

# SEPnet Placement Report

## SEPnet Summer Placements for physics undergraduates – 2015 survey results

June 2016



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### SEPnet Summer Placements

#### Background

The SEPnet Summer Internship Scheme was set up in 2009 to create dedicated work experience opportunities for physics 2<sup>nd</sup> and 3<sup>rd</sup> (non-final) year students in order to:

- raise awareness of career opportunities
- develop students' employability skills
- encourage graduates to pursue physics-related careers
- persuade employers of the benefits of recruiting physics graduates.

Since 2009 the number of students registering for a placement has increased from 38 to over 312 in 2015 (334 in 2016 to date) and the number of placements from 19 to 83.

This report provides a summary of the 2015 placements including information and feedback from students and employers.

#### About the placements

91 projects were submitted by employers/research institutions from which 83 were selected, up from 60 in 2014. 43% were employer-funded (down from 46% in 2014). Organisations providing placements were sourced from areas including defence, IT, energy, engineering, space, knowledge exchange and research institutions. 29 new employers and 28 repeat employers submitted projects including 35 SMEs. Projects comprised data analysis, modelling, programming, testing products, website development, creating science demonstrations and research.

The range of projects was diverse. See examples in the box below:

<b>Company</b>	<b>Project</b>
Culham Centre for Fusion Energy	Tokamak Transformer Model at CCFE JET
Echo Group	Scientific account handler
EnSilica Ltd	Modelling thermal transfer between an IC package and heatsink
eOsphere Ltd	Delivering satellite derived ice information for vessels in polar regions.
Fat Fish Games Limited	Mobile Games Data Analyst
FDM Group Plc	Finance Analyst

Students applied directly to organisations who each received between 2 and 35 applications. The organisations receiving the most applications were Culham Centre for Fusion Energy, National Physical Laboratory, Things We Don't Know and University of Portsmouth. These organisations are likely to have received the highest number because projects which are familiar and relate to physics, ie research and science communication, are particularly popular with students. (See also Graph 2 on page 7 below which demonstrates that work discipline is an important factor when choosing a placement).

### **About the students**

312 students registered for SEPnet placements from the 9 partner universities (27% of the cohort) up from 199 in 2014. 23% of registrants were female and 29% of placements were taken up by female students compared with 32% successfully securing placements in 2014. See breakdown of placements and students below.

<b>Summer Placements 2015</b>	
No of projects submitted	91
No of student applications	312 (28% of cohort)
No of placements	83 (9 research)
Female students	29% (23% of registrants female)
No of SMEs	35 (46 placements)
Employer funding	43%
No of repeat employers	28

### **Feedback from the employers**

#### **Applications, CVs and interviews**

Employers were asked for their feedback on applications and interviews via student application tracking forms. 33 employers responded. An analysis of the feedback shows that the quality of the applications was generally considered to be quite high with some very positive feedback.

*"The quality of the applications was very high and professional....The ones that stood out were those that had something different in them (as most students had 2:1 or 1st class degree marks). Programming experience was essential, and those that took time to write a good cover letter I looked at most closely."* Research institution

However there were a number of points raised, as in previous years, which many students still need to pay attention to, when preparing applications. See employers' comments and recommendations below:

- apply early to make your application stand out and show you are keen
- address people with the correct title
- use formal English in the email and covering letter

- cover letter needs to be tailored to the role
- non-native English students should get their CVs checked by native English speakers
- avoid typos
- don't use different fonts
- include course grades, detail about relevant modules, projects and skills developed
- include hobbies but show how they are relevant in terms of developing skills
- include referee contact details.

