



Industrial Placements in the Life Science Sector:
the Evidence-base and Strategy for the future

Summary and Recommendations

Industrial Placements in the Life Sciences Sector: Executive Summary

**Report of the Life Sciences Advisory Council Placements Working Group
February 2012**

Foreword

In December 2011, the Department for Business, Innovation and Skills (BIS) and the Office of Life Sciences (OLS) released the *Strategy for UK Life Sciences*¹. As part of this work, Cogent was asked to develop a strategy to increase the number of industrial placements in the UK.

Industrial placements are a key priority for the life sciences sector for a number of reasons, including driving forward innovation through industry and academic collaborations, but help embed key practical and highly sought employability skills into programmes of learning, particularly at undergraduate and postgraduate levels.

At a time when the Government has asked Professor Sir Tim Wilson to review Business University Collaborations, it is hoped that the findings of this report will encourage greater industry exchange in this key sector in the future².

Everyone agrees that the challenge is to develop an infrastructure which connects academics, industry, investors, clinicians and crucially, the NHS. If we can become better at recognising and rewarding innovation; ensure that good ideas don't get lost; and adopt them more quickly and efficiently across the NHS, then we can deliver better patient outcomes at home and take a leading role in life sciences globally.

I welcome this report at this critical time – it provides the evidence base for what is already happening in the sector, promotes examples of best practice, and looks to new ways of working.

It reflects the views of academics and industry, bringing together views from across the sector. Through greater collaboration, a stronger support system can be delivered for future graduates and postgraduates, and for wider engagement with post doctoral and clinical industry exchange.

Through collaboration, we can help achieve the Government's ambition to make "*Britain the best place to do science*", driving forward greater collaboration of business with universities, delivering high-tech opportunities, supporting jobs and boosting economic growth, with the UK being the preferred location for R&D³.

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1. Executive Summary

In December 2011, the Department for Business, Innovation and Skills (BIS) and the Office of Life Sciences (OLS) released the *Strategy for UK Life Sciences*¹. As part of this work, Cogent was asked to develop a strategy to increase the number of industrial placements in the UK.

Minister for Universities and Science, David Willetts, at the launch of the Life Sciences Strategy on 5th December 2011, stated that the life sciences industry “*delivers vital growth and employs tens of thousands of people. But this is rapidly changing. We need help to keep ahead of the game and make the UK one of the best places for companies to invest in innovation. To do this we need to create the right environment for scientists and business to work together and translate research into new, cutting edge technologies and medicines. This will boost our economy, create new jobs, and lead to better treatment for patients*”⁴.

Industrial placements are a key priority for this industrial sector for a number of reasons, including driving forward innovation through industry and academic collaborations, and helping to embed key practical and highly sought employability skills into programmes of learning, particularly at undergraduate and postgraduate levels.

In taking this Government policy forward, David Willetts stated in January 2012 the Government’s ambition to make the UK “*the best place in the world to do science*”. This statement generated a number of drivers to push forward greater collaboration of business with universities, delivering high-tech opportunities, supporting jobs and boosting economic growth, with the UK being the preferred location for science R&D³.

In addition, Prime Minister David Cameron stated: “*We can be proud of our past – but we cannot be complacent about our future. The industry is changing; not just year by year, but month by month. We must ensure that the UK stays ahead, yes, we’ve got a leading science base, we’ve got four of the world’s top ten universities, and we have a national health service unlike any other. But these strengths alone are not enough to keep pace with what’s happening – we’ve got to change radically – the way we collaborate, the way we open up the NHS.*”⁴

With current constraints on the Public Purse, there is a clear aim for greater collaboration between industry and higher education through new ways of working, from undergraduate teaching through to the commercialization of research and development.

With the emphasis on science-based industry collaboration with universities, the Life Sciences Advisory Council, facilitated by Cogent, established a ‘task and finish’ group to investigate the benefits of and barriers to industrial placements. This group has considered issues related to industry placements, their uptake and delivery; their findings are documented in detail in the report, *Industrial Placements in the Life Sciences Sector*, which supplements this executive summary⁵.

The recommendations from this report are detailed below. In addition, a strategy is proposed to support an increase in placements provision and uptake.

