



WHITE
ROSE
INDUSTRIAL
PHYSICS
ACADEMY

CAREERS GUIDE FOR PHYSICISTS

IOP | Institute of Physics
Yorkshire and North East



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Welcome to your physics careers guide

Created by the White Rose Industrial Physics Academy (WRIPA) and supported by the Institute of Physics, this guide aims to help you highlight your skills as a physicist, and understand the wide variety of careers available to you.

The skills you have gained from your physics degree go far beyond your knowledge of the cosmos and the strangeness of the quantum world, or your ability to solve maths problems. **You have skills to find the key issues in a given situation, develop a method of finding a solution based on evidence and present your solution clearly. The ability to find a solution when you don't already know the answer is a key skill you have, which is highly desired in a vast number of fields.** From academia to consultancy, management to teaching, your physics degree puts you in an excellent position to get you there.

Best of luck on the next stage of your journey, we hope this guide will provide the relevant information to support your journey. Whether you're thinking about working in Yorkshire, elsewhere in the country or internationally, WRIPA and IOP are here to support you.

Paul Branch
Regional Coordinator: Yorkshire and North East
Institute of Physics

Physics career sectors

As a physics graduate the world is at your feet! You will have high level problem solving and analytical skills that companies and organisations across the world are looking for.

Your challenge will be to translate what you have done in the lab or in a project into the language your prospective employer understands, and to evidence your skills with examples.

What is unique about physics is the sectors that you could work in:

Environment and energy

Apply your technical skills to diverse areas such as weather forecasting, energy technology development, electricity trading, network operations, oceanography and more...

Fundamental research

Discover why many physics graduates stay in university to work in research - from stars and galaxies, to gravitational waves, graphene, quantum computing, solar cells and the life sciences - physics graduates make the best researchers!

Engineering

Apply your knowledge of the world to a wide range of manufacturing and technology-based roles that make up the engineering sector.

Media

Communicate technical information as a science journalist.

Information Technology

Use your programming, mathematics, and data handling skills as a software engineer or IT consultant.

Finance

Analyse and predict markets using your mathematical and logic skills.

Education

Combine physics and communication to inspire the next generation of scientists.

Food

Apply your problem solving, mathematics, computer and simulation skills to all aspects of food production.

Hi-tech industries

Apply your technological knowledge to roles including research and development, product design and manufacture. Check out the opto-electronics industries, which include companies selling products such as solar cells, lasers, OLED televisions; or the communications industries who specialise in space and satellite technologies. Or focus your efforts in developing technologies such as hydrogen fuel cells, next generation batteries or nuclear reactors.

Law

Apply your scientific knowledge to patents, or use your logic and communication skills to become an excellent lawyer.

Entertainment

Use vectors to design virtual worlds - the computer games sector is a big employer of physicists.

Healthcare

Specialise as a medical physicist, as a medical technologist, or in the growing application of mathematics and computing to medical research.

Other sectors you might consider

- Automotive
- Defence
- Data science

Let's talk skills

It is always hard the first few times that you try to talk about what you are learning on your physics degree and translate this to what an employer is looking for on a job application. To get you started thinking about how to talk about your learning, here are the transferrable skills which are gained through undertaking a degree in physics. Next to each skill, we have given examples which you might see on a job description, or want to mention on your CV / job application.

Where to look for examples to evidence skills:

Project work, practical work, types of assessment, problem solving/programming classes, module choices, placements/visits, etc.

