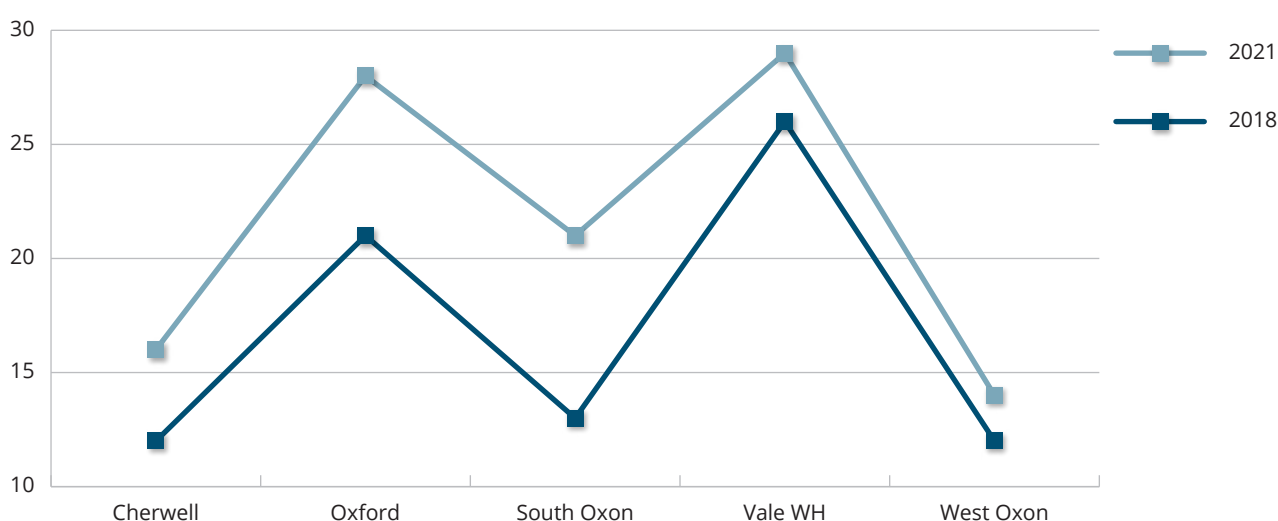
Scientific and technical jobs by local authority

Oxfordshire's innovation-based industries are spread across the county. Nevertheless, there are variations in the level of industrial activity between local authority areas. This difference is reflected in the number of STEM-related jobs being advertised within each area of Oxfordshire, as a percentage of total jobs advertised.

The total number of jobs advertised across all sectors and industries was similar for each time period examined - during the 2018 snapshot 17, 935 roles were advertised; during the 2021 snapshot it was 18,005. Overall, the number of jobs being advertised by local authority was higher in 2021, when compared to 2018, with the exception of Vale of the White Horse, which saw a lower number of advertised roles ($n = 4904$) in 2021 than in 2018 ($n = 6542$), a difference of 1,638 jobs. Across all local authorities, the percentage of STEM-related roles being recruited increased in relation to the total jobs being advertised. Although the total number of jobs advertised, and the number of STEM roles advertised within the Vale of the White Horse had decreased, the percentage of STEM roles as a proportion of the total jobs advertised had increased from 26% to 29%, which may suggest that innovation-based businesses have been less affected by the Covid 19 pandemic, than other sectors.

Local authority	Total jobs advertised	No. science/technical jobs	% Science and technical of all jobs
2018			
Cherwell	2581	316	12
Oxford	4779	1026	21
South Oxfordshire	2230	298	13
Vale of the White Horse	6542	1703	26
West Oxfordshire	1803	209	12
2021			
Cherwell	3546	554	16
Oxford	5250	1468	28
South Oxfordshire	2469	516	21
Vale of the White Horse	4904	1432	29
West Oxfordshire	1836	253	14

(Table 8 – advertised jobs across Oxfordshire's 5 local authority areas, based on two snapshots from June, 2018 and June, 2021. The number of STEM roles is shown, as is the percentage of STEM roles as a proportion of all jobs advertised within the local authority area)



(Chart 5 – STEM roles, as a percentage of all advertised roles, shown by local authority area, for each of the snapshots, 2018 and 2021)

Top ten STEM roles and the salaries they can attract

The 'Top 10' most advertised STEM roles within Oxfordshire were identified, along with the average salary for each role. The top ten was determined by the number of jobs within a particular role type that was advertised. Adzuna applies a system of normalised job counts, based on the nature of the role, regardless of the actual job title used by the recruiting organisation. For example, NET Software Developer (Home-Based) and Junior Net Developer are grouped into the normalised job title: 'NET Developer'; while Computer Vision Engineer, Senior Analysis Engineer and Vehicle Dynamics Simulation Engineer are all classified using the normalised job title: 'Engineer'. The 'Engineer' example demonstrates that there can be considerable variation in the roles which are grouped together. However, given the selected time period and geographical boundaries, greater granularity would result in groupings with very low numbers of job counts and therefore would not provide any degree of significance, particularly when looking at mean salaries levels across similar roles. The analysis covers all seniorities within a normalised job title, from entry level to a role that might include the term 'senior' in its title. Again, given the geographical focus in this analysis – Oxfordshire based roles only – relatively small changes in the seniority of roles advertised