*'We found the distinguishing feature between our applicants who we wanted to interview and those we didn't was the highlighting of extra-curricular programming or mathematical modelling projects. The impressive candidates had CVs which showed a good balance between academic success and getting their hands dirty with real-world modelling problems, or data science-type techniques/projects outside of their university work.'* SME

*'The CV could use a little work; the skills and personal requirements for this placement should be one of the first things an employer reads because he/she may not read any further.'* Research institution

*'CV did not include enough detail on the skills possessed by the applicant (e.g. computing, presentation skills etc).'* Large corporate

Employers either interviewed students face to face or by telephone. While all employers identified a few good candidates who performed well, several students made some common mistakes. Employers' advice was generally the same as in previous years:

- research the project and the company before interview
- revise basic physics
- dress appropriately
- be willing to have a go at questions
- show enthusiasm
- don't be over confident.

*'Very capable student with good understanding of programming and how it can be applied in a practical way to solve problems.'* Large corporate

*'Very confident, demonstrated a methodical approach to research project. Good knowledge of company and sector. Good programming knowledge.'* SME

*'Demonstrated relevant skills for position and real enthusiasm for the work. A possible improvement would be to read about the project before the interview.'* Large corporate

*'More preparation before the interview, research the sector and company.'* SME

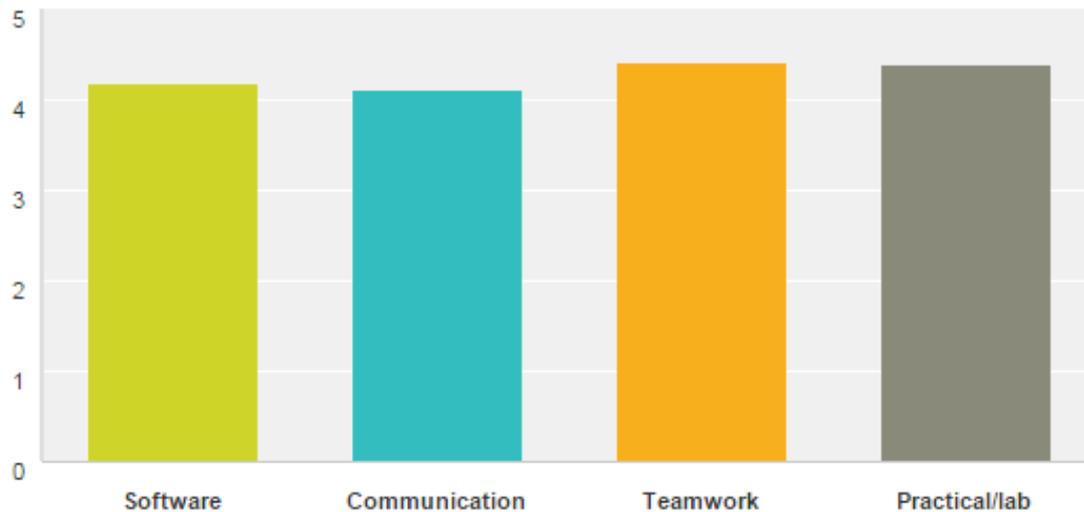
### **Skills, knowledge and attributes**

78 employers were interviewed during placements and asked questions about students' knowledge of physics, their skills and performance. 94% of employers rated the students' physics knowledge as good or very good. Some indicated that physics knowledge was not particularly relevant to the role. By offering a range of placement projects to students – some of which are less physics-related

– we are able to demonstrate to students that they can apply their skills and knowledge to a number of different job roles.

Employers were also asked to rate students’ transferable skills and their software and practical/lab skills on a scale of 1-5 where 1 is poor and 5 is very good. The graph below shows that students scored high for all skills listed.

**Graph 1**



Comments included:

- He has just started doing some client work and he's very good at working with other people.
- Communication is very good which can be clearly seen when writing up reports and writing analytical points. Always asks good challenging questions. Good team player. Always gets stuck in.
- Yes, he’s written a lot of code which is something I wasn’t expecting. I am impressed.
- A is very independent and motivated. She is pro-active and has her own ideas. She can keep going on problems - a key skill.

