Skills Investment Plan
For Scotland’s life sciences sector
We are entering an exciting phase in the development of the life sciences sector in Scotland. It has been identified by the Scottish Government as a key sector, in recognition of its high growth potential and capacity to boost productivity.

In order to achieve the sector’s growth ambitions of doubling economic contribution by 2020, we must continually respond to the skills challenges that exist by ensuring that we provide the right people with the right blend of skills and expertise at the right time for our industry.

There is an increasing demand for a higher level of skills of a multidisciplinary nature. We must continue to attract, retain and develop the very best researchers within our universities but also ensure that we train our scientists in business, commercial and entrepreneurial skills in order to ensure Scottish companies take advantage of the increasing global opportunities which exist and will continue to expand within our sector.

Anchoring such skills in key businesses, building more resilient companies and attracting inward investment, talent and aspiring leaders will help position Scotland as a location of choice for life sciences companies which are both UK and globally based.

Delivering the Skills Investment Plan (SIP) for Scotland’s life sciences sector has been facilitated by Skills Development Scotland, working in partnership with key skills groups and industry stakeholders. The SIP development has involved taking stock of existing capabilities and reviewing future skills requirements, in order to ensure the sector can respond to and embrace the skills challenges that exist in a dynamic and rapidly evolving sector.

As Chair of the LiSAB Skills Group, I’m excited about the future opportunities and growth potential for the sector in the years ahead. I look forward to all sector stakeholders and industry partners working together to implement this SIP and action plan, in order to develop the skills required for the sector to achieve its full potential and be a world-class centre of excellence in the life sciences sector.
The life sciences Skills Investment Plan (SIP) is an industry-led partnership document, facilitated by Skills Development Scotland (SDS) on behalf of the Scottish Government. SDS has worked closely with industry to develop this SIP and will continue to work with industry and public sector partners in its implementation.

The aim of the SIP for life sciences is to set out the key actions to be delivered by the sector to support the achievement of the skills ambitions outlined within the Life Sciences Scotland Strategy, Creating Wealth, Promoting Health (2011). The SIP development has also considered the Health and Wealth in Scotland Statement, published by the Health Innovation Partnership. This has been designed as a bridge between the plans in the health sector and the Life Sciences Scotland Strategy.

Based on robust evidence from, and engagement with the life sciences sector, the SIP sets out a clear statement of the sector’s skills needs and highlights the skills priorities to be addressed to support the sector’s future growth ambitions. It also provides a framework for aligning public and private sector investment to meet these needs.

The development of the SIP has been informed and guided by an industry-led review of existing evidence which was then validated through industry consultation with sector employers including Charles River, ThermoFisher Scientific, GSK and XcellBio Ltd and key stakeholders including the Life Sciences Advisory Board (LiSAB) Skills Group, the Scottish Life Science Association (SLA) Human Resource Special Interest Group and the Glasgow Economic Leadership Group (Life Sciences Workstream), as well as partners from education and the public sector. It has followed a rigorous process represented in Figure 1.

Figure 1: SIP development process

1 Scottish Life Sciences Strategy – Creating Wealth, Promoting Health, 2011
Vision for the sector

Life sciences was identified as a key sector in the Scottish Government’s Economic Strategy, in recognition of its high growth potential and capacity to boost productivity.\(^2\)

The refreshed industry strategy Creating Wealth and Promoting Health (2011) sets out the strategic vision to 2020 for life sciences in Scotland. The strategy’s ambition is twofold:

- **to create an industry** which is a significant contributor to Scotland’s sustainable economic growth
- **to establish Scotland** as the location of choice for life sciences companies.
- The strategy outlines the aspirational headline target of doubling the economic contribution made by Scotland’s life sciences industry by 2020, to £6.2 billion turnover and £3 billion Gross Value Added (GVA).

The framework for achieving these ambitious goals is built around three strategic objectives:

- **anchor** key businesses in Scotland
- **build** more resilient companies
- **attract** inward investment, talent and aspiring leaders.

The importance of skills is embedded throughout these three core themes with a particular skills focus which develops a talent pool of international calibre.

In recognition of the role that a quality workforce will play in its success, the strategy recognises that:

"Life sciences enterprises must attract, retain and develop the best researchers and most entrepreneurial business leaders. Our aim is to ensure that we build on Scotland’s high reputation in science with a pool of suitably trained staff and managerial leadership that is fit for our international ambitions. Our intention is to see Scotland as a place where talented students at all levels will choose to develop exciting and interesting careers. Aspirational leadership of both companies and the industry is just as crucial."\(^3\)

Moving forward, skills will continue to play an integral role in achieving the strategic objectives for the life sciences sector in Scotland.

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\(^3\) Scottish Life Sciences Strategy – Creating Wealth, Promoting Health, 2011
The life sciences sector in Scotland encompasses a wide range of activities from the discovery, development and manufacture of therapeutics, the design and manufacture of medical and surgical equipment, diagnostics and devices, through to clinical research and health informatics.