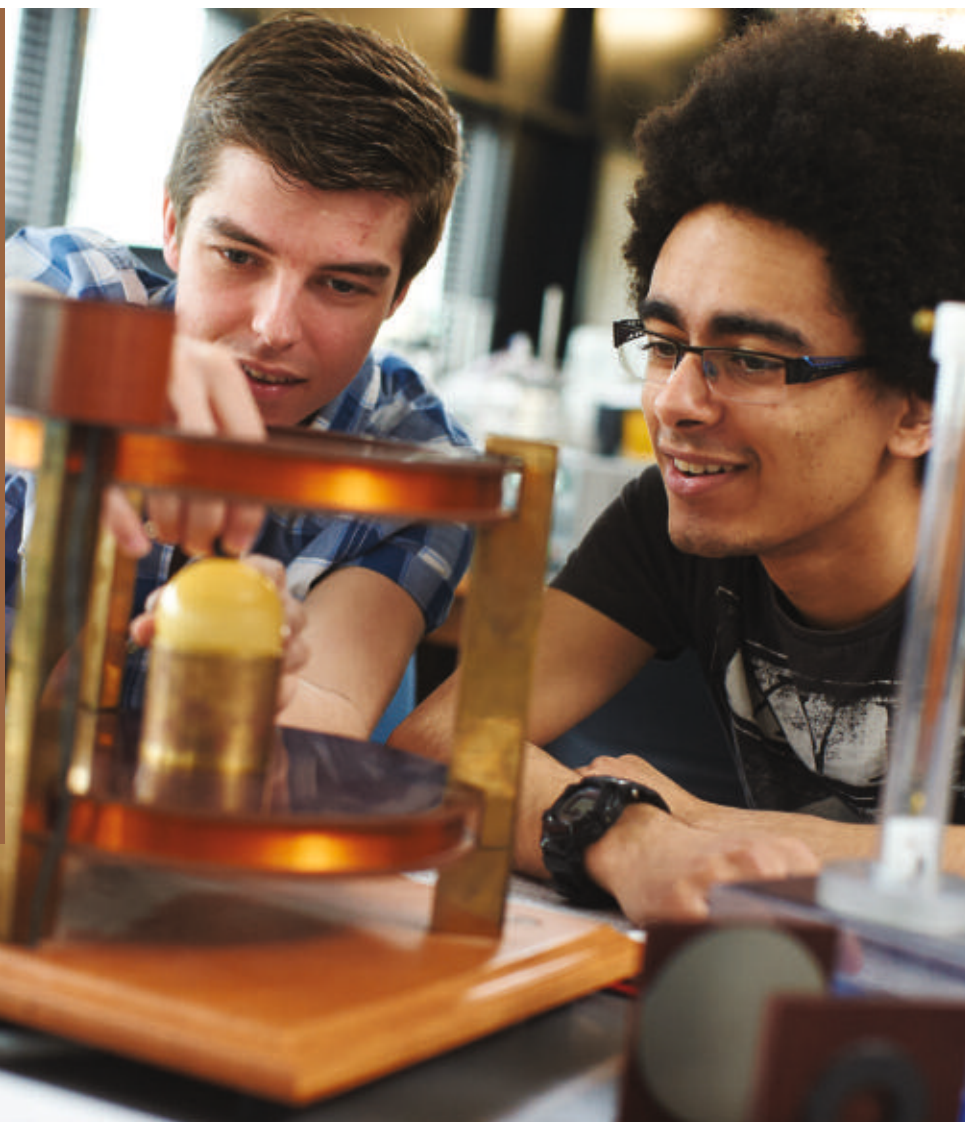
Don't forget:

These transferrable skills are all interrelated, so you may want to talk about a number of them together in the same statement.

Not all skills are relevant to all jobs, so look through the job description with a pen and highlight each skill they require. Then as you write your CV / job application for that post you can tick them off as you go and tailor your words to exactly what they are looking for.

It's great to evidence your skills by thinking about examples not only from your course but from your personal/extra-curricular experiences.

Lastly, the obvious one – only talk about, or use, those skills that you have and feel that you could evidence and back up with clear examples when required.



Skills	Some examples of how you could talk about these...
Problem-solving	<ul style="list-style-type: none"> • I have an analytical approach • I have a pragmatic approach • An ability to think creatively • An ability to identify issues
Investigative	<ul style="list-style-type: none"> • I can apply different approaches/methodologies to a problem • An ability to think clearly and logically • I have a methodical approach • I can conduct investigations / experiments independently • I can conduct investigations / experiments in groups • An ability to research and find information - written and/or electronic sources (give examples)
Communication	<ul style="list-style-type: none"> • An ability to use technical language • An ability to communicate complex information effectively and concisely • Translate and explain technical concepts to a non-technical audience • I have produced written documents, given presentations, taken part in group discussions, etc.
Analytical	<ul style="list-style-type: none"> • An ability to model complex systems • An ability to grasp concepts quickly • An ability to understand, analyse, and interpret data • I can construct logical arguments • An ability to distil a problem to its basic elements • I have experience of data handling • I have a high level of accuracy and numeracy
IT	<ul style="list-style-type: none"> • I am able to program in: Python, LabVIEW™, C, Matlab, etc. (give examples of coding languages you can use, either from your course or externally) • I am IT literate and can use... (list software packages you can use, e.g. Microsoft Office) • I have used IT packages to: prepare documents, undertake information searches, produce numerical calculations, and manipulate and present data
Personal	<ul style="list-style-type: none"> • Am able to work independently • I can use my own initiative • I can organise my own work • I have experience of interacting constructively in a group / team • I have good attention to detail • I can meet deadlines
Ethical behaviour	<ul style="list-style-type: none"> • I have an understanding of ethical scientific behaviour • Throughout my degree I have demonstrated high ethical standards

Job application example

“In my third year I volunteered to take part in the RWE nPower energy challenge. This involved working in a group of 5 students from engineering and physics to design a new approach to the energy services sector. We researched the wide range of current issues in energy before deciding on a solution that involved selling the services that energy provides – rather than the energy itself. We presented at the regional round of the competition at Ferry Bridge and were awarded a merit for our innovative idea and our clear communication.”

Need some experience?



Work experience

Work experience often takes place over a period of days to a couple of weeks and involves you getting hands on experience in a role/sector on the job. Whether you find yourself racing home to hit the 'apply now' button, or decide that it really isn't for you, this is all very important development in your journey to finding the right career path for you.

Internships

Internships often take place out of term time for a period of weeks up to a year, and are usually structured schemes offered by employers. Many take place over the summer months and, dependant on the scheme, could involve training and pay too.