Employers were asked if they were seeing improvements in their students’ performance. Many employers commented on impressive improvements over the 8 weeks in terms of confidence, approach and levels of understanding. Comments included:

- He was thrown in at the deep end and had to learn quickly. His rate of learning is impressive.
- The energy industry is complicated and what we’re getting her to do is complicated as part of that – she’s had a steep learning curve. Her software skills have improved massively – she can now use Excel to a high, professional level.
- He is already becoming more independent, grasping concepts more quickly and progressing well.

### **Value of the placement scheme**

Employers were asked about the strengths of the summer placement scheme and the reasons why they host students. Building links with universities was identified as a strong motivator as well as enjoying working with young people and mentoring. See table below:

**Table 1**

Answer Choices	Responses
It helps with graduate recruitment	52.56% 41
Students carry out less business-critical projects that permanent staff have not got time for	57.69% 45
Students can carry out business-critical work at a busy time	46.15% 36
It allows more junior staff to develop managerial skills	26.92% 21
We (the organisation) like to have links with universities for other reasons	61.54% 48
I enjoy working with young people and mentoring	64.10% 50

Total Respondents: 78

In terms of the value of the scheme to employers and students, the reasons can be summarised in these 4 statements:

- It gives students a chance to experience different sectors of industry as well as non-commercial ventures. It offers students a practical application of the theory they have learned, adding realism. It also gives them preparation for when things go wrong.
- Good access to strong physics graduates from reputable universities and low overhead associated with arranging a placement.
- The scheme generates interest among students of good calibre. The Expo is a good showcase event - it is impressive to see the projects undertaken.
- It's efficient. You communicate well with the employers. The Expo Day is excellent. It's very good for the students to have a deliverable, it drives quality.

### Feedback from students

77 students were also interviewed during their placement. They were asked how many placements they applied for, about their choice of project, how the placement was going and what they felt they were learning.

### Skills and knowledge gained

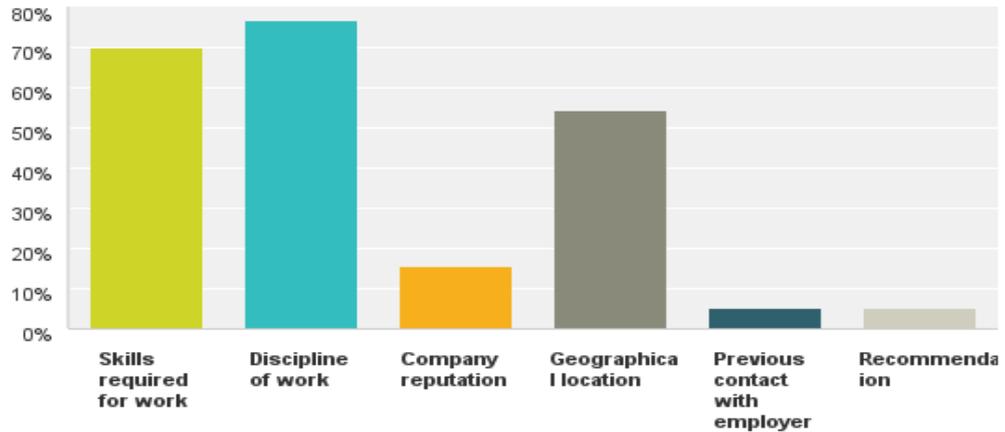
While 11% only applied for one placement, 19% of students applied for 10 or more with one student applying for 40! Graph 2 below indicates that the nature of the work was an important factor influencing their decision with many students citing relevant course projects a factor as well as a desire to develop particular skills described in the job spec. Location was an important consideration for 54% of respondents. Comments included:

- I took the group project module in the spring and ended up working on the Black Swan project. I really enjoyed it and became very interested in data science.
- The augmented reality stuff sounded really cool – the interviewer did his PhD at QMUL and I liked the link with the university.
- It had an interesting title, it sounded like I'd be doing something really useful. I liked how it was described. I'd be part of a team working on different projects.
- I liked the fact that it was in a small company which meant it could be more hands on and that I'd get more attention from people I'd be working with.