2. Taking Placements Forward in the Life Sciences Sector

The full *Industrial Placements in the Life Sciences Sector* report covers many topics around the wealth of placement opportunities in this sector and presents extensive evidence on types of placement and associated data. Among the diverse topics covered, some common themes emerge, including the need to improve the practical skills and employability of those entering this sector, to champion the benefits of placements and wider collaboration, and to recognize best practice⁵.

It is clear that there is an ever-increasing appetite and need for placements within this industry in the context of both academic study and research. Yet some key challenges remain; for example, the cost to the employer of providing a placement, and higher undergraduate fee levels, present actual or potential barriers on either side. These critical factors need to be addressed.

2.1 Recommendations to Engage Industry

The UK life sciences industry invests heavily in education and research collaborations, particularly with universities. In recent years, employers have highlighted the difficulty of attracting and recruiting high-quality graduates and highly skilled researchers. A number of reports have expressed shared concerns around recruits' practical and mathematical skills and their ability to apply these in the industrial context, in addition to their subject-specific knowledge⁶.

There are also substantive skills deficits in some core disciplines, many of which are at the heart of translational medicine or are key to the commercialization of research, including:

- Clinical pharmacology/experimental medicine
- Drug metabolism and ADME
- Pharmacokinetics, pharmacodynamics and modelling
- *In vivo* sciences and supporting animal technologies
- Chemical and process engineering
- Biopharmaceuticals
- Statistics
- Computational chemistry

However, in this period the life sciences sector has changed in both size and shape, with many multifunction sites being rationalized into more focused operational units, and increased outsourcing and collaboration with supply chain companies.

As such, the skills needs of this industry may have become less well defined, with a move away from traditional set job roles to multi-skilling and valuing the diversification of workforce skills. This move has increased the demand for business skills combined with academic skills to allow the UK life sciences sector to compete globally.

As a result employers now prefer to recruit graduates and researchers with experience gained through courses that offer industrial experience, to ensure that these recruits have the desired skills.

Recommendation 1: A platform to discuss the future skills needs of the sector and support greater SME involvement should be facilitated.

Placements are available in the sector and offer a cost-effective way for employers to supplement their skills and knowledge requirements. They can provide extra capacity to deliver projects that might otherwise require resource from elsewhere in the company. They also provide an opportunity for employers to assess the skills and abilities of a student prior to recruitment. Placement students can also inject new enthusiasm and fresh thinking.

Despite a number of reservations, employers are also beginning to see placements as a way to develop relationships with academia.

Recommendation 2: Case studies that detail good working practice should be produced and used to market the value of placements to industry.

With the increased emphasis on industrial work experience as a route to employability, more universities are seeking to develop links with employers, and competition to secure placements with industry has therefore increased dramatically,

The key challenges facing employers are associated with costs and time, in particular the effort needed to provide supervision for placements and the time and effort to make links with higher education institutions and potential students. Employers may also have difficulty in constructing their provision to meet the specific requirements of placements undertaken as an assessed part of a degree programme.

Recommendation 3: An industry guide should be produced to support companies through the process of devising and delivering a placement, particularly where it is part of an assessed undergraduate year.

Once employers decide to offer placements, they benefit from an increased talent pool, a rigorous process for assessing potential future employees and reduced recruitment costs.

Large pharmaceutical companies are well organised when it comes to offering placements. With larger cohorts, they are able to provide participants with intensive upfront training, and generally prefer to engage with full 'year in industry' schemes, to maximize their potential to assess performance and gain a return on investment.

However, while many employers, particularly small employers, cannot financially resource a full year in industry and therefore prefer to offer shorter placements, they may also find that placements of less than six months' duration bring insufficient return on the upfront training and investment required for the research environment in particular.

Companies that are new to placements often struggle initially and need to be supported.

Universities and employers should think creatively about opening up more "scientific" and "technical" roles as placement opportunities; this would have both recruitment and career learning benefits. In addition, placements in generic support roles should also be encouraged. These opportunities are likely to have wide appeal.

There is a range of existing programmes offering financial support for participants, but these are not widely known.