Want to stand out from the crowd, boost your CV, or experience the world of work first hand before you apply? The importance of getting the right work experience for your career can make a real difference if you are chasing after that dream job, or are even still unsure what you want to do. Take a look at some of the ideas below and see if you could fit one or two around your current studies. You never know where it might lead.

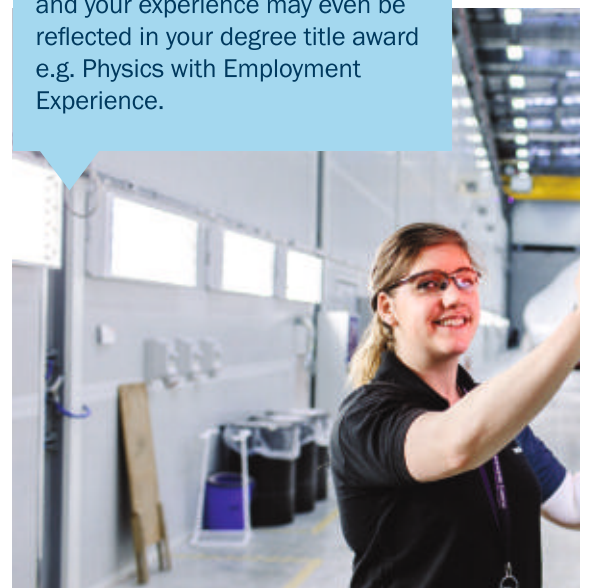


Placements

Placements often take place during term time and can have an aspect of assessment associated with them. In practice, internships and placements can be one of the same when advertised and are not always seen as distinct by employers, so make sure you keep a look out for both. Lots of different companies offer placements around a piece of work or project they want you to deliver, and this could be a great chance to get some extra skills on your CV, make contacts, and impress. Check out your University Careers Service, who will often be advertising a range of opportunities.

Integrated Year in Industry / Year-long placements

A year-long placement is the way to go if you want to take a break during your studies and truly experience working in a particular field or sector. You will get to embed yourself within your chosen workplace / team and hopefully take away a whole range of new experiences and transferrable skills. Your university will keep in touch whilst you are away, and help you reintegrate when you return. Although this might be a daunting option for some, the rewards afterwards can be huge and your experience may even be reflected in your degree title award e.g. Physics with Employment Experience.





Local university opportunities

Check out what your own university can offer in terms of research placements embedded within research groups, work experience within and outside your department, temporary work, etc.



Working abroad

Have you ever wanted to experience what it is like to both live and work abroad? Many students who seek this kind of opportunity look to their contacts, family and friends to help them identify and find the right opportunity for them. Dependent on what you have in mind, your university may also be able to help you or suggest a place to start. Past students have gone to spend time working as a Support Astronomer on La Palma, or on a placement at CERN.



Volunteering and outreach

Many universities have a volunteering team based within their students' unions to advertise vacancies in your local area. Volunteering is a great way to find out what motivates you, and can be both challenging and rewarding. Check out your local job shop or outreach team too, as they could be looking for students to take part in schools' outreach, or helping out in university activities. Often the work is very short term (couple of hours), so can easily be fitted around your studies. The IOP also has great opportunities to get involved delivering science outreach, just contact your local IOP Regional or National Manager.

Not sure where to start?

If you have something in mind that you want to do but are not sure how to go about it, talk as soon as you can to your tutor, employability lead or careers service. They may have ideas and contacts to get you started. Many placements and internships can be competitive to secure, so make sure you use the previous Skills section to really highlight your strengths clearly.



How to write a covering letter and application

You can create a compelling document that will engage the reader and get you an interview!

What is a covering letter? The covering letter accompanies your CV or application form when applying for a job. It explains why you are interested in working for the company, your interest in that particular role, and why you are the best person for the job. Unless specified a covering letter should never exceed more than one side of A4 in length.

Know what is expected of you and always read the instructions! Some roles will want a CV and covering letter, others a covering letter and an application form and some will want all three. Make sure that you understand what is required before you begin so you can confidently send the right mix of documents in time to meet the stated deadline.

Your name
Address
Contact numbers
Email

[Hiring manager's name]
[Hiring manager's company name]
[Company address]

[Today's Date]
Dear Mr/Mrs/Miss/Ms [Hiring managers name]

The first paragraph should state why you're writing the letter. Begin by stating the position you're applying for, where you saw it advertised and when you are available to start. Say why this organisation appeals to you. Draw on the research you have done (e.g. their website, brochure, contact with one of their representatives at careers events, work experience, etc.)

In the second paragraph detail what makes you suitable for the role and why you are interested in this type of work. Explain why the company is attractive to you, demonstrating your knowledge about the organisation and industry.

In the following third paragraph, talk about your relevant experience and give examples of how your skills match those included in the job description. Where you have additional skills to offer summarise these and explain how these could be of benefit to the company.

Finally, use the last paragraph to draw these threads together. Let them know that you would value an opportunity for interview, indicating any dates that you are unavailable. Finish by thanking them and state that you look forward to receiving a response.

Yours sincerely / Yours Faithfully

Application forms – Top tips!