## **Graph 2**

### **Q9 What criteria did you use when selecting placements?**

Answered: 77 Skipped: 0



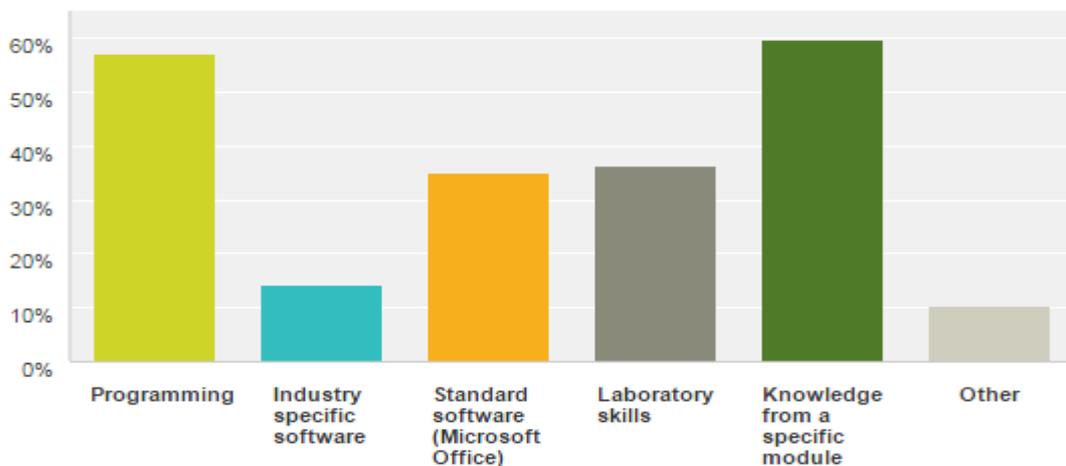
*'The first thing I looked at was location, I got a map out and excluded those that were really remote. Then I looked at anything that required a programming language. Then I applied for the QMUL exclusive ones because I thought I'd have higher chances of getting an interview.'* Queen Mary student.

Students were also asked about the relevance of their degree course and which aspects their studies they applied during their placement. The graph below indicates that degree knowledge was relevant for many students and programming knowledge was also very important in their placement role.

## **Graph 3**

### **What elements of what you have learned in your physics degree have you used in your placement?**

Answered: 77 Skipped: 0



*'Being able to understand code and algorithms – it does help, there are bits of knowledge that will come in handy. The maths aspect helps (not the high level we do in*

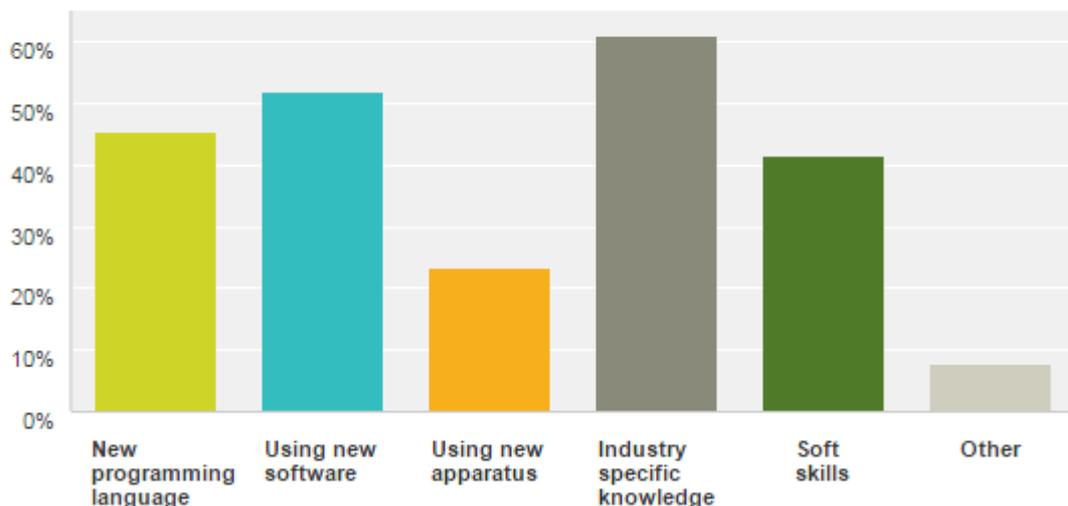
*Physics but it helps to be confident with it). Physics definitely helps but in a weird indirect way, it's hard to explain.'* Queen Mary student.