The structure of the sector, in terms of its businesses and workforce, is an important consideration in understanding the nature and impact of the skills challenges which it faces. The importance of the sector is reflected in the scale of contribution that it makes to the national economy both in its role as an employer and as a generator of economic output.

Economic contribution

Life sciences form a strong and vibrant sector of the Scottish economy both industrially and academically with excellent market potential internationally. A $1.1 trillion global market (2011), it is expected to grow in excess of $1.4 trillion by 2016. The latest figures for the Scottish life sciences industry show that company turnover has increased by 5% to £3.2 billion in 2011 compared to 2010. The figures also show that GVA remained stable at £1.6 billion compared to 2010.

Business base

The latest SE internal statistics illustrate that employment over the wider sector stands at approximately 35,000 people across 650 organisations (ranging from higher education institutions to companies). The Scottish sector has a wide company base covering such diverse fields as medical technologies, pharmaceutical services, regenerative medicine, health informatics and red, green, blue and white biotechnology. Larger organisations (employing more than 250 people) account for the majority share of employment within the sector although the life sciences business base is dominated by smaller organisations.

The university sector also plays an important role as an employer: life sciences account for 55% of total Scottish University research funding, attracting 15% of UK academic bioscience research funding.

The workforce is highly qualified, with a significant proportion educated to postgraduate level. In general this is reflected by relatively higher than average wages, compared to the Scottish average. Levels of productivity (measured by GVA per employee) within the sector are also relatively high at £68,396 in 2011 in comparison to some other key sectors. This is indicative of the high value added activities taking place across the sector.

The first in-depth review of the State of the Life Science Start-up sector in the UK, by Mobius, identified that Scotland has the highest number of life sciences start-ups per capita in the UK (2005-2009). This continues to be the case, as the most recent survey (2012) revealed that “Scotland has emerged as the leading location for life sciences start-up companies”. However, this “increase in Scottish start-ups is entirely accounted for by increased university spin-out activity”, with a “28% decline over the same period in start-ups that didn’t emanate from a university.”

“The sector currently employs 35,000 people across 650 organisations”
Business ownership and workforce structure
Scottish life sciences companies are more likely to be internationally owned, when compared with the Scottish average. Only 1% of all registered enterprises in Scotland are owned by a company based outside the UK. This figure is higher for the life sciences business base, at 9%. Scottish life sciences registered enterprises are Scottish-owned, compared with 97% of all businesses across Scotland.

Gender balance
Data from the Scottish Life Science Employer Skills Survey (2010) reveals a fairly balanced ratio of male to female employees within the sector. The overall ratio is 54% male to 46% female, but the gender distribution is less balanced within some individual sub-sectors. Specifically, it shows that:
- both medical devices/diagnostics and specialist services/suppliers sub-sectors have a greater proportion of the workforce who are male (60% male and 40% female);
- clinical research organisations is the only sub-sector where females are better represented than males with 63% females compared to 37% males.

Whilst this data shows no overall imbalance across the sector as a whole, there are a number of reports which explore gender inequalities within the life sciences sector and one report in particular identifies:
- a gap between the numbers of women studying and working in biological sciences – the same document reports that the number of females working in biological sciences falls some way short of the number of women studying this subject at university. This suggests that women are ‘falling out’ of the pipeline at some stage between graduation and moving into employment in the sector.

Future labour demand
There is no definitive statement outlining the future demand within Scotland’s life sciences sector. However, there are a number of sources, including projections from Senta and Cogent, which can be used to provide an indicative view of the scale of expected future demand for skills. The SIP also considers the nature and type of skills which will be required by life sciences employers, rather than simply the volume of job opportunities.

Within the context of future labour demand, it is important to note the headline target of doubling the economic contribution made by Scotland’s life sciences sector by 2020, increasing turnover to £6.2 billion and Gross Value Added (GVA) to £3 billion. Whilst this is not mentioned specifically within the strategy, it is implicit that this will be dependent upon an increase in the number of jobs within the sector.

Drivers for change
The information on future labour demand within the life sciences sector points to an increase in demand for skilled occupations, but lower demand for less skilled occupations such as technicians. Data on the types of occupations which employers themselves expect to be recruiting also indicates that the greatest demand is expected to be for professional and technical occupations such as research, science and manufacturing roles along with other professional business roles including sales and marketing staff.

There is no one statement on the impact these changes will have upon the future skills needs of the sector. However, evidence suggests that wider drivers will have an impact on the types of skills required by employers. These wider drivers are shown in figure 2.