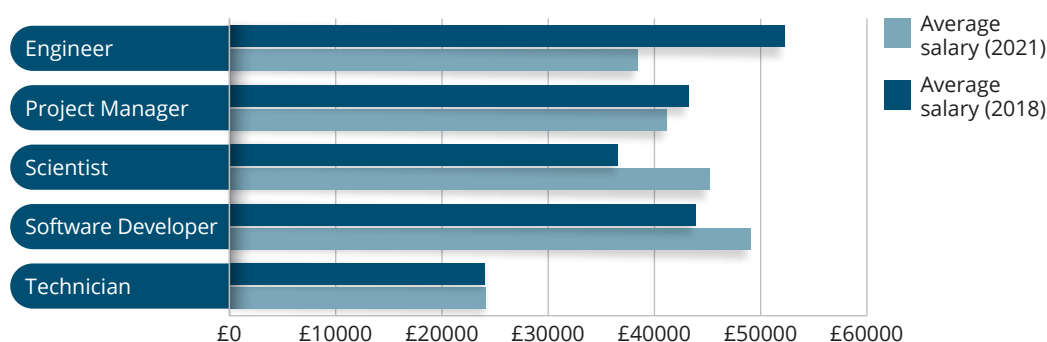
may influence the average salary for each role. Nevertheless, all roles in the data presented below include > 40 individual job counts for each snapshot, with highest ranking roles having > 200 individual jobs advertised.

The top ten shows some differences between each time point, but there are five common roles which appear in both the 2018 and 2021 ranking: Project Manager, Technician, Scientist, Engineer and Software Developer. 'Technician' has seen a modest increase in average salary between 2018 and 2021, whereas 'Scientist' and 'Software Developer' have both seen substantial increases. Furthermore, while the average 'Project Manager' salary is slightly lower in 2021 than in 2018, the difference between the two time periods for 'Engineer' is striking. The 2018 average salary for 'Engineer' is based on the analysis of 85 advertised roles, whereas the 2021 average salary is based on 108 advertised roles. Given the wide range of roles that can be captured within the 'Engineer' category, the decline in average salary likely relates to the mix of roles being advertised. What is more, where 'Engineer' roles could be allocated to a seniority level – based on information within the job title – the average salary for a senior engineer in 2018 was £51,409, while the average salary of a senior engineer in 2021 was £61,667. Again, this suggests that the 2021 average salary across all engineer roles has been influenced by an increased number of more junior roles being advertised.

Year the role appears in the top ten STEM roles advertised	Job title (normalised)	Average salary (2018)	Average salary (2021)
2018	NET Developer	£44,197	-
2018	Maintenance Engineer	£37,889	-
2018 and 2021	Project Manager	£43,242	£41,191
2018 and 2021	Technician	£24,089	£24,166
2018	Design Engineer	£39,119	-
2018	Java Developer	£48,313	-
2018	Mechanical Design Engineer	£41,127	-
2018 and 2021	Scientist	£36,576	£45,203
2018 and 2021	Engineer	£52,326	£38,422
2018 and 2021	Software Developer	£43,935	£49,096
2021	Full Stack Developer	-	£53,621
2021	Vehicle Technician	-	£41,764
2021	Manager	-	£44,203
2021	Field Service Engineer	-	£31,938
2021	Research Associate	-	£34,517

(Table 9 – average salary data from the top ten STEM-related roles advertised, based on data from June, 2018 and June, 2021. The top ten for each time period is based on the most frequently advertised roles)

A comparison of average salary for 5 STEM roles data from 2018 and 2021



(Chart 6 – a comparison of average salary levels for roles, taken from the ‘top 10’ rankings, based on data from June, 2018 and June, 2021)

In a small number of instances, there was sufficient data to examine the average salary levels by seniority of role. Looking at the normalised job title, ‘Software Developer’, data was examined across a range of levels – entry, junior, medior and senior, all based on terminology used in the job title and adverts. Looking at this specific role, the data shows a progression in salary level as roles become more senior, as would be expected. Moreover, a growth in average salary levels between 2018 and 2021 can be observed, with a very substantial difference (23%) for senior roles.