Asked what students learned on the job, most students highlighted the importance of gaining industry specific knowledge. Using new software or learning a new programming language were rated as the second and third most important learning outcomes.

#### **Graph 4**

### **What have you needed to learn 'on the job'?**

Answered: 77 Skipped: 0



Students described other business-related knowledge they have acquired:

- There's a lot of industry specific language (acronyms), I've been keeping a little dictionary of all the acronyms.
- Commercial awareness - I have become more familiar with business and economics. We are doing energy trading so it's similar to the stock exchange and I wasn't familiar with market terminology.
- How a company works in a start-up and in industry. How much it takes to get a start-up going.

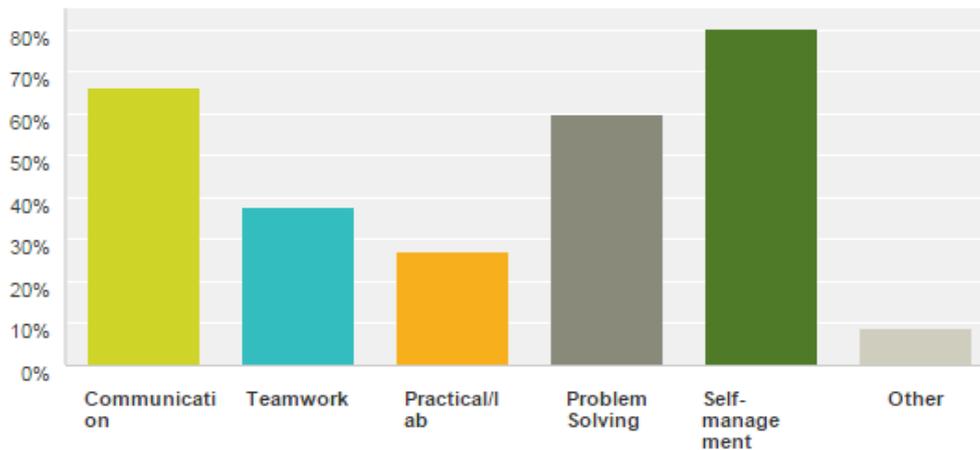
*'I have learned how to read the scientific papers efficiently, how to use Wolfram Mathematica and LaTeX, how the real science world functions and last but not least I realised how easy it was to make a mistake when doing calculations and that you have to be really careful with it. Measure twice, cut once.'* Southampton student.

Students' perception of the skills and attributes they acquired were explored in more detail (see graph 5). Self-management was rated highest with communication and problem-solving also recognised as important.

### Graph 5

## What other skills have you developed?

Answered: 77 Skipped: 0



*'I feel I can now convey a message in a meeting. I had to explain to an investor about the work we're doing.'* Queen Mary student

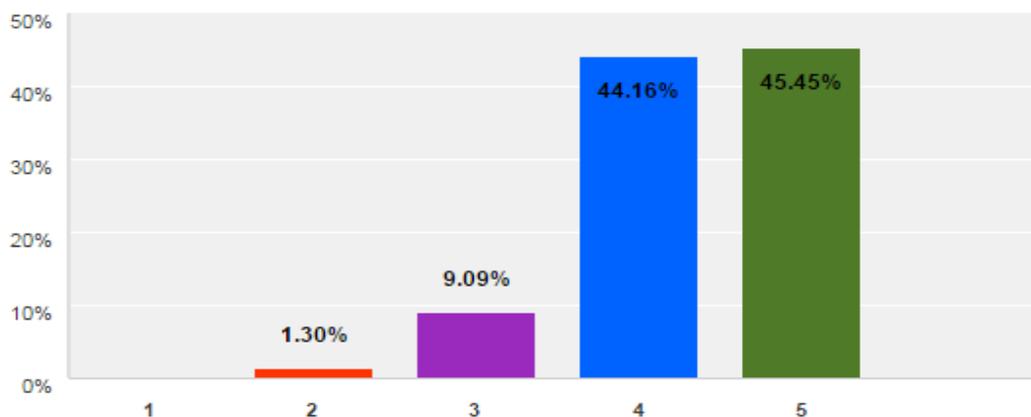
*'I felt dependent on others at first, but now I feel more self-reliant, seeking things out myself.'* Portsmouth student