Recommendation 4: A not-for-profit organisation should be formed to support companies in the delivery of high-quality placements. This organisation should provide assistance in recruitment, management of payroll and human resource functions, and mentoring and training where it is required.

Recommendation 5: Enhanced training prior to placement should be supported for all participants through this organisation.

Recommendation 6: Companies who receive students on full year placements should be able to obtain a tax credit or national insurance contribution freeze proportionate to the salary costs of employing the student.

Recommendation 7: The profile of existing financial support for placements should be raised and employers supported through the application process.

2.2 Recommendations to Engage Higher Education

Universities seek to provide their students and researchers with the education and knowledge relevant to the sector. They want to work with industry to deliver the practical and employability skills required for a long-term career and to increase collaboration for knowledge transfer. They aim to deliver and enhance capacity for employer engagement.

Given the critical skills need in the life sciences sector, work experience embedded into undergraduate and research programmes is increasingly necessary. Through collaboration with industry, there must be the means to sustain and further encourage the delivery of work experience to ensure student and researcher aspirations and university and industry expectations are met. However, there are barriers to increasing placement opportunities and investments are required by both universities and industry to overcome these barriers.

Universities searching for PhD students also tend to recruit graduates with experience gained through courses that offer industrial placements. It has now become commonplace to hear that there are not enough graduates with the right skills to fulfill the employment needs of this sector.

Recommendation 8: The not-for-profit organisation suggested above (Recommendation 4) should support universities to increase collaboration and delivery of high-quality placements with industry partners. This organization should also provide a commitment from participating companies whilst assisting with financial and administrative support.

However, universities offering high-level experimental courses particularly suited to the research and development sector need to be resourced more appropriately to support

practical skills delivery. Enhanced funding for such strategically important disciplines, such as chemistry, physics and engineering should be extended to include designated biological science courses.

Intensive training of students prior to placement would also be welcomed, particularly for the research and development environment. Training in practical skills should be encouraged alongside complementary 'soft' skills development, including problem-solving, effective communication at work, time management, presentation skills and networking.

Skills gaps relating to business improvement techniques, interdisciplinary collaboration, complex project management and commercial awareness should also be addressed.

Some employers already work with professional training companies to deliver flexible training solutions; this is a good working practice that should be encouraged and rewarded.

Professional accreditation across the sector aims to improve standards, allowing talented candidates to showcase their skills. However, it may not be the only solution. Universities that provide high-quality placements may wish to consider the use of Quality Awards such as those from the National Council for Work Experience (NCWE). Improved visibility of this external validation for prospective students and researchers through Key Information Sets (KIS) would be welcomed.

The value that some universities place on maintaining work experience as a key part of their programmes, and the subsequent enhanced employment prospects that such an experience provides, should be championed.

In addition, there is overwhelming evidence to suggest that when individuals participate in placements, they return highly motivated, more mature, and often attain a higher degree classifications and enhanced career prospects.

Clearly the university has to invest to provide placement opportunities for students: developing and maintaining relationships with employers is time-consuming and is not cost-free. However, although creating new placement destinations requires significant investment, good experiences can lead to repeat placements, at a lower cost, and to further collaboration in other areas of university services.

While new ways of working with industry through open collaboration have been proven beneficial to universities, there can be significant problems with intellectual property (IP) and confidentiality around placements in areas of commercial interest. Students may not always be able to present their work in a manner readily acceptable for assessment and accreditation by the university. In these cases, greater flexibility around confidentiality and legal agreements should be provided in order that placements can be taken forward.

Recommendation 9: The not-for-profit organisation should support the delivery of placement training, career guidance and open innovation where required, through active collaboration between industry and higher education. Accreditation of training should also be encouraged through a range of stakeholders. Mechanisms to link this work to Key Information Sets (KIS) should be championed.

2.3 Recommendations to Engage Students and Graduates

While employers recruiting graduates may use the degree subject as a precondition, they also seek additional characteristics to identify the right candidate for their environment.

In addition, they increasingly seek to employ graduates who have evidence of work experience, and can demonstrate their technical competence, practical/laboratory and analytical skills, and a wide range of employability skills.

As such, what differentiates one recruit different from another is their individual capability, motivation and commitment to the position on offer, and their ability to evidence this.