Software Developer – level of seniority	2018	2021	% change between 2018 and 2021
Entry	£27,339	£29,500	8%
Junior	£31,250	£34, 201	9%
Medior	£40,000	No data	-
Senior	£50,484	£61,853	23%

(Table 10 – a comparison of average salary for a software developer, broken down by seniority level)

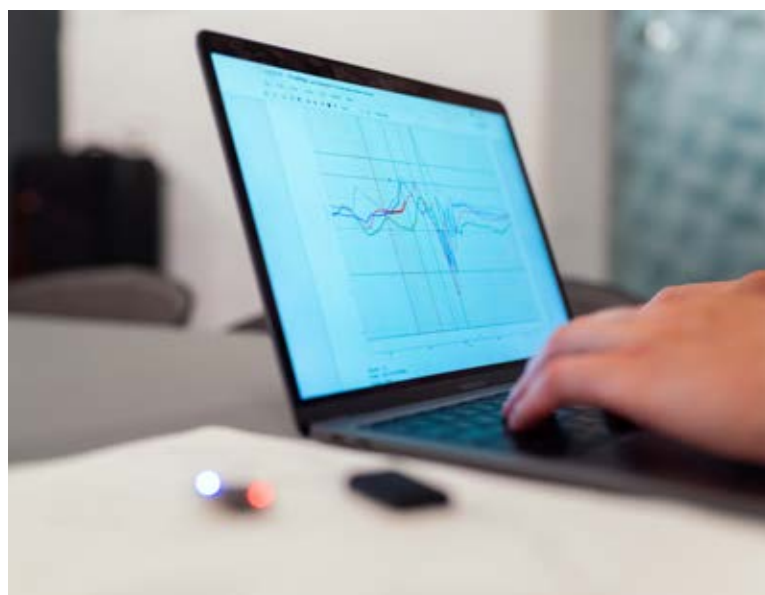
The skills employers require

Data from job adverts within STEM-related roles was collected and analysed, applying a skill count methodology. This provided a hierarchy of skills requirements, based on all roles within the science and technology categories, regardless of seniority. 103 different skill types were counted across STEM-related roles in the 2021 snapshot, ranging from abilities such as ‘Assertiveness’ which appeared in six different job adverts, to ‘Engineering’, occurring in 380 different role specifications. The different skill types were allocated to one of three groups below:

Transferable skills – skills that are used widely across a range of professions, sectors, and industries, such as interpersonal skills, problem solving and strategy skills. As seen below, some of these skills use generic terms, such as clients or solutions, which could be applied to a range of activities and roles. Communication skill is frequently identified as a key requirement.

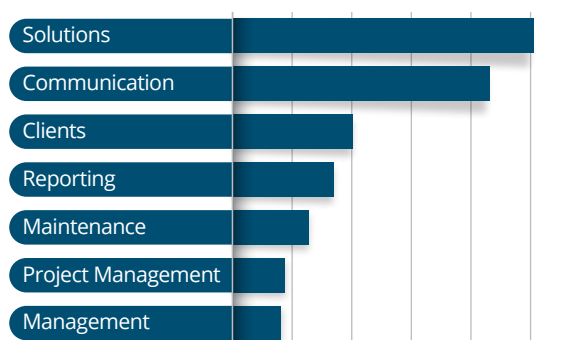
Professional skills – skills that apply to particular professional roles and vocational groupings, such as cell biology, mechanical engineering, and chemistry.

Technical skills – skills that relate to a particular technology or activity, although may be used in different settings, across different sectors and industries. The majority of proficiencies in this category relate to software and computer science and include skills such as SQL, cell culture and scrum.



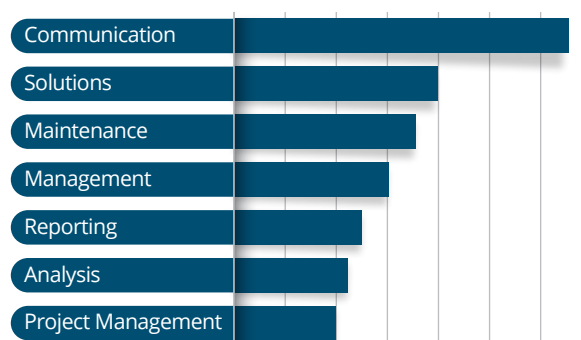
The most frequently demanded capabilities across all three skill types are shown in the charts below for 2018 and 2021. The data presented shows skill types that are sought across multiple roles, sectors, and settings.

