PROFESSIONAL DEVELOPMENT

Transitioning from academia to industry

1. Introduction

There is huge demand for employment of microbiologists in industry as microbes can be used for health, environmental and economic benefits. If you are a researcher in academia, your research and professional skills are highly transferable to working in an industrial setting.

This guide aims to provide an overview of career options for microbiologists in industry, highlight the differences between conducting academic and industrial research and demonstrate how to adapt your academic experience when applying to jobs in industry.

There are many benefits to gaining industrial experience, including tangible, direct, application of your research and higher financial compensation. Additionally, being aware of your options in industry can maintain your career resilience, allowing you to adapt to any unforeseen circumstances in your professional life.

2. Funding

2.1 Microbiology in industry

Industry focuses on the development of products or services which will address a problem for a consumer and generate profit. There are many ways that the activity of industry intersects with microbiology, as microbes can be beneficial for health, the economy and the environment. Additionally, bacterial, viral and fungal infections currently pose a significant burden on healthcare systems and many industrial companies are focused on developing novel therapeutics or diagnostic approaches for these infections.

The aspect of microbiology you choose to focus on, if choosing a career in industry, will depend on your research interests and the technical skills you have developed during your time in academia. This expertise will make you eligible for a specialist role within an industrial company.

Below are some examples of the sectors in industry and the areas of microbiology research they focus on:

Agricultural

In production of crops, microbes can be important additions to soil to help improve productivity. Additionally, they can cause plant-associated diseases and many industrial companies research ways to prevent these to increase crop yield. Microbes can also cause animal diseases which can impact the productivity of the agricultural sector and animal welfare. Some industrial companies are focused on developing new diagnostics and treatments to reduce the impact of animal diseases.
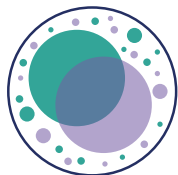
Biotechnology

Biotechnology companies use molecular biology to engineer microbes for development or the manufacturing of products. Some companies intersect between the pharmaceutical and biotechnology sectors, as genetically modified microbes can be used in the manufacturing process of antibodies, vaccines or other proteins with therapeutic applications. Additionally, microbes may be used to produce enzymes involved in manufacturing processes or for biochemical assays.

Diagnostics

Development of more streamlined or accurate diagnostic tests for infectious diseases can improve the clinical management of patients. Some industrial companies focus on the development of these tests, or provide diagnostics as a service for healthcare providers.

Environmental

Microbes can be utilised for environmental benefits. Some industrial companies conduct bioremediation, where microbes are used to break down environmental pollutants from soil, water or other environments. Similarly, wastewater treatment plants use microbes on a large-scale to purify water from sewage. These treatment plants will also test for microbial contamination in water supplies.

Food and beverages

In food and beverage manufacturing, industrial companies must conduct quality control. This includes assessing their products for microbial contamination. Some companies also use microbes for large-scale fermentation to produce fermented food and beverages.
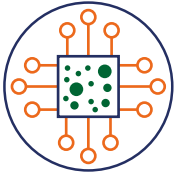
Multiomics and artificial intelligence

Genomics, transcriptomics, proteomics and metabolomics can improve our understanding of microbes in human health and disease. Some industrial companies provide these as a service, including genomic sequencing to identify and characterise pathogens or microbes in a sample. This may also include the use of deep learning and machine learning models to analyse these datasets.

Pharmaceutical

Pharmaceutical companies are involved in the process of drug discovery, pre-clinical and clinical drug development and drug manufacturing. In microbiology, this can focus on the development of novel therapeutics or vaccines for pathogens, including antimicrobial resistant bacteria, fungi and viruses. Some pharmaceuticals are also developing probiotics for health benefits.

Research products

Conducting research in microbiology requires the use of enzymes and reagents for experiments. There are many industrial companies that develop these products and aim to streamline microbiology research.

2.2 Types of companies

Companies can be categorised based on their size and organisation. This is important to consider when exploring careers in industry as this can affect your experience. Therefore, you may want to tailor your job search to a company of a particular size and organisational structure based on your preferences.

○ **Start-up companies**

These are companies in the initial stages of formation and usually focus on the development of a single technology, product or service which is unique and solves a problem for a consumer. Generally, they have high costs and limited revenue, but are funded by business loans, venture capitalists, angel investors or crowdfunding.

In microbiology, start-ups are usually generated as 'spin-offs' from university-based research. As a result, these companies can be very diverse and you should be able to transfer your research and professional skills to a wide range of start-ups.

Working at a start-up provides an environment that nurtures creativity and there can be many opportunities for professional development and career advancement within a company. However, there is much less job security as there is always the chance that the company will fail to become profitable. Additionally, start-ups generally provide a lower salary and can have limited resources.

○ **Small and medium sized enterprises (SMEs)**

Small enterprises are defined as having less than 50 employees whereas medium sized enterprises have between 50 and 250 employees. These make up over 99% of all businesses in the UK. In microbiology, these companies normally focus on drug discovery and preclinical drug development or diagnostics. However, they may not have the resources for clinical drug development and manufacturing.