### Figure 2 – Drivers of change for life sciences sector

<table>
<thead>
<tr>
<th>Driver</th>
<th>Description</th>
<th>Skills implication</th>
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<tbody>
<tr>
<td>Increased demand for providers to develop new, innovative and cost-effective healthcare solutions and products to treat the rise in chronic old age diseases such as cancer, diabetes and dementia.</td>
<td>Skills implication.</td>
<td>Constant change in skills requirements of the workforce.</td>
</tr>
<tr>
<td>Significant opportunities due to the growth in demand for medical products in countries such as China, Brazil, India, Russia, Turkey and Mexico.</td>
<td>Skills implication.</td>
<td>Demand for a high-quality skilled workforce becomes critical if Scotland is to take advantage of increased global opportunities.</td>
</tr>
<tr>
<td>Companies are under increasing pressure with blockbuster drugs coming off patent.</td>
<td>Skills implication.</td>
<td>Further development of the talent pool needs to be aligned with the changing expectations and business opportunities, as well as a requirement for specialist regulatory skills. This can act as a catalyst for growth and job creation.</td>
</tr>
<tr>
<td>Life sciences companies, like those in many other sectors, are increasingly reduced access to financial products, including venture capital.</td>
<td>Skills implication.</td>
<td>Demand for the right blend of business and commercial skills.</td>
</tr>
<tr>
<td>Not all drugs are equally effective in all patients. It is estimated that only 30-70% of patients respond positively to any particular drug. Cost-effective solutions to deliver the right treatment to the right patient at the right time will need to be created.</td>
<td>Skills implication.</td>
<td>Opportunity for Scottish life sciences companies to specialise in health informatics and bioinformatics.</td>
</tr>
<tr>
<td>The merger of life, physical, and engineering sciences is creating new data recording systems.</td>
<td>Skills implication.</td>
<td>A requirement for increased IT and data recording and analysis skills (including analysis of large and complex datasets, clinical informatics, patient administration and health records).</td>
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8 Equality & Diversity Baseline Information on Scotland’s Key Economic Sectors – Scottish Enterprise and Highlands & Islands Enterprise, July 2010.
Implications for skills

Scotland is at the forefront of stratified medicine and will create the £20m Stratified Medicine Scotland Innovation Centre (SMS-IC) at the new South Glasgow Hospitals Campus.

The SMS-IC will focus primarily on developing new forms of treatment for chronic diseases including cancer, stroke, diabetes and rheumatoid arthritis, as well as respiratory and cardiovascular diseases. A recent independent economic impact assessment forecast that the centre could generate up to 334 jobs and up to £68m to the Scottish economy over its initial five-year funding period.

There is a need to move towards integrated models of care and the use of safe, cost-effective treatments tailored to the likelihood of individual response. The SMS-IC is a response to the need for close multidisciplinary collaboration to ensure that innovation extends beyond the medical aspects of stratified medicine to encompass disciplines such as IT, genomics, public health and data science. To this end biomedical informatics will play a vital part.

The Farr Institute, a collaboration between six Scottish universities and the NHS will position Scotland as a global leader in health informatics research.

Scotland has already capitalised on its world-leading research expertise in stem cells and regenerative medicine through the Scottish Centre for Regenerative Medicine (SCRM), that has created a viable industry cluster and supply chain as well as a strong inclusive and collaborative community. We anticipate this area will continue to grow.

A new innovation centre for industrial biotechnology (IB) is forecast to increase IB-related turnover up to £3 billion by 2030, create 1,500 jobs within five years and put Scotland at the forefront of a global transformation.

This drive of technological developments which places more power and responsibility with patients draws attention to the medical technology industry. Bringing together specialists in engineering, the life sciences, physical sciences and the NHS to research and innovate the technologies of tomorrow, the medical technology industry will continue to be an area of future growth and potential.

We believe these key initiatives will impact upon skills demand within the sector, suggesting the following:

• outsourcing will present opportunities for Scotland’s life sciences sector and its researchers. Contract Research Organisations (CROs) and consultancies will have the opportunity to take advantage of the need to submit complex data submission packages
• developments in personalised and stratified medicine present an opportunity for Scottish IT companies to specialise in health informatics and bioinformatics
• a need for higher level of skills of an interdisciplinary nature
• a need for workforce development in the face of rapid technological change.

Life sciences account for 55% of total Scottish university research funding
Mapping of the supply side provision is an important stage in understanding the extent to which the existing skills system can meet the current and future demands of life sciences employers.

A broad and varied range of providers are involved in the provision of skills to the life sciences sector, to new entrants coming into the sector, as well as the up-skilling of existing employees.

In terms of the supply of newly qualified entrants into the sector, education providers play a key role. Newly qualified candidates can enter the sector through the following routes:

- **Modern Apprenticeships**
- **further education**
- **higher education**

Some preliminary work has been undertaken to map the potential flow of students into the life sciences industry through each of these channels. However, a more comprehensive mapping exercise needs to be undertaken in order to gain a clearer understanding of the extent to which the current supply side provision can respond to the future demand from the sector.

This would help to develop a better understanding of the volume of students studying life sciences subjects at different levels as well as the destinations of these students once they have left the education system.

**Modern Apprenticeships**
- uptake of the qualification peaked in its first year, with 46 apprentices on this framework. This could perhaps be as a result of the 2 for 1 incentive (and associated financial incentives, such as the offset of salary costs for the second apprentice)
- learner numbers were at their lowest (10) in 2011/12 but increased to 21 in 2012/13
- life sciences MA’s account for a very small share of total Modern Apprenticeships across Scotland.