Top transferable skills - 2018



(Chart 7 – top transferable skills demanded by employers, based on roles advertised in June, 2018)

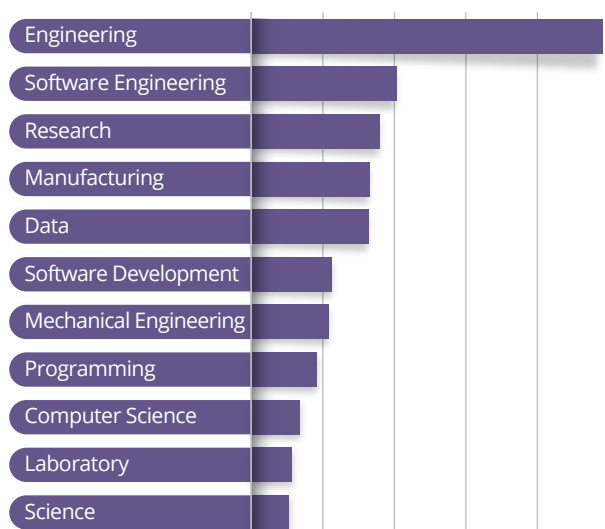
Top transferable skills - 2021



(Chart 8 – top transferable skills demanded by employers, based on roles advertised in June, 2021)

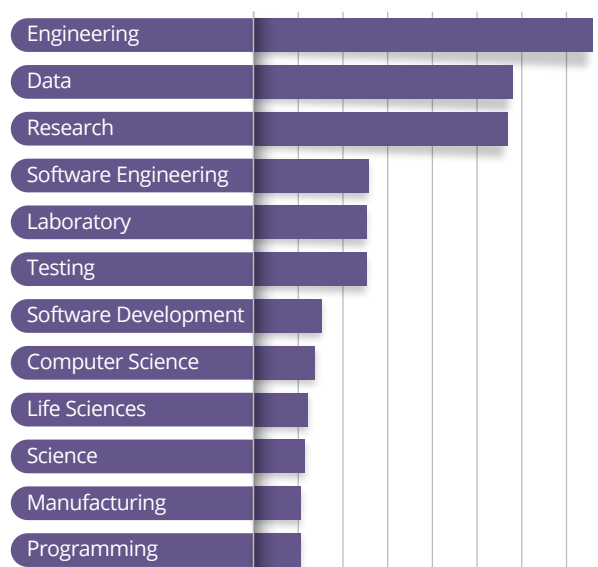
Looking at transferable skills, within the 2018 data ‘management’ has a skill count of 41, whereas ‘solutions’ appears across 253 roles. In 2021, ‘project management’ appears 99 times, while ‘communications’ appears in 327 roles.

Top professional skills - 2018



(Chart 9 – top professional skills demanded by employers, based on roles advertised in June, 2018)

Top professional skills - 2021

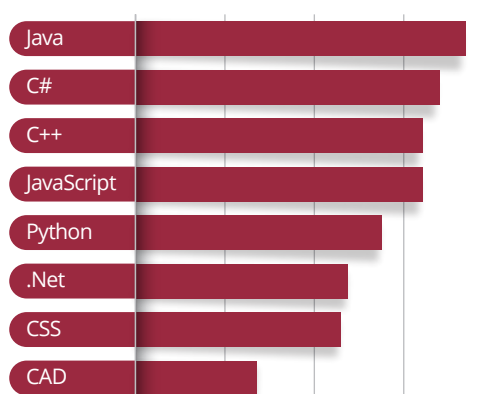


(Chart 10 – top transferable skills demanded by employers, based on roles advertised in June, 2021)

Turning to professional skills, ‘engineering’ is the highest-ranking skill appearing 492 times in the 2018 data and 380 times in the 2021 snapshot. ‘Science’ appears in 53 jobs advertised within the 2018 data set, whereas ‘manufacturing’ and ‘programming’ were included across 53 different job adverts in 2021 respectively.

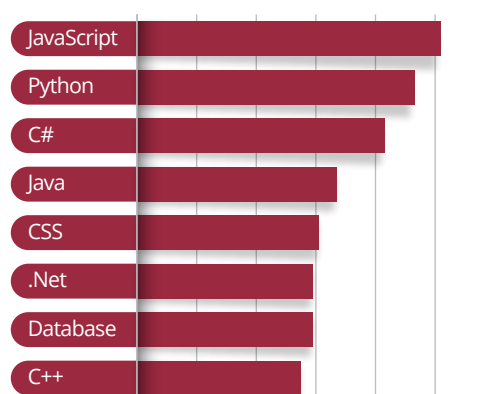


Top technology skills - 2018



(Chart 11 – top technology skills demanded by employers, based on roles advertised in June, 2018)