- Some information, your name, educational history and address details, can be saved in a Word document and safely copied and pasted for each application you do. This saves a lot of time!
- BE CAREFUL copying and pasting information from previous applications! This can be tempting when time is short and the answer fits the question but if you tell CERN that you have always wanted to work for Rolls Royce, you won't win any fans!
- Always check and read your answers aloud to yourself, you will be surprised how this sharpens your application editing skills. It's the closest you get to hearing how it sounds in someone else's head.
- Competency based questions, such as, "Give an example of", "Describe a time" etc. can be answered using the STAR method (see below).

How should I lay it out and what should I include?

By using this framework, you can create a coherent and compelling document that will engage the reader and get you an interview. You should lay it out as a business letter with your name and details in the top right hand corner and the employer details set below this information and to the left.

Always try and address your covering letter directly to the person who will be reading it, many advertised roles will include a contact name. If you are contacting a company speculatively, it is worth a phone call to find out who you should direct your CV and covering letter to. Most employers will appreciate you taking the initiative and time to do so. Only use a general salutation such as "Dear Sir/Madam" or "Dear Director of human resources" if you have exhausted all avenues of inquiry beforehand.

How are speculative covering letters different?

Speculative letters are investigatory in their nature, you do not know if a vacancy exists and you are enquiring whilst applying. Know who to address it to (it is worth a phone call) and know the company! What does the company do? How many staff do they have? Who are their customers? Research pays off and well researched approaches are more likely to elicit a response!

Question: Tell me about a time when you had to overcome a difficult situation? How did you handle the situation?

Answer:

Situation: Part of my role at John Lewis is to be the first point of contact for customers with complaints, refund requests or other customer service related issues.

Task: During the Christmas rush a customer approached the desk and he was furiously angry over an issue he was still having with a previously returned product and demanded to see a senior manager.

Action: I advised the customer that I could do this and if he was happy to explain the situation I could get him to the most appropriate manager immediately. On listening to his complaint, I realised that the problem was related to his device set-up. I summarised the situation with the customer and asked him if I could take a look, he agreed. Going through the set-up process again and in detail corrected his issue and I was also able to provide him with product support information to take away.

Result: Within 30 minutes I had calmed the situation, solved the customer's issue and negated the need for senior management involvement. The customer asked for my name and gave my manager some excellent feedback about the service that I was able to provide.



- The STAR method:
Situation = what was the context?
Task = what did you need to do and why?
Action = what did you do?
Result = what was the outcome?

How to write a good CV

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Personal profile

Final year physics student with well-developed programming and problem solving skills, gained through undergraduate projects and laboratory work. Aiming to pursue a career in Data Analytics in the civil service.

Education and key skills

University of Hull (2016 - Present)

BSc Physics: Predicted 2:1 (Year 1: 67%; Year 2: 65%; Year 3 first semester: 66%)

Relevant modules include: Programming in Python, Physics with LabVIEW, core physics (including thermal physics, statistical physics, electricity and magnetism), problem solving and advanced skills in physics.

Group research project: Currently working with Hull Council to analyse their local populace data to drive service improvements using statistical and data science techniques. This work includes writing new scripts, advising on database design, and applying sampling methodologies to analyse data sets.

Skills: Designing programmes and scripts, project and group work, reporting writing and presentations, data analysis, programming in Python and LabVIEW.

2016 Felton College, Felton.

A-levels: Physics (B), Maths (B), History (B).

2014 Hammerstein School, Bristol.

GCSEs: 10 (grades A* - C) including English and Maths.

Employment history

2018 Learning and Teaching Assistant (Summer Placement),

University of Hull, Hull.

- Created two new practical laboratory experiments for undergraduates which demonstrate key first year physics concepts.
- Produced written teaching materials to support the future delivery of the experiments.

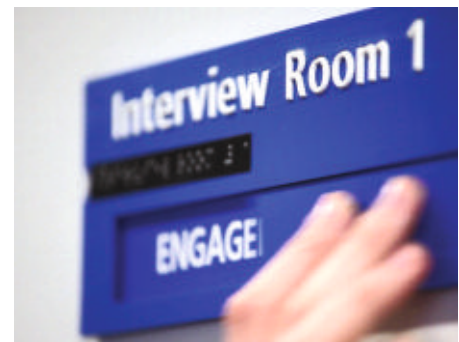
2016 - 2017 Bar staff (Part time), Weatherspoon, Hull.

- Served and presented beverages efficiently to customers in a friendly and welcoming manner.
- Worked together with team members to assist in keeping the bar and restaurant facilities clean and tidy.

Additional skills

- Full clean driving licence.
- Microsoft office packages (Word, Excel, PowerPoint).
- Familiarity with Linux.

The purpose of the Curriculum Vitae or CV, is to summarise your education, skills and experience relevant to whatever role you may be applying for. A CV should always be tailored to the organisation and role for which you are applying, so an employer can see that you have the technical and transferable abilities and skills required to justify offering you an interview.



Your name and details

It is a great idea to place your name (followed by any designatory letters after your name e.g. BSc) in the header of the document, in a large bold font. This will mean your name will be visible at the top of each page.