In terms of students' overall experience, over 89% rated their placement as good or very good demonstrating the value that work placements of all kinds offer to students.

### Graph 6

## Can you rate your experience so far in general? (1 is v.bad, 5 is v.good)

Answered: 77 Skipped: 0



### Students' Expo

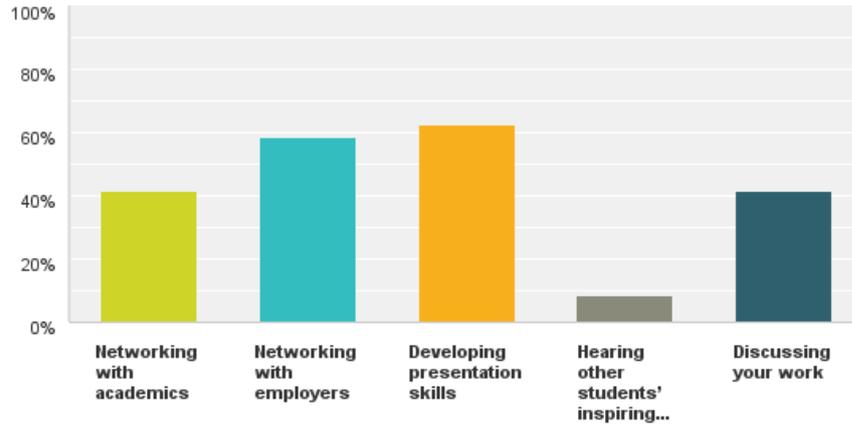
Every year students attend the annual Students' Expo in London in November to celebrate their achievements and to give a 1-minute presentation and exhibit a poster about their project to placement employers, academic staff and guests. Students were asked what they valued most about the Expo; the experience of delivering a

presentation to a large audience as well as practising their networking skills with employers were rated as most important. See graph 7 below.

**Graph 7**

**Q5 What did you find useful about the SEPnet Students' Expo?**

Answered: 24 Skipped: 3



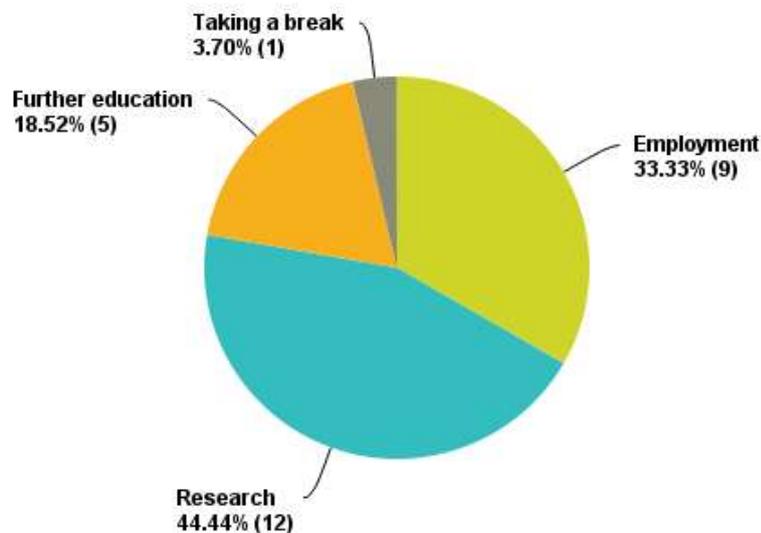
**Future career plans – student survey results**

SEPnet contacted students 6 months after their placement to find out about their career plans and to ask how they felt their placement had influenced their career decisions. 27 students completed our survey. Over 44% of students indicated that they were considering a research career compared with 33% planning to work in industry. See graph 8.