**Further education**
The number of students participating in a life sciences related further education course fell by more than one quarter (-27%) from 2007/08 to 2011/12. However, it’s important to note that there was a significant increase of 24% from 2007/08, peaking at 1,749 in 2008/09. Student numbers in this subject area have fallen each year since and are now below pre-recession levels.

An overview of gender representation within life sciences further education courses reveals that around two out of every three students are females (66%) and around a third are males (34%).

**Higher education**

On the whole, the number of students studying life sciences subjects at a higher education institution increased between 2007/08 and 2011/12. This includes those studying a first degree as well as those studying a life sciences subject.

- in 2011/12, Edinburgh University had the greatest number of undergraduate students studying a life sciences related subject (1,424). The majority of these students (85%) were studying biology. This was followed by Strathclyde University, which had a total of 1,212 students studying a subject in this field, the majority of whom (75%) were studying pharmacology, toxicology and pharmacy
- similar to further education, females account for a greater share of all higher education students studying a life sciences subject (64% of these students are female, compared with 36% male)
- the number of students studying a PhD life sciences qualification also increased over the same period from 2,441 in 2007/08 to 2,928 in 2011/12, an increase of 20%. A greater share of students studying PhD life sciences qualifications are female (60% female compared to 40% male)

- it is also important to acknowledge the much wider network of skills provision outside that which is provided by the education sector. In addition to the work of schools, colleges and universities there is also a range of workforce development, networking and talent attraction activity, all of which also has an important role to play in developing skills in the sector. Figure 3 below shows the numerous and complex nature of the supply-side landscape. One outcome of the SIP is to align and better co-ordinate these activities.

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11 & 12 Statistics sourced via the Scottish Funding Council

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**Figure 3: Broad landscape**
A review of existing evidence along with employer and stakeholder consultation has identified a range of skills challenges and priorities for Scotland’s life sciences sector.

The research and consultation carried out with the sector identified four broad skills priorities that were tested and validated with the Life Sciences Advisory Board (LiSAB), a joint industry, enterprise and government strategy team:

- build graduate work readiness
- improve attractiveness to new entrants
- attract and anchor key skills
- build an accessible and responsive skills system.

**Figure 4: Skills Investment Plan vision**

Developing and retaining a talent pool of international calibre to support the growth of the Scottish life sciences sector

**OBJECTIVE A**  
Raising awareness of the range of career opportunities in order to attract more talent into life sciences

**OBJECTIVE B**  
Refresh research to ensure we meet employer demand

**Theme 1:** Building graduate work readiness  
**Theme 2:** Improving the attractiveness of the sector to new entrants  
**Theme 3:** Attracting and anchoring key skills  
**Theme 4:** Building accessible and responsive skills system

“Greatest future demand is expected to be for professional and technical occupations”
5 Key skills challenges and priorities continued

Theme 1: Building graduate work readiness

Whilst some life sciences employers are satisfied with the quality of graduates entering the sector, others indicated that graduate work readiness was a significant issue for them. Results from the SLA employer skills survey revealed that the provision for work experience, practical skills and soft skills amongst new graduates required further attention.

Specific issues have been identified, with a need to:

- develop graduate laboratory skills
  in a highly regulated industry, basic laboratory skills are a pre-requisite. Employers raised concerns that new graduates can often lack the practical skills necessary to work within a laboratory in an industry environment

- develop graduate soft skills
  employers have commented that new graduates need to build their "soft skills", including: commercial awareness; team work; attitudes to deadlines; work ethic; and communication skills in order to excel in a commercial life sciences environment

- encourage realistic expectations of working in the industry: employers have indicated that graduates often have unrealistic expectations about salary, job roles and career progression within the sector. Employers need to play a key role to manage the expectations of new graduates and postgraduates

- develop work experience opportunities:
  work experience is an important attribute for employers who are recruiting new graduates. It is also one of the attributes which some employers believe needs to be enhanced in new graduates. Although work experience is considered to be important, issues exist around the capacity of smaller businesses to offer work experience through placements and a lack of co-ordination of placements across the sector.

Objectives:

5.1 Raising awareness of the range of career opportunities in order to attract more talent into life sciences

5.2 Improving attractiveness of the sector to new entrants

Priorities:

- to embed laboratory and soft skills into the curriculum of relevant university and college life sciences courses over the long term
- to develop a pathway laboratory skills course in conjunction with industry to improve the practical skills of new graduates
- to improve the soft skills of undergraduates before they begin looking for jobs in industry
- to develop and establish a CV competition which will encourage students to give thought to their future careers, develop a better understanding of what employers are looking for and determine how best to showcase their skills. The incentive will be to win a work placement with a life sciences employer
- to co-ordinate requests to the life sciences industry for placements from Scottish universities and consider factors which might encourage and support smaller companies to offer work placement opportunities for students.