Underneath the header, provide your current contact details, making sure you give ones which will work throughout the employer's recruitment process (don't use your university email address if you're about to graduate and lose it!).

Personal Profile

Your personal profile should be no more than 5 lines, and give a snapshot of who you are, what you can offer the employer, and what career goals you have. This should always be tailored to the role you are applying to.

Education and key skills

- List your academic qualifications in reverse chronological order.
- If you are still studying, state your predicted degree classification. If you have completed your course, move the date ahead of the qualification, following the same format as your other academic qualifications (see example opposite).
- Under your degree, focus on listing relevant modules, skills, and describing any project work underway/undertaken. All experiences and skills listed should be tailored to the role and be relevant, and of interest, to the employer. For example, if you are applying for a technical position you might want to highlight scientific skills and techniques, whereas for a non-technical position you might want to focus on transferrable skills.
- Keep your A-level and GCSE information brief, but meeting any criteria required by the recruiter (e.g. GCSE Maths and English at grade C).

Employment History

Document all your work experience / employment history here, again in reverse chronological order, and describe it using positive language. Include any paid employment, voluntary experience and technical work experience as appropriate. It's important to ensure that each bullet point is tailored to the role that you are applying for. For example, the employer may ask for experience of project management, programming, and teamwork skills. Your experiences need to highlight such skills as far as possible.

Additional skills

You need to include additional skills here that are relevant to the employer and/or role. The employer may be interested to know that you have a clean driving licence or experience of Microsoft Office (list which software if appropriate). You may add extra-curricular activities here too, but avoid anything not particularly relevant to the role, or repeating skills already demonstrated elsewhere on your CV.

General Hints and Tips

- Your CV should be a maximum of 2-pages long and be customised for each job application you make.
- You may write in the first or third person, but you must be consistent throughout.
- Although there is no need to list referees at the end of your CV, it is worth having a think now about 2-3 people who would be prepared to provide a reference, and contacting them for permission to give their details. Then, when a recruiter requests them you have them ready to go.
- Your CV should be formatted so it is easy to read, send electronically, and print in black and white. Keeping layout and font choice simple, and not introducing any colour is best. Use bold text for emphasis and split into sections if helpful.
- Think about converting your CV into a PDF document before sending electronically so that it retains its formatting and content.
- Once you have written your CV, ask others who you trust for comment on its content and appearance.

Excelling at interviews and assessment centres

Interviews, assessment tests and assessment centres are an inevitable part of the process for securing placements, internships and graduate jobs. Everyone deals with them differently but the key to success, even if you are nervous on the day, is preparation. Here are a few pointers to help you handle the process with confidence.

Interviews

Organisations employ a number of different interview formats to help them to select the best candidates for their roles.

Group In these interviews multiple candidates are interviewed at the same time by either a single interviewer, who is usually the hiring manager, or a panel. The interview panel can be made up of a representative from HR, the manager and one or more co-workers. Employers can have varying reasons for holding a group interview but most often this is for time efficiency, and it also allows the interviewers to observe how you interact with others and consider how you might fit in with the organisational culture as a whole.



Face-to-face These interviews can be conducted by a single hiring manager or a panel with only one candidate present.

Video This format is used where there are many candidates to screen or where it is impractical for a candidate to get to an appointment. Video interviews can be live, using software like Skype, or where the candidate signs in and answers a number of pre-recorded questions under timed conditions, using software like HireVue.

Telephone A candidate is given a time slot where they have to be available to accept a call from the organisation's hiring staff. Plan to be in a quiet space where you will get no disturbances during this time to allow you to focus. Take the call standing up to allow you to breathe well, speak with confidence, and sound crystal clear to the recruiter.



- Do some additional research about the company, their competitors and any positive news items that they have recently drawn attention to in the media or industry related press. This will ensure that you have lots to talk about at the interview.
- Know what to expect on the day, read and then re-read the instructions that you have been sent. Do you know how to get there and in good time? How many people will interview you and at what time? What is the organisation's dress code? **HINT:** it is best to be smart!
- For some roles you may be required to give a presentation as part of the interview. Make sure that you know what the subject matter is, how long to talk for, and what type of presentation software they would like you to use. Have your presentation with you in hard copy, attached on email, and on memory stick to make sure you can deal with any software issues smoothly.

How to prepare for any interview

As previously stated, *preparation is key*. However, much of the research that you did for your application will stand you in good stead on the day so revisit your application documents and know them thoroughly.

Interview question types

Competency based questions

These are the most common type of questions asked at interview and can be answered very effectively using the STAR method (Situation, Task, Action, Result) – see page 11.

For example: 'Tell me about a time you...' or 'Give me an example of...'

Strengths based interview questions

More employers are beginning to use these types of questions when selecting candidates. Strengths-based interviewers are trained to read your body language and interpret the way you say things in order to assess what you genuinely enjoy. Best prepare by reading through the job description, person specification and the employer's website beforehand to think about what strengths they might be looking for and have examples ready of where you have demonstrated these skills.

