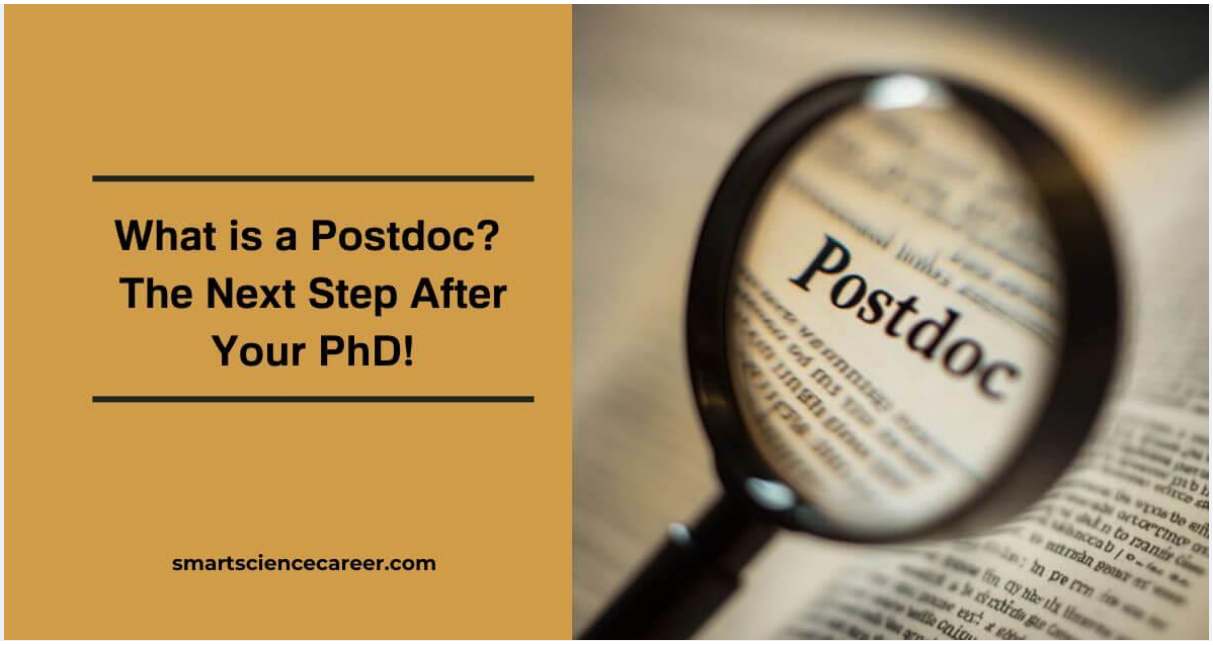

WHAT IS A POSTDOC? THE NEXT STEP AFTER YOUR PHD!

Read online: https://smartsciencecareer.com/what-is-a-postdoc/

A postdoc, or postdoctoral position, is a key stage in the academic career path for those who have completed a doctoral degree and want to pursue a career in research. It provides an opportunity for training, mentored research, and professional development to further refine skills and pursue a career in academia, research institutes, or the private sector. If you are considering pursuing a postdoc, you must understand its significance and the opportunities it offers – but also the downsides.

1. WHAT IS A POSTDOC?

A postdoc, short for a postdoctoral position, is a research role undertaken after earning a doctoral degree. It provides additional training and opportunities to engage in mentored research to refine skills and pursue a career path in academia, industry, policy, or other sectors.

Postdoctoral scholars are generally employed in academic institutions or research institutes (and sporadically in the industry sector as “industrial postdocs,” see below) and work on specific research projects during this temporary period of mentored research.

How It Fits Into Postsecondary Education

Postdoctoral training represents a specialized form of tertiary education that extends your learning journey beyond completing doctoral degrees. Unlike bachelor’s degree programs or vocational training in fields like veterinary medicine or massage therapy, postdoctoral work is designed for those aiming for research independence and advanced professional skills.

2. IS A POSTDOC AN EDUCATION OR A JOB?

A postdoc serves as both a continuation of education and a professional role, combining elements of both. On the one hand, it is a continuation of scholarly training, providing opportunities to develop research independence, hone technical skills, and gain expertise under the mentorship of experienced researchers.

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In this sense, a postdoc is a form of advanced education, much like graduate school, but focused on refining one's specialization. On the other hand, postdocs are typically full-time employees, receiving a salary or stipend and contributing significantly to their research group's output.

They are often tasked with responsibilities akin to those of a job, such as grant writing, mentoring junior researchers, and publishing findings. While the educational aspects help prepare individuals for long-term career goals, the professional demands place postdocs firmly in the workforce, blending education with practical job experience.

3. IS A POSTDOC A TEMPORARY OR A PERMANENT POSITION?

A postdoc is typically a temporary position designed to provide advanced training and research experience after completing a doctoral degree. Most postdoctoral appointments last between two to five years, depending on the nature of the research project, the source of funding, and the career goals of the postdoc.

These roles are not intended to be permanent but serve as a stepping stone to long-term positions, such as tenure-track faculty roles, industry jobs, or policy positions.