**Graph 8**

**Q1 What are your future career plans?**

Answered: 27 Skipped: 0



When asked if their placement had influenced their career choice, 89% stated that this was the case.

*'I knew I wanted to go into research, I wasn't sure what area. The placement hugely influenced which field I want to go into.'*

All students felt that SEPnet placement had aided their career prospects and, when asked how, some gave the following responses:

*'An internship at a well-known and well-regarded employer helps on a C.V. Also, the work I did there has helped me develop and demonstrate programming skills.'*

*'Helped me gain relevant work experience meaning I got job interviews and had something relevant to talk about in the interviews. Also having a company like BAE, and reference from them, on my CV was a huge benefit.'*

*'Gave me more technical skills and experience, which I can put on my CV. I'm also more comfortable talking about technical subjects, which would be helpful in interviews.'*

*'I am still employed by the company that my SEPnet placement was based at.'*

## **Conclusion and lessons learned**

### **Funding and future of the scheme**

The SEPnet Summer Placement Scheme has grown in terms of the number of projects submitted by employers, in particular SMEs, indicating the value of short placements for employers. However the proportion which are fully or match funded by employers has not. Unfortunately this negative trend has continued in 2016. When asked why employers were unable to fund, reasons given included:

- sector cuts (eg oil industry, government) leading to a freeze on recruitment including placements
- unsuccessful funding bids leading to limited resources to manage students (SMEs)
- lack of suitable projects at the right time
- unable or unwilling to include the student on the payroll (employers are now required by the HMRC to employ students).

On the positive side, there has been an increase in the number of employers taking advantage of the offer of providing two or more placements with match funding from SEPnet partners.

We need to increase the number of employer funded placements in order for the scheme to be sustainable. SEPnet partners currently contribute funding towards placements in order to create more opportunities for students. However departments face increasing financial pressures and, in the longer term, we need employers to increase their contribution and we must take more advantage of other funding sources eg Access (widening participation) and Santander Internship Scheme.

Some schemes have introduced a policy of offering full or match funding to employers in the first year with the understanding that the employer will fully fund the following year. However, this policy has been largely unsuccessful with employers often claiming lack of funds or suitable projects the following year.

Some members of our Employer Advisory Panel believe employers should, and could, fund and, in order to test employers' willingness to pay, it may be necessary for SEPnet to introduce a policy of only offering match funding to selected categories in future eg

SMEs, new organisations etc. with the expectation that other employers will see the value and will find the necessary funding.

### **Why students choose placements**

The number of students registering for placements has grown year on year which indicates their increasing awareness of the importance of gaining work experience prior to graduating. It is clear from the placement student survey that many physics students still plan to pursue a PhD after graduation and interesting to note that these students are aware that work experience can also be beneficial in securing a PhD position. It is possibly still a reflection of a lack of awareness of career roles for physicists outside academia that many physics students still aspire to a research career and disappointing to note that some still view industry as the second best option. Many are likely to share the following view when asked about their next step:

*'Ideally a PhD but that depends on my grades! If not then I hope to go into employment.'*

On the other hand, it may be a positive sign that students interested in a PhD see work experience as beneficial. They may see a PhD as leading to opportunities outside, as well as inside, academia.

### **Student applications**

While some employers did comment on the good quality of applications, weaknesses identified in feedback on CVs and covering letters remains largely consistent with previous years. While SEPnet's Employer Engagement Officers and the university careers advisers do give advice and offer help with student applications, many still do not take up this offer while those that do benefit greatly. Employers highlighted the same weaknesses in interview performance for some students. Advice and mock interviews are offered to students and a minority take advantage of this service. Often, this is the student's first experience of applying for a job role and is a very valuable learning process: for many, they need to experience the process first before realising that they may need help with improving their applications and interview performance.