For example: 'Do you consider it important that colleagues consider your work to be of high quality?' or 'Do you prefer starting or finishing tasks'.

Motivational questions There is no given structure to answer these questions but your answer should be logical and concise.

For example: 'Why have you applied for this role in this company, industry etc.'

Technical questions Don't panic about the idea of being asked to talk about a technical aspect of the role. The purpose of these questions is to find out more about how you think about technical problems rather than how much you know.

For example: You walk into the lab one day and start to make some measurements as normal. However, the equipment isn't working. What do you do? How do you approach the problem?



Methods of assessment

Assessment methods vary depending upon the industry and role you are applying for, and it is essential that you practise them prior to attempting for real. Often, assessments form part of the online application process and you will need to pass these to be selected to move on to the next stage. Assessments can also form part of the activities at an assessment centre and in both cases you will have to complete them under timed conditions.

The trick here is to be calm and assertive whilst not dominating the proceedings

Assessment tests These come in many forms to assess different aptitudes and abilities related to the role. You may come across verbal or numerical reasoning, situational judgement tests or inductive and deductive reasoning.

It is your responsibility to make sure that you are clear about the instructions that you have been given so that you prepare and practise beforehand. Many students fall down at this stage merely because they are unfamiliar with the test formats and NOT because they are unable to do them! A link to online practise tests can be found in the Resource Links section, or through your university careers service.

Presentations If a presentation, either as an individual or within a group, is required of you, check that you have understood the requirements, and then plan and practise. This is a challenge at an assessment centre where you will be working with candidates that you may not have met until that day.

The recruiter may want you to use tools such as PowerPoint or Prezi, or they may want you to use no tools at all! Most degree courses include some requirement to present at some point so that students can begin to develop these skills. However, if your experience presenting is limited then rehearse until you feel confident.

Group work exercises The group exercise is a common assessment centre method run by recruiting staff who score the candidates based on their contributions to the exercise. You may have to complete a task, or discuss an issue or a work related problem with a view to finding a solution. The trick here is to be calm and assertive whilst not dominating the proceedings or other group members.

If you can remember them all, use you team member's names, and try to include those who seem reserved and help them to feel comfortable to contribute. Most importantly stay positive about the task/process, and be an effective contributor.

Additional resources

Online Physics careers materials

IOP Careers

iop.org/careers

Assessment practice

assessmentday.co.uk

or ask in your local careers service.

Group interview hints and tips

thebalancecareers.com/group-interview-questions-and-interviewing-tips-2061157

Prospects Options with Physics

prospects.ac.uk/careers-advice

Physics World

physicsworld.com

Physics.org

physics.org

Science Council

sciencecouncil.org

STEM jobs websites

Bright recruits

brightrecruits.com

Gradcracker

gradcracker.com

Prospects

prospects.ac.uk

STEM Graduates

stemgraduates.co.uk

TARGETjobs

targetjobs.co.uk/graduate-jobs

Yorkshire Graduates

yorkshiregraduates.co.uk

Institute of Physics

iop.org

Physics World

physicsworld.com

ECM: Maths/Physics Jobs

ecmselection.co.uk/maths-physics-jobs

SciGrads

scigrads.com

Knowledge Transfer Partnerships

ktponline.org.uk

New Scientist Jobs

jobs.newscientist.com/en-GB

NHS Careers

nhscareers.nhs.uk

The Women's Engineering Society

wes.org.uk

Engineering Council UK

engc.org.uk

Institution of Engineering & Technology (IET)

theiet.org

British Automation and Robotics Association

bara.org.uk

The Career Engineer

thecareerengineer.com

The Engineer

theengineer.co.uk

Engineer Jobs

engineerjobs.co.uk

The Engineer Jobs

jobs.theengineer.co.uk

Engineering and Technology Jobs

theiet.org.uk/jobs/

Engineering Careers

engineeringcareers.eetimes.com

Engineering Jobs

engineeringjobs.co.uk

Fédération Européenne d'Associations Nationales d'Ingénieurs (FEANI)

feani.org

Justengineers

justengineers.net

Matchtech Group

matchtech.com

British Institute of Radiology (BIR)

bir.org.uk

British Nuclear Medicine Society

bnms.org.uk

Institute of Physics and Engineering in Medicine (IPEM)

ipem.ac.uk

Society for Radiological Protection (SRP)

srp-uk.org

Carbon60

carbon60global.com

Earthworks Jobs

earthworks-jobs.com

Jobs in Science

jobsinscience.com

Cogent Skills

cogentskills.com

Postgraduate study

Masters degree search (worldwide)

findamasters.com

PhD search

findaphd.com

jobs.ac.uk/phd

Masters loan

gov.uk/masters-loan

Alternative Guide to Postgraduate Funding

postgraduate-funding.com/gateway

Careers in research

Many physics graduates use the skills they have gained to pursue a career in research. Like many employment sectors a career in research can mean a lot of different things.

It could mean fundamental research in a university - that starts with a PhD project. For example, looking for new particles or searching for exoplanets as part of an international physics collaboration.

It could mean investigating new materials that might work well in solar cells or applying graphene to new nanotechnologies.