Data relating to student employment and salary is currently collated just six months after graduation. The data regarding employment outcomes within descriptors of undergraduate courses can therefore be misleading and unhelpful to students faced with a choice of undergraduate courses that seem to meet sector need.

Students will be increasingly seeking high quality placements to meet their needs. This is not just about professional recognition; the use of employer kite marks may also be considered. Quality Awards such as those from the National Council for Work Experience (NCWE) also ensure best practice in placements with employers and universities.

Methods to increase students' awareness of and participation in placements should therefore be considered. Clear messages must be delivered around the value of placements and work experience.

A better and fairer reflection of career pathway and employment would be gained by collecting data at a later point, and noting where work experience was offered as part of a programme. This type of information should supplement the KIS now being provided to prospective students, and would demonstrate the connection between participation in placements and gaining the essential skills to secure a route into employment.

Placements also help with career planning, ensuring that recruits are familiar with and committed to the environment they choose to enter on graduation.

The benefits of placements and internships to the students are manifold, but in summary they are an opportunity to engage in a two way "interview and induction" to the industry.

Placements align student aspirations with the reality of the graduate market, and highlight the importance of considering work in companies across the life sciences sector, particularly in the SMEs and the wider supply chain.

Recommendation 10: The ease with which graduates are able to find and choose a course that provides placement opportunities should be enhanced through the Key Information Sets (KIS) mechanism.

Recommendation 11: Longitudinal analysis of graduate careers, and the value of work experience in this regard, should be presented clearly through KIS.

Students are now faced with increased costs as a result of the new funding system: these include higher tuition fees and interest charges on the student loan during the placement. Students may therefore be reluctant to extend their student debt by undertaking a “year in industry”.

Recommendation 12: Students should not suffer financially for taking up a placement. The present regulations permit a tuition fee of up to £4500 for sandwich years. Universities should be encouraged to adopt a lower fee – a guideline fee of £1000 is suggested.

Recommendation 13: The Student Loan Company should suspend interest charges on any existing loan during the period of the placement.

Other factors that act as barriers to participation include the time pressures of application, uncertainty in securing a placement, strong peer-group pressure to opt out, and difficulties in finding a placement close to the university or parents’ home. It is in the interests of students, employers and universities that any barriers to uptake are removed.

Work experience also needs to be recorded more formally in order that participating students can demonstrate their skills and employability more readily at the time of recruitment.

Recommendation 14: During the placement, support for the student should be encouraged through a partnership of academic supervision and industry mentoring.

Recommendation 15: Use of the Higher Education Achievement Record (HEAR) to record work experience will allow students to present prospective employers with better information on their skills, progress and attainment. The HEAR also has the potential to increase student self-awareness, a critical characteristic for graduate

Ideally, every full-time undergraduate student should have the opportunity to experience at least one structured, university-approved undergraduate placement or internship during their period of study.

Recommendation 16: Graduates should be encouraged to take up internships.

Where such internships are paid, companies should be able to obtain a tax credit proportionate to the salary costs of employing the student.

Where internships are unpaid, universities should use Office for Fair Access (OFFA) funds to support eligible students rather than condone a policy that could inhibit social mobility.

However, recognising the constraints on the Public Purse, it is recommended that only companies entering into the graduate internship programme for the first time are supported by a one-off subsidy.

Repeated graduate internships are for the company and the university to fund.

2.4 Recommendations to Engage Researchers

Postgraduate education forms a considerable part of UK Higher Education provision, and unsurprisingly, students' main motivation for undertaking postgraduate study is to improve their employment prospects. Work experience is therefore as crucial for postgraduate students and researchers as for undergraduates and interns.

Work experience contextualizes research through practical delivery of skills, often enhancing academic progress, and ultimately employability. Employers also benefit from a period of time to assess the performance of potential future employees, and in the case of research staff, gain fresh insights into cutting edge research and development and knowledge transfer activities.

Research Councils are now focusing on priority research areas and increasing the employability of researchers through a number of programmes.

Although the number of PhD studentships supported by the UK Research Councils has reduced, the resource per individual has increased, and studentships have been extended to four years as standard. This move indicates clear support for "quality over quantity".