Top technology skills - 2021

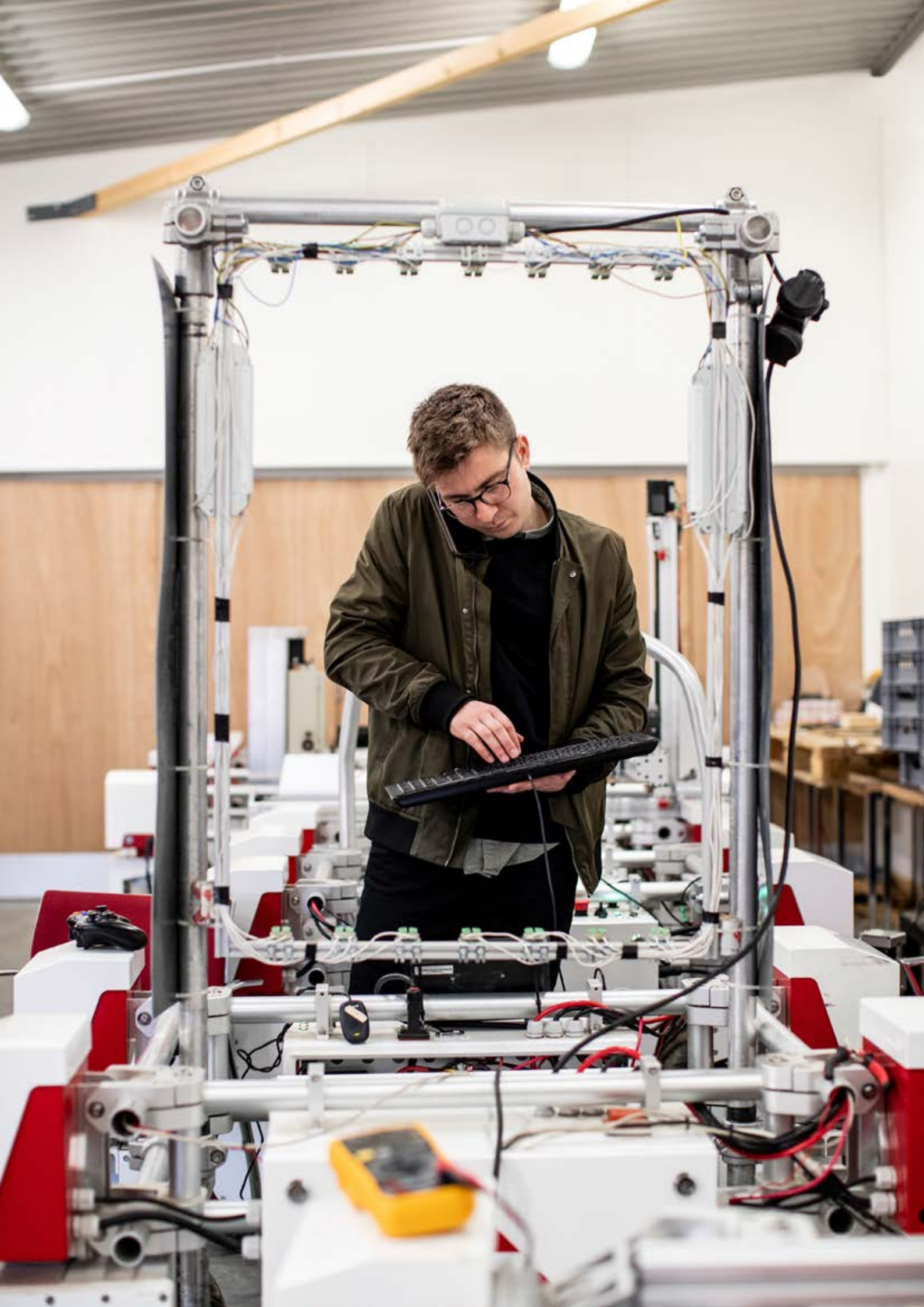


(Chart 12 – top technology skills demanded by employers, based on roles advertised in June, 2021)

Finally, there is commonality within the technical skills sought by employers, with the highest-ranking skills all relating to programming and computer science languages and skills. Java appears in 185 role descriptions in 2018, while CAD appears 68 times. In 2021, JavaScript is the most frequently requested technical skill, with a count of 102 job adverts and C++ appears within 55 adverts.

A need for further investment into skills development

The quantitative data above aligns well with data collected through Advanced Oxford's qualitative research, with engineering, software, data, and specialist scientific roles being among the most frequently sought by employers. There are, of course, common skill groupings that align within individual job descriptions, such as software development, computer science and specific programming languages and skills like Java and C++. These technical and professional skills also come together with transferable skill requirements like project management and communications skills. Combining the analysis from this chapter, with the results from the previous chapter - where hard to fill roles and future requirements were examined - it can be concluded that continued investment into and development of key skills is required to ensure that Oxfordshire's innovation businesses are able to attract, retain and grow the workforce needed across the region.





Recommendations and actions

This research has been undertaken to inform development of skills policy, provision and planning within Oxfordshire, but also beyond the region. The research will be shared widely, and Advanced Oxford will work with relevant stakeholders, including OxLEP Skills, Innovate UK, Further Education and Higher Education providers, careers advisor teams, and the Oxford-Cambridge Arc Universities Group, to ensure that the evidence presented in this report informs decision making.