It could mean switching discipline to computer science to investigate machine learning approaches to efficient information storage, manufacturing engineering or even using your data skills in climate science or geographic information systems research.

These are the sorts of projects that you might be able to secure and up to 40% of physics students end up in this sort of PhD research in the first instance.

Start your journey

Most research careers start with a PhD. From there you can progress onto an academic career path, work in a research and innovation centre, or take an industry careers path. Some companies also invest in graduate research staff directly.

PhD

The PhD application process starts as early as November or December, but there are often still PhD opportunities available as late as June. Check out individual universities' web pages or brochures for more information and to apply.

For many research sectors there are also funded centres for doctoral training (CDT). Take a look at the EPSRC website to find out the sorts of topics they cover: epsrc.ukri.org/skills/students/centres/profiles

Studentships are partially/fully funded PhD places (linked to research projects) that allow promising students to continue their studies after first degree. The application process will be competitive, but if you are interested in securing one it is worth checking out interesting research groups within Departments to see if they hold any that you could apply for.

Academic Career path

If university life is for you, you could stay on (after PhD) and apply typically for a post-doctoral research post in order to start your pathway towards a permanent academic position.

Even if you don't make a permanent position (and most university researchers don't) the skills you continue to learn as a researcher will make you increasingly employable in industrial research.

Research & Innovation centres

A career in research could also mean working on projects at the interface between industry and academia. These are becoming more popular and there are centres called "Catapults", for example, that fund research in engineering areas such as advanced manufacturing, transport, semiconductor, digital technologies, etc. You can also do a PhD at one of these centres.

Take a look at the Innovate UK website to find out more: catapult.org.uk/catapult-centres

Industry Career Path

Over 50% of all research and development (R&D) is funded directly within companies. Often companies will look for PhD level qualifications to help them with a particular problem. This is why PhD study is an excellent route to higher level jobs. In fact, by far the majority of PhD graduates end up in industrial jobs rather than academia.

Some companies also invest in graduate research staff directly. Big technology companies may run graduate schemes in R&D, whereas smaller companies may recruit as and when they need new skills.



Resilience, or the ability to bounce back from challenges and restore your wellbeing, is a trait that does not normally feature on a CV. But it is a hugely important one because it defines the quality of your life beyond your professional space.

Setbacks will happen ubiquitously and inevitably whenever a task is being done, so we need to be aware of the strategies that would help us to cope and adapt. Coping means that our resources balance out, or are greater than, the stresses and challenges we face. No one expects working life to be consistently straightforward and routine, particularly in research and science, which intrinsically deal with the unknown and where a career involves a great deal of uncertainty and changes. But there needs to be a balance. Adaptability means the ability to change oneself to fit the changing circumstances and it has also become a key quality in the modern fast changing world.

When can you say that you have a resilient approach to study, work and life? What are the common triggers that reduce wellbeing? What are the ideas and strategies to restore it? Here, we review just some of the aspects of developing a more resilient approach and hope this will encourage you to look for more.

Resilience starts with developing an understanding of what triggers problems for you. Working out what your triggers are can help you anticipate them, adapt to them or avoid them.

Is it the mounting challenges of the academic path and you worry you are not good enough to pursue your career or qualification? Are you uncertain about what comes next in your career? Do you encounter people who are stressful to work with? Do you struggle to face rejection on the competitive physics career path? Do you push yourself too hard to do well?

These are the challenges you are likely to face. Below are some suggestions that come from physicists about how to cope and adapt to them. But before you read on, one thing to note is that talking to people in the same situation as you is extremely helpful as it reveals the difficulties and setbacks they had and how they overcome them. Learning to ask for help is an important skill to strengthen your resilience.



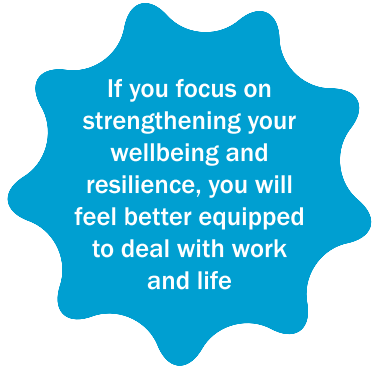
So, here are some central ideas and strategies to build resilience. They aren't intended to be a definitive list, but hopefully will help you to reflect on your own resilience and wellbeing. Don't be confused if they seem contradictory - different things work for different people.

- Even the greatest challenge can be a good thing, as it can lead to something that is far more enriching and interesting than you were doing before. Whatever the situation you are in, there are likely to be options.
- Try and make a little bit of progress each day, don't wait for a perfect day to finish a task in one go.
- Plan to allow time for when things don't run as smoothly as you expect.
- Taking time out, if that's what you really need, is also an option.
- Give yourself time for leisure. Remember to keep things you enjoy in your life like going outdoors or doing sports.
- Make sure you are properly rested. Walk away to disconnect from a task that is not progressing. You will achieve more when you come back refreshed in an hour than sitting at your desk feeling weary.
- See people. You are not alone in experiencing challenge and frustration. It really helps to vent occasionally with people who understand how it feels. If you aren't confident about networking, particularly when your resilience is low, then on-line networks are much easier to engage with (#phdchat #ecrchat on Twitter).
- Stop comparing yourself to others. Focus on doing the best you can in the circumstances you are in. Be kinder to yourself and set yourself realistic goals.
- Learn to say "no" if you feel you get drawn into doing things that you don't want.
- If someone is upsetting or undermining you, the best thing to do is to approach them to explain the effects they are having on you. Give them a chance to respond. If the situation is not resolved, find the right person to talk to. Posters and information should be widely available that explain procedures and whom to contact.
- Trust your own judgement on what would make you feel better and what won't. Don't aspire to do all the right things - getting everything right may add pressure.