The main benefits of working at an SME include access to senior management, opportunities to showcase your initiative, variety in your workload and responsibilities and better job security than a start-up company. However, your workload may be greater than in a large enterprise and there may be fewer senior positions, and therefore, less opportunity for career progression.

○ **Large enterprises**

Large enterprises are well established corporations that employ more than 250 people. These companies can span the breadth of microbiology research, with products and services in several areas. In addition, larger companies are more likely to be involved in clinical drug development as they have the resources to sustain investment in a product over several years.

In a larger company, there is usually higher compensation, better resources for your research, job security and more opportunities for promotion. However, there may be less opportunity for you to interact with senior management and use your creativity in your work.

2.3 How to start exploring your career options in industry

To explore careers in industry you should follow the steps outlined in our ['Adapting to a non-research career resource'](#), including:

- Becoming self-aware of your skills, interests, values and career priorities.
- Researching your career options.
- Taking action to find out more about a career and support your transition.

Once you have decided you want to start a career in industry, you should start preparing as early as possible, ideally while you are still working in academia, as it will take time to identify and secure suitable industrial opportunities. The specific actions you can take to prepare yourself for a career transition to industry include:

- Search for job adverts in industry online and collect those you are interested in. Make a note of the skills and experience you need for these jobs.
- Identify individuals who currently hold an industry position or are working for the companies you are interested in. Research their career path to find out what experience and skills they needed to secure the position. Additionally, you can reach out to these individuals to find out more about the position and get advice on transitioning into industry.
- If you are still at university, go to careers fairs attended by industry employers. Use this as an opportunity to discover companies, job opportunities and network with recruiters, asking them what they are looking for in employees in different roles across the company.
- Make enquiries to companies you are interested in working for by sending them your CV and a cover letter, explaining why you would be suited to their organisation. You can ask to visit their premises and have an informal chat about current and future opportunities and find out whether there are any current vacancies in specific roles suited to your skills and interests.
- Update your online presence, including your LinkedIn profile. This is a great way to establish a network in industry and keep in contact with any connections you make. Start to share interesting and engaging content about your professional life.
- Start to address any skill and experience gaps in your CV. This could be through finding relevant training, internships, work, shadowing or volunteering opportunities to help with applications in the future.
- Attend events and conferences which bring together academia and industry to help you network with relevant people and find new opportunities.

3. Differences between research in academia and industry

There are several differences between research in academia and industry, particularly as industrial research is focused on products and services which will ultimately generate profit for the business. In contrast, academia is focused on the generation of knowledge. Being aware of these differences will help you to make an informed decision about which environment is right for you.

Feature	Academia	Industry
Career path	Training in your PhD, consolidation as a postdoc and move to independent research through fellowships or entry level lectureships. This is followed by senior positions including senior lecturer, reader/associate professor and professor.	Following a PhD, you can usually enter at a mid-level research scientist position. This can progress into positions with more managerial responsibilities in a hierarchical structure.
Funding	A researcher is responsible for generating funding for their research through grants or fellowships.	The company provides all funding for a project from their revenue, loans or investment. This allows you to focus solely on research work.
Impact	Generation of knowledge in a specific field.	Immediate and tangible impact to consumers of the products or services.
Intellectual ownership	Research outputs are credited to the individual researcher.	Research is credited to the organisation as the individual researcher is achieving objectives set out by the company and using their resources and funding. Additionally, publication of any work needs to be discussed with the company and depends on their policies.
Job security	Generally, less job security within academia as it is often dependant on external funding. Many positions are offered as fixed-term contracts.	As discussed in section 2, job security varies across the sector, depending on the type and size of the company.
Management	Large degree of autonomy in managing your research projects and deciding on the direction of your research.	You will report to your manager and be expected to meet deadlines and performance indicators for your projects.
Outputs	Main outputs are publications, but academics are also involved in software development, patents, policy work and public engagement.	The focus is on developing, manufacturing or marketing products and services which will solve a problem for consumers and generate profit for the company.
Salary	Salaries are generally lower in academia.	Generally, you will have a higher salary in industry, with other company benefits included.
Tasks	Research; planning objectives and experiments; applying for funding; working on publications; training students and public engagement work. You will have more independence to follow your own path in academia.	Focused on your research, collaborating with colleagues and managing your projects. In senior positions, you will have more managerial responsibilities in multiple projects.

4. Applying for industry jobs with academic experience

4.1 Skills industry employers are looking for

Industry employers often recruit academic researchers due to their expertise in a specific research area. The main skills industry employers are looking for include commercial awareness, financial management, understanding of business strategy, teamwork, leadership, communication and problem solving.