All full-time PhD students should have an opportunity to experience at least one 8-12 week internship during their period of study and should be encouraged to attend a short intensive enterprise skills programme alongside other research students.

Recommendation 17: Universities and employers should consider providing internships to PhD students to aid the development of skills.

Recommendation 18: Greater awareness of the future skills pipeline through studentships and people exchange mechanisms has been developed by the UK Research Councils: the uptake of these grants should be championed.

There is also a need for greater career awareness and guidance, not only among postgraduate students but also postdoctoral researchers.

Recommendation 19: All full-time postdoctoral research staff should have the opportunity to benefit from 8-12 weeks of work experience outside academe. Career guidance should be an integral part of professional development.

2.5 Recommendations to Encourage New Ways of Working

There are emerging models of good working practice across the UK, where universities and industry work together to deliver placements across a consortium.

Consortia models can increase the number of placements available to students in a variety of environments: placements can be in the research laboratory or in manufacturing, but also

in roles supporting the business operation. Students may also work as a team to deliver solutions to a business, enhancing project-based learning and teamwork.

These work experience models offer greater flexibility for employers who are unable to offer year-long placements; they maximize benefits and minimize risk of engagement, whilst improving meaningful and consistent commitment to working with academia. Through analysis of the work experience on offer, there is also improved articulation of future industry needs through which academic institutions can learn from and improve provision for future students and researchers.

Consortia models offer employers wider access to administrative and external funding support whilst being more cost effective for the provider and the employer. A single point of contact between universities and industry also aids communication. These models are designed to aid SMEs in particular, and this innovative practice is welcomed.

Boundary-scanning with intelligent brokering to facilitate innovation through collaboration with universities, research funders and business should also be encouraged.

Open innovation projects could provide a valuable resource for the future: such projects should have the capability to network and link companies in relevant sectors to universities seeking collaboration to develop applications for their research, whilst also enhancing people movement.

Recommendation 20: The not-for-profit organisation suggested above (Recommendation 4) should be based on consortia models offering a framework for excellence for open innovation and collaboration, with an emphasis on greater SME engagement.

2.6 Recommendations to Explore Overseas Placements

As the life sciences industry competes on a global scale, we need to raise the importance of the knowledge and skills required to work in this environment.

By promoting these needs and the mechanisms available to support international placement experience, universities, and their students and researchers, will be encouraged to take part in placements outside the UK.

Increasing the uptake of ERASMUS placements by STEM students will only provide a partial solution. Programmes that provide placements beyond the geographical scope of Europe are needed to truly address the needs of this sector. The British Council must be involved in seeking solutions to this requirement.

European Competency Frameworks, such as the European Medicines Research Training Network (EMTRAIN), provide a pan-European platform for education and training covering the whole life-cycle of medicines research. Researchers should be encouraged to participate in order that UK researchers are prepared and mobile within this landscape.

Recommendation 21: Students should be encouraged to take up ERASMUS opportunities; universities and industry should also encourage researchers to participate in professional networks such as EMTRAIN.

Recommendation 22: Overseas placements should be encouraged through an internationally recognised framework of best practice. The Government should facilitate and support this through stakeholders including the UKTI and the British Council.

3. Learning from Other Sector Based Approaches

There are a number of sector based approaches to ensure a sustainable route to people movement and collaboration of industry and academia. These approaches maximize resource and effort, but also improve dialogue across academia and industry, and can help inform and influence education and research.

In Scotland, the Scottish Universities Life Sciences Alliance (SULSA) has been organised to deliver a comprehensive package and coordination of funding to help SMEs work on knowledge exchange with researchers across six institutes: Edinburgh, Glasgow, Strathclyde, St Andrews, Dundee and Aberdeen.

This scheme also aids and supports the development of PhDs and People Movement mechanisms, and offers funding support.

In Canada, the Government has invested in the development of Mitacs. This national, not-for-profit research organisation, delivers unique research and training programmes to aid the development of the next generation of innovators with vital scientific and business skills.