Employer Skills Survey – Scottish Life Sciences Association, 2010

Theme 2: Improving attractiveness of the sector to new entrants

Raising the attractiveness of the sector is vital to ensure a flow of talent into higher and further education and subsequently across the sector. In order to do this, it is important to illustrate the breadth and depth of rewarding careers and opportunities on offer within the life sciences sector.

Key areas to be addressed include:

- raise school pupils' awareness of career options within the sector: employers felt that work was required with school pupils and teachers to raise awareness of the range of career opportunities available in the sector. This has the potential to positively affect the flow of new talent into the industry

- enhance graduate awareness of the range of opportunities within the sector: feedback revealed that graduates could benefit from a better understanding of the range of job opportunities available within the sector, along with the expectations of employers within the industry

- promote different entry routes into the sector: feedback from employers indicated that pupils should be made more aware of the different entry routes into the life sciences sector. Some employers believe that school leavers are steered towards more traditional routes at university rather than other vocational routes such as Modern Apprenticeships (MA), HNCs and HNDs.

Priorities:

- develop programmes to raise awareness of the range of attractive career options and different entry routes in the sector by targeting pupils, students, careers advisers and teachers
- develop a promotional pack of information for use by school pupils and undergraduates to raise awareness of career opportunities in the life sciences sector
- deliver careers events for undergraduates in collaboration with industry, in order to raise awareness of the types of jobs on offer within the life sciences sector
- investigate the reason behind the low uptake of the life sciences MAs and promote this route within industry in order to increase uptake.
Challenges securing skills at this level can be an issue for employers – it can result in delays in developing new products or services, thus creating difficulties meeting customer needs and introducing technological change.

The challenges which have been identified in relation to this theme are summarised below:

• the perceived lack of scale in Scotland’s life sciences sector can make it difficult to draw talented, highly skilled candidates into Scotland

• many Scottish life sciences companies work in specialised or niche areas which demand a multi-disciplinary set of skills: often employers can find it challenging to recruit senior candidates with the right ‘blend’ of scientific and business skills. Specifically, data from the life sciences employers skills survey revealed skills challenges in the following areas:
  • general science or technical skills, such as laboratory work and research and development (cited by 53% of companies who had identified a skills shortage vacancy)
  • general business and commercial skills (42%)
  • biological and medical skills (42%)
  • core skills (40%)

• company size can have implications for the way in which workforce skills are leveraged: many larger organisations have access to systems and tools which aid the growth and development of their workforce, whilst smaller life sciences companies, especially without a specific HR function, are unlikely to have access to such systems. This has the potential to have a knock-on effect on recruitment and workforce development

• industry engagement revealed that the type of business skill most in demand was sales: when asked about the types of business training which was required, employers mentioned:
  • better awareness of the value of commercial activities
  • sales training with a global focus
  • management and finance training.

However, a recent Mobius report14 revealed that the increase in new life sciences businesses in Scotland is being primarily driven by academic spin-out activity. Most of these new life sciences companies are therefore unlikely to have experience in these areas.

Priorities:

• to provide a pool of experienced mid to senior level life scientists with the niche skills required by industry

• to overcome concerns about career progression opportunities by senior talent considering a move to Scotland

• to develop a roadmap of career and employment opportunities available in Scotland

• to raise the profile of Scotland as a top choice for life sciences careers at all levels

• to ease the flow of key talent from outside the EU

• to address the lack of basic HR support for SMEs

• to improve business/commercial skills in SMEs and support business growth.

Priorities:

• to refresh employer research within the life sciences sector, produce annual demand statements and ensure that all of this information is fed into the skills planning system

• to carry out a mapping exercise in order to better understand how well placed the supply side is to deal with both current and future demand. To articulate support for life sciences companies on the SDS employer website, Our Skillsforce

• to examine provision for health informatics and medical technologies.
The action plan details the key actions that will be undertaken to support the growth ambition of the life sciences sector. It has been developed in conjunction with industry and other stakeholders in order to respond to the key skills priorities of the sector.

This has been developed around the four themes which were set out throughout this document:

- build graduate work readiness
- improve attractiveness to new entrants
- attract and anchor key skills
- build an accessible and responsive skills system.

The action plan sets out specific short-term and longer-term actions, partners and inception timescales.

The projects contained within the action plan will be accessible to life sciences employers across Scotland, and will have a regional focus where a need for this is identified.

This includes existing activity which is either already underway or was already in the pipeline to take place. Activities have not necessarily been initiated as a result of the SIP, but are deemed to be an appropriate existing mechanism for responding to some of the skills issues which have been raised.

The action plan also presents solutions which have been designed specifically in response to the skills issues identified within the SIP. These activities are strategic in nature and require further work before they can be delivered.