If you maintain focus on strengthening your wellbeing and managing your resilience, you should feel better equipped to deal with work and life. There are plenty of resources about wellbeing and mental health that you can use. You can find easily available tips and guides at mind.org.uk, actionforhappiness.org, breathingspace.scot, Five Ways to Better Mental Health and Wellbeing at samh.org.uk, timetochangewales.org.uk and many others.

The Institute of Physics has a wide range of career stories and guides that can help you to look ahead and think about the challenges you are likely to face as you progress. Finally, don't feel that you have to approach someone in a formal role for advice on resilience and wellbeing - you can talk to friends and colleagues, or indeed go on-line for support. Talking about problems when they are still small means that you are more likely to have the resilience to find solutions to them and have the confidence to ask for help from others.

(Based on "Resilience Toolkit" by the IOP)



If you focus on strengthening your wellbeing and resilience, you will feel better equipped to deal with work and life

Get the most from a careers fair

Attending a careers fair is a great way to get an overview of the diverse roles available to physicists - enabling you to increase your understanding of career options, and meet with recruiters who may have placements, graduate training programmes or other opportunities.

Before the Fair

Take time to consider the type of company you want to work for and why - what drives you?

- Review the list of exhibitors and business sectors they are part of, and then identify which employers you would like to speak to. Don't forget to check out the smaller companies at a fair too that you might not have been aware of.
- Prepare some questions beforehand to ask employers – it could be around the roles available for physicists, career paths, training, or their recruitment process.

Don't forget to look out for a Careers Fairs + app

Used by both universities and WRIPA, check for and download your fair's app, so that you can research employers, prepare your questions, and get the most out of the day.

- Some of the companies will be looking to spot potential recruits on the day, so plan your outfit and dress business casual to make the right impression (formal business dress not required).



On the day

- Plan your stand route ahead of time so that you can speak to your favourite recruiters early on.
- Try to visit stands on your own rather than in large groups, but feel free to involve other waiting students around the stand in your conversation (if appropriate).
- If you are nervous on the day, get your questioning skills warmed up by visiting one or two other stands before you visit your favourite recruiter.
- When you visit a stand, do introduce yourself to make a positive impression – you could tell them your name, course, and year of study.
- Try to establish a dialogue with the company by asking questions that demonstrate you have done your homework on both them and their business sector.
- If you are talking to a recent graduate, you could ask them what their first year at the company was like, and what sort of projects or responsibilities they were given. This shows genuine interest and could give you a sense of the company ethos.
- When you have the information you need, it is always appreciated if you can thank them for their time.
- Before you leave the stand, do collect their name and business card/contact details for after the fair, so you know who you spoke to.

Top tips

- Bring a notepad, so you can make notes after you have spoken to a recruiter about what they said and the contact you spoke to - you might want to refer to it on a future application or interview.
- Don't worry about bringing copies of your CV to hand out to employers at a UK careers fair - most will point you instead towards their own formal online application processes.
- Try to ask consistent questions to different organisations at the fair, as this will help you compare answers to make a considered decision about later applications.

After the Fair

Follow up on any business cards or contacts you made and keep in touch (as appropriate) – it could lead to work experience or a future job.

- Stay connected with any employers you are interested in by following their social media profiles or monitoring their websites in order to keep up to date with their latest news and developments.

Top tip

- Check whether your university runs an alumni mentoring scheme and utilise it to learn more about the world of work, contact graduates directly with your questions, or find a graduate to mentor you.



Prepare some questions beforehand to ask employers – they could be around career paths or training opportunities

White Rose Industrial Physics Academy

The White Rose Industrial Physics Academy (WRIPA) is a consortium of five university physics departments (Hull, Leeds, Nottingham, Sheffield and York). WRIPA helps physics students to get graduate-level technical jobs by offering work placement opportunities, and by developing the technical and professional skills of students during their degree programme. We also organise employer recruitment events, including an annual physics careers fair.

University Careers Service support

Wherever you are studying, don't forget to make good use of your university Careers Service. As well as offering impartial, individual advice and guidance, they will have established strong links with regional, national and global recruiters and offer you information about a wide range of work experience opportunities and graduate vacancies. In addition, they will provide access to resources which will assist you in preparing for and effectively participating in the recruitment and selection process. If you are thinking about postgraduate study or for those of you whose future career plans are still uncertain, assistance is also available to help you explore the wide range of options open to you.