*'The process of applying for internships and interviewing has been really useful because I've never done it before. It put me in a mindset of how the application processes work – how to prepare.'* Queen Mary student

### **Skills and knowledge**

In terms of knowledge and skills gained, employers were generally very impressed with their students' level of knowledge and transferable skills. They also saw good improvements in overall performance and evidence of making a real contribution – demonstrating that an 8-week placement, while considered too short by some employers, can be of real value to them as well as to students.

*'I asked him to explore a system with the potential of developing a mail system and he actually ended up completing the whole task and coded the whole thing on his own too.'* SME.

Students, when asked what they needed to learn on the job, did not rate soft skills as high as software and industry knowledge – possibly indicating that students may be developing these skills during their studies to an acceptable level. This perception is supported by employers' feedback on students' skills and from employers in other skills surveys who generally agree that communication, team working and presentation skills are now well embedded in most STEM degree courses (eg see Wakeham Review of STEM Degree Provision and Graduate Employability 2016).

While students did believe their placement helped improve their communication and problem-solving skills, self-management was acknowledged by many as the most important skill they acquired.

*'Self-management – I get left alone to get on with a project or task'. Sussex student*

Clearly self-management is important for newly-employed graduates in order to be able to hit the ground running and academics might need to consider how physics courses could be designed to better enable students to develop this skill during their studies.

### **Diversity of students on placement**

SEPnet is committed to supporting under-represented groups in physics. The percentage of female students who successfully gain placements is consistently higher (approximately one third) compared with the proportion of female students studying physics (20%). While the percentage of female students on placement decreased from 32% in 2014 to 29% in 2015, this has increased again in 2016 to 35%. Female students who register for placements are also proportionately more successful at securing them. This suggests that female students may feel well supported by the scheme and/or may be more likely to consider career opportunities outside academia and therefore see the value of gaining work experience.

SEPnet does not have access to data about other under-represented groups so is unable to compare how many register or are successful in securing placements as a proportion of the overall cohort. However, each year, widening participation funding is used to support placements for any students who meet its criteria and, through this, we can identify if we are reaching disadvantaged groups. The Government aims through the Teaching Excellence Framework (TEF) to better support these students and it will be increasingly important to identify ways to reach these students to ensure they can benefit equally from these opportunities - for example, by reviewing the funding for placements and how this is allocated to ensure that students from poorer backgrounds are not put off applying for financial reasons and by focusing on identifying placement opportunities close to universities to avoid additional accommodation costs.

### **Employment outcomes**

Anecdotal information about the benefits of placements for students' career prospects and successful employment outcomes is collected through the placement student survey and through additional feedback from students and employers. For example:

*'SEPnet has been incredibly valuable for me as a graduate, with the jobs market getting more competitive it is important to have experience on your belt. I would advise anyone interested in a career in a STEM field to take advantage of the scheme.'* Royal Holloway student securing a graduate job at Grant Thornton.

*'One of our SEPnet students, has been offered a job by Ultra Electronics. They were so impressed with her work at the Expo they asked her to give them a call, and last Friday Charlotte got the job.'* University of Portsmouth

However, gathering hard evidence on how summer placements improves students' career prospects proves challenging. For example, comparing the employment success rate of summer placement students with the average employment rate of their peers, as measured by DLHE data, requires contacting them one year after their placement to find out what they are doing and comparing the findings with DLHE data gathered at the same point in time. Students carrying out placements in their 2<sup>nd</sup> year need to be tracked 2 to 2.5 years after their placement in order to compare the same information resulting in often incomplete data on small numbers of students. However, over time, it is hoped we may be able to gather some meaningful data which will add value to other

employment information and which will be beneficial for SEPnet partners seeking further evidence of support for graduate employability as part of their TEF assessment.

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