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Disadvantages of a temporary position as a postdoc

While the temporary nature allows postdocs to explore new fields and build their skills, it can also bring uncertainties

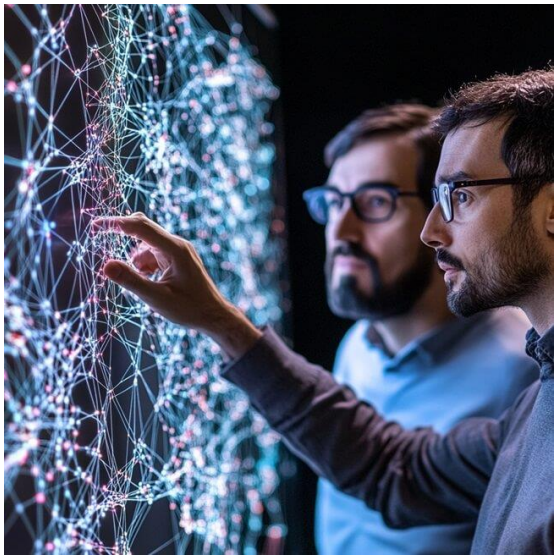
regarding career progression and job stability, making it a transitional yet critical phase in an academic or professional journey.

There may also be reasons to quit a postdoc before your contract ends. Read more here: Should I quit my postdoc?

Disadvantages of a permanent position as a postdoc

At my university, we had permanent contracts for postdocs. However, we have realized that this arrangement may have substantial disadvantages for supervisors and postdocs.

Firstly, in my humble opinion, from a career perspective, your postdoc time should be limited to a maximum of 6 years – otherwise, you will have problems getting hired for more advanced positions such as group leader, principal investigator, or assistant professor.



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However, there are many things to consider when planning your postdoc time. Read more here: For how long should I be a postdoc?

Secondly, as a postdoc with a permanent contract, you might get too comfortable or lazy and not perform well. This may sound mean, but it will be a problem for both you and your supervisor. However, this is a potential risk for *some individuals*, while others perform greatly and find excellent positions later.

As a supervisor, I get unhappy that there is not enough ambition and not enough work gets done. As a postdoc, you will be disappointed when a reduced output (low numbers of publications and successful grant proposals) ruins your career perspectives in the long term.

However, my simple advice would be: when you get offered a permanent contract, you should definitely accept it but treat it as a transient position and stepping stone to the next career level.

4. WHY PURSUE A POSTDOC?

Pursuing a postdoc allows Ph.D. students and graduates to continue their training in a specialized research environment. Many individuals holding a doctoral degree or advanced degree seek postdocs to develop independence and gain expertise in their fields.

Professional Development as a Postdoc

The postdoc years provide a chance to hone technical skills, improve grant writing, and establish a strong foundation for career progression in academia or

other sectors, including professional schools and technical colleges.

Become an Expert as a Postdoc

One of the primary goals of a postdoc is to develop deep expertise in a specific field of study. In research, you must become an expert in your field. During this phase, postdocs refine their technical skills, focus their research interests, and achieve a level of mastery that distinguishes them as leaders in their discipline.

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This period of advanced training allows individuals to build on their doctoral work, often expanding into new methodologies, interdisciplinary approaches, or cutting-edge technologies.

Postdocs solidify their reputation as experts by publishing high-impact papers, contributing to significant research projects, presenting findings at conferences, or organizing symposia. This expertise is critical for securing tenure-track faculty positions, industry leadership roles, or other advanced career opportunities.

Read more here: How to become an expert in your scientific field?

Networking and International Reputation as a Postdoc

Your postdoc time also provides invaluable opportunities to build a professional network and establish an international reputation.

Working closely with mentors, collaborators, and peers, you expand your academic and professional circles. Attending international conferences, participating in research collaborations, and publishing in well-regarded journals enhance your visibility in the global research community.

Working abroad as a Postdoc

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I am convinced you must work abroad to pursue a successful career in academia. Unfortunately, working abroad has its disadvantages. Whether you want to work

in academia, industry, or policy, international experience is a big plus.

I know of several famous universities that only hire scientists with international experience for their professor positions. Thus, international experience is not universally mandatory but highly advantageous.

Working abroad substantially broadens your cultural and professional horizons. Networking and recognition are crucial for your career advancement, as they open doors to new opportunities, funding, and long-term collaborations in academia, industry, or policy.

Read more here: Do I really have to work abroad as a scientist? and 9 reasons not to go abroad – and how to handle them!

5. WHAT DOES A POSTDOCTORAL RESEARCHER DO?

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Postdoctoral researchers engage in advanced research under the supervision of a principal investigator (PI). Postdoctoral scholars contribute significantly to research activities, working on specific research projects that often align with cutting-edge topics in areas like the biomedical sciences, social sciences, or STEM fields.

Their responsibilities vary but typically include:

- **Research and Publications:** Conducting experiments, analyzing data, and publishing results in peer-reviewed journals.
- **Mentorship and Collaboration:** Working with faculty mentors, graduate students, undergraduate college interns, and other staff members within a research group, as well as with external collaborators (academia or industry).
- **Grant Writing and Funding:** Securing research grants and funding is critical for advancing your research career, including personal funding (such as NIH F training grants or individual fellowship programs from other research councils) and project funding.