"Demand for a high quality skilled workforce is critical for Scotland to take advantage of increased global opportunities."
### Theme 1 – Building graduate work readiness

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Expected outcomes</th>
<th>Partners</th>
<th>Start date</th>
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</thead>
<tbody>
<tr>
<td>Developing graduate laboratory skills</td>
<td>To embed laboratory and soft skills into the curriculum of relevant life sciences courses over the long-term.</td>
<td>Laboratory skills viewed as an important part of the curriculum.</td>
<td>SFC/SLA</td>
<td>Q4 2015</td>
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<tr>
<td></td>
<td>Develop and deliver a trial laboratory skills programme which will provide a short-term solution by improving the practical skills of new graduates.</td>
<td>A reduction in industry citing laboratory skills as an issue with fresh graduates.</td>
<td>BioCity/SDS</td>
<td>Q1 2014</td>
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<tr>
<td>Supporting graduate soft skills</td>
<td>Support the introduction of soft skills into the curriculum.</td>
<td>Graduates better able to communicate their skills and attributes to potential employers.</td>
<td>SFC/University of Strathclyde Department of Pure &amp; Applied Physics</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Develop soft skills training for undergraduates and post graduates before entering into employment.</td>
<td>A reduction in industry citing soft skills as an issue with fresh graduates.</td>
<td>Business Gateway/SDS/SE/University Careers Services</td>
<td>Q3 2014</td>
</tr>
<tr>
<td>Expanding Oxfordshire Biotech Roundtable (OBR) across Scotland</td>
<td>Improve communication between graduates and industry by supporting the expansion of OBR in Scotland.</td>
<td>Establish strong links between industry and graduates.</td>
<td>OBR</td>
<td>Q3 2014</td>
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<tr>
<td>Increasing industrial placement opportunities</td>
<td>Co-ordination of university placements into the life sciences sector and consider the factors which might encourage companies to offer a placement.</td>
<td>Central database created for industrial placements.</td>
<td>SDS/SULSA</td>
<td>Q3 2014</td>
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<td></td>
<td>Industry offering more placements for students.</td>
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<td>Developing and delivering CV competition</td>
<td>Establish a competition to encourage students to develop strong CVs and engage in the career planning process early in their college/university careers.</td>
<td>Students will demonstrate a better understanding of the diversity of job opportunities within life sciences companies.</td>
<td>GEL/Industry/SDS/University Careers Services</td>
<td>Q2 2014</td>
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<td></td>
<td>The prize for top CVs will be an early in their college/university careers.</td>
<td>Students become more aware of what industry needs and expects from graduates and how best to communicate these competencies to potential employers.</td>
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### Theme 2 – Improving the attractiveness of the sector to new entrants

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<tr>
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<th>Expected outcomes</th>
<th>Partners</th>
<th>Start date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry/school engagement</td>
<td>Develop 4 STEM ambassador teacher events in areas of high life sciences employment, in order to demonstrate the range of job opportunities and inspire young people into the sector.</td>
<td>Teachers and pupils have a better understanding of the diverse job opportunities within the life sciences industry.</td>
<td>SDS/STEMnet</td>
<td>Q1 2014</td>
</tr>
<tr>
<td></td>
<td>Develop 10 career speed networking events with life sciences industry STEM Ambassadors in secondary schools across areas of high life sciences employment, in order to inspire young people to work in the industry.</td>
<td>Increased uptake of life sciences subjects at school, FE and HE.</td>
<td>SDS/STEMnet</td>
<td>Q1 2014</td>
</tr>
<tr>
<td>Career opportunities</td>
<td>Introduce 5 industry career events for university students, delivered by industry, to educate on job opportunities and manage expectations.</td>
<td>Students and pupils will give much greater consideration to the career paths they may consider to the MA in life sciences.</td>
<td>Industry/SDS/University Careers Services</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Provide support for ProScience event. This event will bring together industry, HE/FE and school pupils in order to stimulate pupil’s interest in science, and consider the factors which would attract pupils to become involved in life sciences.</td>
<td>Increased uptake of life sciences Modern Apprenticeships and consider the factors which would be interested in and the most effective routes into any chosen area.</td>
<td>BioCity/SDS/Royal Society of Chemistry/University of Edinburgh</td>
<td>Q2 2014</td>
</tr>
<tr>
<td>Modern Apprenticeships</td>
<td>Undertake a review of the uptake of life sciences Modern Apprenticeships and consider the factors which would support and encourage employers to make use of the modern apprenticeship frameworks and other work experience/placement programmes.</td>
<td>Increased awareness of the MA in life sciences. With industry highlighting recent success stories with MAs.</td>
<td>Industry/LSIAB/SDS/SLA</td>
<td>Q3 2014</td>
</tr>
</tbody>
</table>
### Theme 3 – Attracting and anchoring key skills