The innovation economy within Oxfordshire is also an audience for this report. Businesses can learn from each other, and case studies have been used to provide information about activities and support, relevant to companies across the region. To supplement the narrative, a resources list can be found at the end of this report, with links to organisations within the skills system. This list is not exhaustive, but signposts readers to many sources of information, advice, and programmes. The list will also be provided as a stand-alone resource on the Advanced Oxford website - there is an open invitation to relevant organisations to provide information on other activities and support that can be added.

Increased investment into areas of skills shortage and demand is required. In particular, there is a need to swell the pool of individuals with engineering, software, data, and scientific skills. There is a need to increase the stream of apprentices and graduates in STEM related subjects who are entering the labour market. This means that work to encourage young people to study STEM subjects at school is essential. While there are examples of good practice, more can be done to raise awareness of career opportunities and to support activities such as work placements.

Areas for action

- (i) Data from this report will be used to inform school-based careers services about the local labour market, job opportunities, areas of demand and how potential routes of study can lead to fulfilling and rewarding roles within the innovation economy. Oxfordshire LEP's (OxLEP) Careers Hub has recently been awarded funding for a project which aims to answer the question, *'Will teacher's increased knowledge of the Oxfordshire local labour market, and engagement with employers, lead to improved outcomes for young people'*. Awareness of the variety of

pathways and local opportunities available has been identified as a potential barrier to young people across the county, in particular, low awareness of Oxfordshire's significant innovation assets and employment opportunities. As this project provides an opportunity to build knowledge about key sectors in Oxfordshire within the school community, Advanced Oxford will work with the Careers Hub to turn the analysis contained within this report into materials and information that can be used by teachers, as part of the OxLEP project, but also to be made available more widely.

- (ii) There is a need to increase the number of work placement opportunities available within the region for young people to explore STEM education, skills, and career opportunities. Given the work already undertaken to support these activities, companies should consider engaging with Science Oxford, which can support, organise, facilitate, and administer the brokerage of students from schools into work placements, reducing the time and effort required by the company and ensuring a fairer, more equitable system of provision.
- (iii) There remain considerable barriers to the adoption and use of apprenticeships as a route for developing skills and talent. This research has found two key barriers, (i) organisational capacity; (ii) lack of awareness and/or information to help companies explore opportunities to use apprenticeships. While it is difficult to recommend actions that can overcome the organisational capacity barrier, there are, nevertheless, apprenticeship support and advice services that can help companies, some of which are identified in this report - see, for example, the relationship that is being developed between OAS and Lloyds Bank, detailed in the resources list at the end of this report. However, there is still a need for all apprentice-related organisations to raise awareness and to reach out to all businesses, in particular, younger, earlier-stage companies, in order to encourage them to explore this route for training. Advice should routinely be provided by the Growth Hub and through programmes such as Innovation Support for Business. In the longer term, mechanisms to allow smaller companies to work together to train apprentices, possibly through pooling the apprenticeship levy, should be explored further.

- (iv) The Advanced Therapies Apprenticeship Community (ATAC) has proved successful in working with employers within this high growth sector and has stimulated uptake in apprenticeship usage. ATAC has benefitted from Government funding and from the convening power and coordination activities of the Medicine Manufacturing Industry Partnership Advanced Therapies Manufacturing Taskforce, and more recently, the Cell and Gene Therapy Catapult. It seems likely that other sectors could benefit from this type of support, and this should be explored further within the context of sector strengths within Oxfordshire.
- (v) In addition to schools career services, Advanced Oxford encourages university career services to make use of this report to help students and graduates understand the opportunities that exist within the local innovation-based labour market. In particular, the relationship between local employers and the two Oxford business schools should be strengthened so that graduates have a better connection to local job opportunities within high growth science and technology companies within the region.
- (vi) The demand for improved commercial skills is likely to increase in the next 5 years. There is an opportunity for local education providers, in particular for Oxford's two business schools, to develop short courses and skills development offers, particularly targeting science and technology specialists.
- (vii) Knowledge Transfer Partnerships (KTPs) provide a route to skills, knowledge development and exchange, including through the Management KTP scheme. All companies are eligible, with the opportunity to collaborate with a university partner, as well as training a graduate 'associate'. The scheme also benefits from funding from Innovate UK. However, awareness and uptake of the scheme is low in Oxfordshire. Increased and improved promotion of the KTP scheme is needed and this should be directed not just to employers, but also to students and graduates given that the number of applicants from UK-domiciled candidates is low.
- (viii) While many businesses use their company websites to good effect, with information made available about careers and job opportunities, there is still a group of companies that provide poor information and do not promote themselves actively to potential talent. Advanced Oxford has reviewed a wide range of company websites, not just for this research project, but also for the *Powering Up for the Green Recovery*¹ project, published in November, 2021. It is clear that many companies do not have a good understanding of the value of digital marketing in the broad. It is recommended that all incubation, acceleration, business support and Growth Hub programmes within the region are active in building an understanding of the need for an effective digital presence for any company, regardless of sector.
- (ix) Oxfordshire LEP (OxLEP) is currently developing its Connecting Global project, creating a range of digital assets, including functionality to attract science and technology talent to the region. This will be facilitated through a platform for Oxfordshire companies that will allow them to reach out to science and technology talent from within the UK and across the globe. Advanced Oxford's view is that the talent related features could be helpful. However, at this stage there is no indication whether this will be a free-to-use service funded by OxLEP, or whether it is intended to be a commercial proposition. Recognising that not all businesses are using the full range of channels available to them to promote their job vacancies and career opportunities, there will need to be a concerted effort to raise awareness of the Connecting Global platform as well as active marketing of the facility to companies in an effort to onboard them and encourage usage. Given that many companies either choose or neglect to use job boards available to them, provided free of charge, it is recommended that the platform is not provided on commercial terms, particularly as poor utilisation will undermine Connecting Global's objectives and under-represent the Oxfordshire labour market and the exciting opportunities it offers.