The table below will give you some ideas about the academic activities which can be used to evidence your transferable experience to industry employers:

Skill	Why this is important for research in industry	Transferable experience from academia
Business strategy	They will want to know you understand the overall vision for how a company progresses and how to formulate and act out their strategic plan.	Formulating a strategic plan for the direction of your research and securing funding for this; writing fellowship applications.
Commercial awareness	This demonstrates your understanding of a company's business model. You should aim to understand the development process for their products and how academic research could be translated into products.	Keeping up-to-date with new products and start-ups in your research area; being aware of industry research in your field; conducting a placement in industry; networking with individuals in industry; attending conferences which bring together industry and academia; securing patents and collaborating with industry in your research.
Communication	This complements your teamwork and leadership skills. However, it is also important as you are expected to report back to a line manager on a regular basis.	Grant applications; peer review; lecturing; giving talks at conferences; public engagement; publishing.
Financial management	Keeping track of how money is generated and spent is important for a business. They will want to see that you understand the performance indicators for a business and how to track expenses, incomes and sales generated.	Managing your research budgets or grants in a successful project; applying for fellowships and funding.
Leadership	This can demonstrate you are the right candidate to drive forward progress on their projects and you have potential for career progression in their company.	Supervising students; mentoring; organising conferences; teaching; public engagement work; holding a position on a council or committee.
Problem solving	This is important to be able to meet your project objectives and deliver progress in product development.	Making progress in a research project; analysing data and developing novel approaches in your research.
Teamwork	Companies are driven by teamwork as problem solving in a team can be more efficient and effective. In addition, you will need to collaborate with colleagues from different disciplines in your research projects.	Working in a research group; committee work; organising conferences; collaborating with other research groups.
Technical skills	This will demonstrate your expertise in your field and that you are the ideal candidate for their projects.	Technical skills you have developed in you PhD or postdoctoral research.

4.2 How to write an industry CV from academic experience

A CV is designed to summarise your professional achievements to persuade industry employers you are the right candidate for the position. Both an academic and industry CV aim to showcase your skills and provide an overview or your professional experience. Additionally, both types of CV should be tailored to each position you apply for so you can highlight your most relevant competencies.

However, a few key features of an industry CV include:

- Stick to a maximum of two pages on your industry CV. Think about which of your skills and experience are most relevant to this position.
- Place a focus on your technical research skills that make you ideal for their project development.
- Include evidence of your professional skills which demonstrate that you will be able to adapt to working in an industrial environment.
- Focus on your educational history and professional achievements (publications, awards and grants). Aim to showcase those which are most relevant to the position.

4.3 Formatting your industry CV

- Use a maximum of two pages.
- Split your CV into clear headings. Use these to signpost your specific experience. For example, you can have individual sections on your 'research experience', 'teaching and administrative experience', 'software development experience' or 'policy experience'. However, use this strategically to showcase your experience relevant to the position. Remember you do not have to include everything on your CV – you should be selective.
- Keep space between sections to make the CV easy to read.
- Ask someone to proofread your CV to check for spelling and grammatical errors.
- Use bullet points to describe your experience. These should start with an action verb, explain the task you were responsible for and end with a result.

4.4 Essential contents of an industry CV

The sections to include in your industry CV highly depends on the job you are applying for and what skills and experience you need to showcase. Below are the essential sections for an industry CV and which experiences from your academic career to include:

Heading	What to include
Personal details	This can include your professional social media, email, home address or, if you have one, a professional website. However, you should try to keep this section to a minimum and only include your social media if you actively post on these.
Research experience	You should summarise your research experience and their main outcomes. Your experience with links to the work of the company, collaboration with industry partners or placements in industry will be the most important.
Education	This should be listed in reverse chronological order and is usually placed after your work experience sections in an industry CV. This should start from your undergraduate degree and highlight impressive grades and outcomes.
Technical skills	Highlight the techniques from the research you are proficient in. This may include lab, IT, statistical or programming skills. The skills most relevant to the position should take priority.
Professional skills	This includes evidence of your teamwork, leadership and communication. Focus on the professional skills which the employer has listed on the job application.

4.5 Additional contents in an industry CV

There are other sections you will want to add to the CV. These should be strategically chosen for a place in your CV and should aim to provide more evidence that you are the right candidate for your job.

Heading	What to include
Profile	A profile is optional to include, but you can use this to draw the reader in with brief introduction of your key skills, research expertise and career aspirations at the very top of your CV. This should be three or four key bullet points.
Additional experience (if these are all focused on one area, you can change the title to reflect this).	You may also want to include other work experience from academia around teaching, software development or policy if this is relevant to the post. However, if this can also be included in your 'relevant experience', 'technical' or 'professional skills' sections, you may not need to include this section as well.
Publications	Include publications in the format they would appear in a reference list and highlight your name in the author list. You may have a long list of publications so focus on those which are most relevant to the work of the company.
Patents	List the relevant patents you have obtained or are in progress, if applicable.
Conferences	Give a list of the conferences you have attended and given talks at. You should focus on those which may have included both industry and academia to demonstrate that you an aware of what research in industry is like.
Funding, awards and prizes	This can demonstrate to the employer that you are a successful researcher. Be selective with these and specify the amount of award when talking about funds you have received.
Professional memberships	These should be directly related to the company you are applying for or your field of expertise. Include the organisation name, membership status and dates for the membership. You can also include how these memberships have aided your career progression.

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