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Expected outcomes</th>
<th>Partners</th>
<th>Start date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanding talent pool</td>
<td>Widen the talent pool of experienced mid to senior level staff by accessing those already identified as having niche skills set.</td>
<td>Increased number of experienced staff taking up roles within Scottish life sciences companies.</td>
<td>Industry / SE (Talent Scotland)</td>
<td>Q2 2014</td>
</tr>
<tr>
<td>Improving sector attractiveness</td>
<td>Promotion of the benefits of working for SMEs, alongside those of larger corporations within Scotland’s life sciences sector.</td>
<td>Increased numbers of people working in SMEs.</td>
<td>Industry / SE (Talent Scotland) / SDI</td>
<td>Q2 2014</td>
</tr>
<tr>
<td></td>
<td>Develop a toolkit of seminars and webinars to provide HR related skills within SMEs and micro SMEs.</td>
<td>Increase survival rates of SMEs.</td>
<td>SDS / SLSA HR Skills Investment Group</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Develop an “introduction to sales &amp; marketing” training initiative with a group of life sciences companies.</td>
<td></td>
<td>Industry / SDS / SE</td>
<td>Q1 2015</td>
</tr>
<tr>
<td></td>
<td>Develop a 2-day life sciences specific “lean start-up” course.</td>
<td></td>
<td>Industry / SDS</td>
<td>Q3 2014</td>
</tr>
<tr>
<td>Promoting Scotland globally as life sciences career location of choice</td>
<td>Promote Scotland as a top choice career destination for life sciences at major UK/international events, such as Medica and Nature Careers.</td>
<td>Scotland becomes the location of choice for a career in life sciences.</td>
<td>Industry / SE (Talent Scotland) / SDI / SDS</td>
<td>Q2 2014</td>
</tr>
<tr>
<td></td>
<td>Organise and deliver short seminars to introduce SMEs to the UK immigration system and becoming a sponsor.</td>
<td>Increased number of experienced staff taking up roles within Scottish life science companies.</td>
<td>Industry / SE (Talent Scotland)</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Provide immigration advice and support to life science employers on an individual basis where appropriate.</td>
<td>Industry cite an increase in ability to recruit the right staff for experienced roles within their organisation.</td>
<td>Industry / SE (Talent Scotland)</td>
<td>Q3 2014</td>
</tr>
</tbody>
</table>

### Theme 4 – Building accessible and responsive skills system

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
<th>Expected outcomes</th>
<th>Partners</th>
<th>Start date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Commission work to produce updated demand statements for the life sciences sector. This will ensure wide coverage of life sciences, in terms of both sub-sectoral and geographic representation of the sector in Scotland.</td>
<td>Identify future issues and challenges within the life sciences sector.</td>
<td>SDS</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Agree mechanism for communicating an annual statement of need to inform SFC outcome agreements.</td>
<td></td>
<td>LISAB / SDS / SFC</td>
<td>Q3 2014</td>
</tr>
<tr>
<td></td>
<td>Develop a life sciences zone on Our Skillsforce and on My World of Work.</td>
<td></td>
<td>SDS</td>
<td>Q3 2014</td>
</tr>
<tr>
<td>Engaging with the wider sector</td>
<td>Re-fresh the SIP to focus on other areas such as medical technology and health informatics.</td>
<td>Identify future issues and challenges within the wider life sciences sector.</td>
<td>SE / SDS</td>
<td>Q2 2014</td>
</tr>
<tr>
<td>Provision mapping</td>
<td>Comprehensive mapping of existing provision and learner numbers.</td>
<td>Identify future issues and challenges within the life sciences sector.</td>
<td>SFC</td>
<td>Q3 2014</td>
</tr>
</tbody>
</table>
The co-ordination and delivery of the SIP will be led by the SDS life sciences sector manager and overseen by the LiSAB skills group. Specifically SDS will facilitate the following:

- co-ordinating the activities of partners in support of the action plan and reporting on progress to the LiSAB skills group. Included within this is the need to develop a performance monitoring framework which will enable the group to evaluate the progress of the SIP. In addition, it will be important to consider how the progress made within the SIP can be reflected within the outcome agreements developed by the colleges and universities.
- where required, securing resources to support the implementation of activities set out in the action plan.
- ensuring the most appropriate membership on the LiSAB skills group, to ensure that all key players within the sector are represented – including both colleges and universities.
- co-ordinating the delivery of specific projects, through working in partnership with public sector and industry colleagues, to ensure that they are delivered in areas of need.

A formal review of the SIP and action plan will be undertaken 18 months after the launch of the document and a statement of progress will be produced by SDS on behalf of the LiSAB skills group.
Table 1: Structure of business base in Scottish life sciences sector (2013)

<table>
<thead>
<tr>
<th>No of employees</th>
<th>No of businesses</th>
<th>% of businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 employees</td>
<td>135</td>
<td>28.10%</td>
</tr>
<tr>
<td>1-49 employees</td>
<td>285</td>
<td>59.40%</td>
</tr>
<tr>
<td>50-249 employees</td>
<td>35</td>
<td>7.30%</td>
</tr>
<tr>
<td>250+ employees</td>
<td>25</td>
<td>5.20%</td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Scottish Government, Office for National Statistics (Inter Departmental Business Register)

The latest SE internal statistics illustrate that employment over the wider sector stands at approximately 35,000 people across 650 organisations.