In partnership with companies, government and academia, Mitacs coordinates and provides a range of programmes aimed at supporting placements and people movement, offering a single platform for:

- Internships
- STEP Programme
- Elevate for PhD students
- Globalink: undergraduates to be introduced to global R&D
- Enterprise: STEM graduates business and enterprise skills
- Mentoring and Work Based schemes in SMEs

Recommendation 23: The learning outcomes and support mechanisms offered by successful sector based approaches should be used to form a national centre of excellence for placements in the life sciences sector. This centre will address the wide ranging collaboration of business, universities and students whilst sustaining and maximising collaborative funding arrangements.

4. A Strategy to Deliver Placements in the Life Sciences Sector

In taking forward placements in the UK life sciences sector, there is agreement that a sector based approach would be welcomed. This would offer business and academia a sustainable method to collaborate, but would also maximize resource and effort across the sector in the long term.

Longitudinal interaction would also help build an improved skills monitoring system, helping to inform and influence the provision and research being undertaken in the academic and industry environment. Improved collaboration would also be achieved.

A number of challenges to uptake of placements could be eased through this sector-based approach.

Firstly, a more formalised audit process across the sector could be achieved. This would provide a more accurate measure of the extent and uptake of opportunities. Adjustment of existing reporting mechanisms could readily provide robust and significant information on the extent and impact of work experience during university.

The formation of an independent not-for-profit organisation to run a clearing house for life sciences placements should be taken forward. This would be national centre of excellence for placements in the life sciences sector.

This organisation would address the recommendations stated above whilst delivering a service to increase placement uptake and considerable benefits to the sector. These would be to support industry, particularly SMEs, to engage and collaborate with academia, to increase awareness and uptake of placements on a cost effective basis, but also to support SMEs to provide quality placements.

The organisation would offer a national training programme to ensure that academics and industry mentors in the life sciences recognise how to support work-based learning and how to prepare students and researchers for industry careers.

The organisation would support participants in their challenge to ease financial burdens through a number of mechanisms:

- Companies who took part in placements would be able to obtain a tax credit or national insurance freeze proportionate to the salary costs.
- Students undertaking placements would challenge universities to adopt a flat tuition fee for the year in industry – a guideline fee of £1000 is suggested.
- In addition, the sector would challenge the Student Loan Company to suspend interest charges on any existing loan during the period of the placement.
- Universities would be challenged to use Office for Fair Access (OFFA) funds to support eligible students wishing to undertake an unpaid undergraduate internship.
- Companies seeking postgraduates, and researchers taking up industrial placements, will be offered support to access grants from the Research Councils and other organisations.

The organisation would arrange a national conference for all life sciences placement participants highlighting the importance of placements and rewarding programmes. For example, an award scheme for best students, best breakthrough inventions, best supervisor, and best learning support would be initiated.

These conferences would also facilitate broader networking across the industry, and provide a focal point for a media campaign, demonstrating the positive impact that placements have on the sector.

Through these mechanisms, the life sciences sector could more readily support skills needs analysis and delivery, ultimately improving education and research. Publication of best practice and case studies would reinforce these developments.

Courses that offer placements, and the funding to support uptake, would be identified more readily, and first point of contact within industry and academia would be readily facilitated.

International profile would also be facilitated through global business partners and other stakeholders including the UKTI and the British Council. Increasing the awareness and availability of international placements would be a key success factor.

Ultimate Goals for the Life Sciences Sector

Although this strategy would formalise placements in the life sciences sector, the formation of a not-for-profit organization to facilitate and increase placements activity is required to deliver substantive change.

With over 3000 companies in the UK life sciences sector alone, the majority of which being SMEs, the reliance on large pharmaceutical companies to deliver placements is reducing.

If every company in the sector was able to offer a placement of some form, this would improve the skills and mobility of those entering the industry, increase collaboration and innovation whilst easing recruitment from within the UK. If those companies with international reach were also to consider placements outside of the UK, greater UK competitiveness and international exchange may also be achieved.

Successful placements are underpinned by effective and supportive training environments, built on the foundation of strong partnerships between academia, industry and the NHS.

Our ultimate goal is to ensure that senior influencers from all sectors understand the benefits of placements for the individual, the research and the partner organisations.

Consequently the staff and students within these organisations see placements as an integral part of their career progression and continuing professional development - placements would become "mainstreamed" into the life sciences sector career pathways.

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