¹ <https://www.advancedoxford.com/green-recovery>



Resources

This report references a number of organisations, institutions, providers and support which can help companies in relation to skills and training. This list is not exhaustive but provides useful links for anyone wanting to explore opportunities relating to this research.

Apprenticeships

The Government's **Apprenticeships** service - <https://www.apprenticeships.gov.uk>

Abingdon and Witney College - <https://www.abingdon-witney.ac.uk> Abingdon & Witney College is a general college of Further Education offering high quality apprenticeships, vocational, professional and technical education and training, working across three main campuses and in more than 20 community venues.

Activate Learning - <https://www.activatelearning.ac.uk> Activate Learning provides apprenticeships, secondary, further and higher education in Oxfordshire and across the Thames Valley and south east of England. Activate Learning has two colleges in Oxfordshire: **Banbury and Bicester College** and **City of Oxford College**.

Advanced Therapies Apprenticeship Community (ATAC) - <https://advancedtherapiesapprenticeships.co.uk> ATAC has been established to develop the first apprenticeship programme designed specifically to train and upskill individuals to develop, manufacture and deliver these innovative advanced therapies at scale.

The **Advanced Therapies Skills and Training Network (ATSTN)** - <https://www.atskillstrainingnetwork.org.uk> ATSTN provides skills development through a single platform to access industry recommended training programmes, hands-on training and a tool to help people explore routes into the advanced therapies and vaccines manufacturing field.

Cogent - <https://www.cogentskills.com> Cogent Skills is sector based, working with companies from across the Science Industries embracing Life Sciences, Industrial Sciences and Nuclear. Cogent Skills apprenticeship and graduate services support science industry employers to attract, retain and develop people <https://www.apprenticesandgraduates.co.uk/employers>

The Engineering Trust - <https://www.theengineeringtrust.org> Engineering Trust Training Limited (ETT) is a subsidiary company of The Engineering Trust and has been delivering work-based apprenticeships in Oxfordshire and surrounding counties for over 25 years. ETT currently has around 150 apprentices in training with them who are employed within engineering and manufacturing companies, most of which are small and medium size enterprises. The Engineering Trust also has a role in reaching out to schools to raise awareness of engineering as a career and profession.

Oxfordshire Advanced Skills (OAS) - <https://www.oas.ukaea.uk> Oxfordshire Advanced Skills (OAS) is a partnership between the UK Atomic Energy Authority (UKAEA) and the Science & Technology Facilities Council (STFC) with a purpose-built apprenticeship training facility at Culham Science Centre. OAS currently delivers advanced manufacturing apprenticeships at levels 3 and 4. For further details relating to the SME support offering in partnership with Lloyds Bank, use the link here: <https://www.oas.ukaea.uk/smesupport>

Oxfordshire Apprenticeships can help you get started and answer any questions you may have. Oxfordshire Apprenticeships can help find the right apprenticeship framework, training provider, will visit companies at their premises and provides support through the process of recruiting an apprentice. <https://www.oxfordshireapprenticeships.co.uk>

Knowledge Transfer Partnerships (KTPs)

Knowledge Transfer Partnerships - <http://ktp.innovateuk.org> Knowledge Transfer Partnerships is a UK-wide programme that helps businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills.

Oxford Brookes University KTP service - <https://www.brookes.ac.uk/business-and-employers/collaboration-with-business/knowledge-transfer-partnerships> Oxford Brookes University provides support to help businesses explore KTP opportunities. Oxford Brookes can work in partnership with a business to develop a successful KTP application and manage the project from start to completion.