Table 2: Employment by business size in Scottish life sciences sector (2013)

<table>
<thead>
<tr>
<th>No of employees</th>
<th>% of businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 employees</td>
<td>1.1%</td>
</tr>
<tr>
<td>1-49 employees</td>
<td>17.5%</td>
</tr>
<tr>
<td>50-249 employees</td>
<td>20.2%</td>
</tr>
<tr>
<td>250+ employees</td>
<td>61.2%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Scottish Government, Office for National Statistics (Inter Departmental Business Register)

Table 3: Business base by country of ownership for Scottish life sciences sector (2013)

<table>
<thead>
<tr>
<th>Ownership</th>
<th>No of businesses</th>
<th>% of businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scottish owned</td>
<td>415</td>
<td>86%</td>
</tr>
<tr>
<td>RUK owned</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td>Abroad owned</td>
<td>45</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Scottish Government, Office for National Statistics (Inter Departmental Business Register)

Table 4: Gender distribution of Scottish life sciences workforce by sub-sector (2013)

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical devices and diagnostics</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Specialist services and suppliers</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Human therapeutics</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Agricultural / Veterinary / Environmental</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Clinical research organisation</td>
<td>37%</td>
<td>63%</td>
</tr>
<tr>
<td>Total</td>
<td>54%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Source: Scottish Government, Office for National Statistics (Inter Departmental Business Register)

Table 5: Future demand in Scottish sciences sector (2010-2016)

<table>
<thead>
<tr>
<th>Demand</th>
<th>% of workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion demand</td>
<td>60</td>
</tr>
<tr>
<td>Replacement demand</td>
<td>1,280</td>
</tr>
<tr>
<td>Net requirement</td>
<td>1,340</td>
</tr>
<tr>
<td>Annual net requirement</td>
<td>190</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,340</strong></td>
</tr>
</tbody>
</table>

Source: Semta, Scotland Report: Sector Skills assessment for Science, Engineering and Manufacturing Technologies
Table 6: Life sciences Modern Apprenticeships (2010-2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
<th>Total MA Starts</th>
<th>Life Science MAs as % of all MAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/11</td>
<td>18</td>
<td>28</td>
<td>46</td>
<td>21,561</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>2011/12</td>
<td>5</td>
<td>8</td>
<td>13</td>
<td>26,427</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>2012/13</td>
<td>12</td>
<td>9</td>
<td>21</td>
<td>25,691</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Source: SDS

Table 7: Number of students studying life sciences subjects at different levels

<table>
<thead>
<tr>
<th>Level of study</th>
<th>07/08</th>
<th>08/09</th>
<th>09/10</th>
<th>10/11</th>
<th>11/12</th>
<th>Change 07/08 – 11/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students studying life sciences subjects at further education level</td>
<td>1,409</td>
<td>1,749</td>
<td>1,686</td>
<td>1,287</td>
<td>1,035</td>
<td>-27%</td>
</tr>
<tr>
<td>Undergraduate students studying life sciences subjects at higher education level</td>
<td>7,398</td>
<td>7,685</td>
<td>8,165</td>
<td>8,316</td>
<td>9,247</td>
<td>25%</td>
</tr>
<tr>
<td>Students studying life science subjects at postgraduate level</td>
<td>2,441</td>
<td>2,717</td>
<td>2,703</td>
<td>3,006</td>
<td>2,928</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: SFC

Table 8: Gender breakdown of students studying life sciences subjects at different levels (2011/12)

<table>
<thead>
<tr>
<th>Level of study</th>
<th>Female</th>
<th>%</th>
<th>Male</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further education level</td>
<td>681</td>
<td>66%</td>
<td>354</td>
<td>34%</td>
<td>1,035</td>
</tr>
<tr>
<td>Higher education level</td>
<td>5,955</td>
<td>64%</td>
<td>3,292</td>
<td>36%</td>
<td>9,247</td>
</tr>
<tr>
<td>PhD level</td>
<td>1,748</td>
<td>60%</td>
<td>1,180</td>
<td>40%</td>
<td>2,928</td>
</tr>
</tbody>
</table>

Source: SFC

Appendix 2 – Bibliography

- Life Sciences Sourcebook – Scottish Government.
- Equality & Diversity Baseline Information on Scotland’s Key Economic Sectors – Scottish Enterprise and Highlands & Islands Enterprise, July 2010.
- Personalised & Stratified Medicine, An Overview – Scottish Enterprise Insight.

During the compilation of the SIP, consultation has also been made to the following sources:
- Scottish Funding Council Statistics.
- Scottish Government, ONS Business Register and Employment Survey (BRES).

The definition of life sciences higher education subjects used by the Scottish Funding Council includes:
- bioengineering
- bioinformatics
- biotechnology
- molecular biology
- biophysics
- biochemistry
- biomedical sciences
- biological sciences
- genetics
- molecular biology
- oncology
- pharmacology & pharmacy
- other biological sciences.
Acknowledgement
Skills Development Scotland would like to thank all the businesses and partner organisations who took the time to support the development of the SIP by taking part in workshops, focus groups and consultations. We would specifically like to thank members of LiSAB’s Skills Group.

April 2014