Work experience and internships

Careers Hub -

<https://www.oxfordshirelep.com/skills/our-programmes/careers-hub-and-enterprise-adviser-network> The Oxfordshire Careers Hub helps young people to better understand the modern workplace and develop the skills and attributes they need to compete in today's labour market. This work is led through two programmes, the Enterprise Adviser Network (EAN) and the Careers Hub. This activity is a partnership between OxLEP and The Careers and Enterprise Company <https://www.careersandenterprise.co.uk/> a network that acts as a catalyst, connecting employers with schools and colleges throughout England to deliver world-class careers education.

Crankstart at University of Oxford - <https://www.ox.ac.uk/admissions/undergraduate/fees-and-funding/crankstart/prospective-students> The Crankstart Scholarship provides a programme of enhanced support to UK residents from lower-income households who are studying for their first undergraduate degree, including access to funded internships, volunteering opportunities and social and community building events.

Leading Routes - <https://leadingroutes.org/opportunities> Leading Routes is a pioneering initiative that aims to prepare the next generation of Black academics, including operating the Wellcome Trust summer internship programme.

The Oxford Trust - <https://theoxfordtrust.co.uk> The Oxford Trust is an independent charitable trust that was established in 1985 by Oxford entrepreneurs Sir Martin and Lady Audrey Wood, founders of Oxford Instruments. The Trust's mission is to encourage the pursuit of science and enterprise. The STEM careers programme, delivered through **Science Oxford**, is designed to create opportunities for secondary school students to gain the information, knowledge and skills that could springboard them into a STEM career. <https://theoxfordtrust.co.uk/our-work/careers-programme>

Vertex Learning Lab - <https://www.vrtx.com/responsibility/steam> Global biotech company, Vertex, launched a number of STEM programmes and a new state-of-the-art Learning Lab space at the company's European research site in Milton Park, Oxfordshire in autumn 2021. The Lab space and programmes are designed to create fun, hands-on experiences for students to explore science in the real world alongside Vertex scientists and mentors, giving them the skills needed to succeed in a STEM career.

General business and innovation support

Business support and the Innovation Support for Business programme is delivered by the local **Growth Hub**, operated by OxLEP - <https://www.oxfordshirelep.com/business/growth-hub>

Innovate Edge <https://getsupport.oxin.co.uk> Innovate Edge provides funded, impartial tailored advice to help ambitious businesses scale, innovate and break into international markets.

OxLEP Skills Hub - <https://www.oxfordshirelep.com/skills/our-programmes> Oxfordshire Local Enterprise Partnership has a policy responsibility for skills, linked to the economic needs of the Oxfordshire region.



Acknowledgments

Advanced Oxford would like to thank all the companies, organisations, institutions, and individuals who gave their time to support this research project and the production of this report. Companies participated by completing our research questionnaire, by being interviewed and helped us by sharing case studies and images from their work, some of which are used within this report. We are also indebted to the Advanced Oxford members and other organisations that gave time to develop the scope of this work in the spring of 2021. Data to support the quantitative data analysis was provided by Adzuna.

Images used within this report were courtesy of Bidwells, Harwell Campus, OAS, Oxford AHSN, Oxford nanoSystems, Oxford Science Enterprises, The Oxford Trust/Science Oxford and Vertex. The images accompanying the ATAC case study came with permission of the individuals shown and appear on the Oxfordshire Apprenticeships website. We have also used images from RAEng, This is Engineering accessed through Unsplash.

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Sarah Haywood



About Advanced Oxford

Advanced Oxford is a not-for-profit membership organisation with members drawn from R&D based/ innovative companies working across Oxfordshire. Our membership includes companies, Oxford's two universities, the NHS through Oxford Academic Health Science Network and providers of innovation infrastructure and support.

Advanced Oxford is research-led, providing analysis and a united voice for our members on the key issues affecting the development of the innovation ecosystem in the Oxford region. We generate our own research and work to support and inform key stakeholders involved in the development of the business environment, infrastructure and policy. Advanced Oxford is working to support the long-term development and success of the Oxford region as a place to live and work. We do this by drawing on our collective experience of setting up, running or working in knowledge-based, innovation-focused businesses and organisations. We use our connections to other businesses to generate evidence and undertake research.

Advanced Oxford was set up in response to the Oxford Innovation Engine Update report. Published in 2016, the report identified the need for stronger engagement from the innovative businesses in Oxfordshire in the work to develop the region as a centre of excellence and an engine room for innovation. Work to scope and set up Advanced Oxford started in 2017. Further information about Advanced Oxford, our members and our work can be found on our website, www.AdvancedOxford.com.

You can follow us on:

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