6. TYPES OF POSTDOCTORAL POSITIONS

Academic Postdocs

Postdocs with academic positions work in universities or research institutions. They focus on scholarly training to acquire the professional skills needed for faculty positions or tenure-track roles. This aligns with long-term educational goals tied to tertiary education and four-year programs. In other words, if you want

to become a professor or a research group leader, this is your path.

Read more here: Should I Become A Professor? Success Rate 3 %! and How to become a professor?

Industrial Postdocs

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Industrial postdocs are roles within private sector companies or industry-focused research institutions. These positions emphasize applying advanced research to practical challenges, often in areas like pharmaceutical science, technology development, or engineering.

Industrial postdocs provide a unique opportunity for researchers to gain experience in product development, intellectual property, and collaboration with interdisciplinary teams. These roles are particularly well-suited for individuals aiming to transition into long-term industry careers.

Postdocs in Policy

Postdoctoral positions in policy do exist, but they are relatively niche. These positions usually aim at individuals who wish to apply their research expertise to policymaking, science communication, or advisory roles.

Organizations such as government agencies, think tanks, or non-governmental organizations may offer these roles, often under the title of policy fellowships or similar programs.

They involve tasks like analyzing scientific data to inform public policy, drafting recommendations, or working on science diplomacy.

Other Non-Academic Postdocs

Other non-academic postdocs encompass a variety of roles in sectors such as non-profits, think tanks, or start-up companies. These positions often combine research expertise with practical applications, focusing on areas like public health, environmental sustainability, or education.

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For example, a postdoc in a non-profit organization might work on designing programs to improve community health outcomes. In contrast, a postdoc at a

start-up might contribute to the development of cutting-edge technologies.

These roles offer flexibility and opportunities for those interested in applying their research skills to broader societal challenges beyond traditional academic or industrial settings.

7. HOW LONG IS A POSTDOC?

A postdoc is typically a short-term research position lasting two to five years. However, the length can depend on several factors:

- **Funding:** Duration often depends on the availability of training grants, research fellowships, or other sources of funding. This is similar to the challenges faced by full-time students managing student loans in graduate diploma programs.
- **Career Goals:** Researchers aiming for tenure-track faculty positions may require more time to publish extensively and develop research independence. This is often seen in educational institutions offering advanced degrees.

Read more here: For how long should I be a postdoc?

8. HOW MUCH DOES A POSTDOC EARN?

Postdoc salaries vary between the US and Europe, with some differences in pay structures and ranges (disclaimer: the salary information provided here is based on a specific time period, may differ from source to source, and may change).

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Postdoc Salary in the United States

The baseline postdoctoral stipend for new postdocs in the US in 2022 was $54,840, increasing to approximately $66,600 for those with seven or more years of experience [1]. The national average salary for postdoctoral research fellows is $61,143 annually [2]. Salaries can range from $42,226 to $65,741 per year, depending on location and experience [3].

(sources:
1: https://postdocinusa.com/postdoc-salary-usa/;
2: https://www.indeed.com/career-advice/pay-salary/how-much-does-postdoc-make;
3: https://www.salary.com/research/salary/hiring/postdoctoral-salary)

Postdoc Salary in Europe

Postdoc salaries in Europe vary substantially by country and depending on experience and responsibilities:

- Finland: €34,800 to €60,000 per year
- UK: €36,105 to €48,160 per year
- Germany: €48,000 to €76,000 per year
- Switzerland: €82,341 to €90,706 per year

(sources: https://fastepo.com/comparison-of-salary-of-postdoc-in-europe/; https://www.myscience.de/en/working/salary/postdoc-salaries)

Comparison

Generally, US postdoc salaries are competitive with those of many European countries, especially when considering the cost of living in some areas. Some European countries, like Switzerland, offer higher salaries; however, the living costs are typically much higher.

It is important to note that factors such as cost of living, benefits, and funding structures can significantly impact the overall financial situation of postdocs in different countries.

Interestingly, you have more options to negotiate your salary as a postdoc – particularly in private universities and in the industry sector. It is important to prepare yourself for salary negotiations before you apply for jobs because – paradoxically – you increase your perceived market value when you aim for a higher salary.

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Many state institutions have rigid pay structures for postdocs, especially those funded by grants; however, you can still negotiate perks such as reduced teaching load or flexible working hours, including home-office possibilities.

Read more here: Why salary matters in science careers and Best books on salary negotiation and getting a raise.

9. HOW TO FIND A POSTDOC POSITION?

Finding the best postdoc position for your specific goals, talents, skills, and personal situation involves thorough research and preparation:

Networking

In my experience, the best jobs are often not posted but directly offered to interesting candidates known to the hiring group leader.

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Thus, engage with your academic network and attend conferences to meet interesting researchers in your field who might have a vacancy sooner or later.

In addition, many four-year institutions and graduate schools host career fairs to connect postdocs with researchers looking for postdocs.

Office of Postdoctoral Affairs

Many institutions have an office of postdoctoral affairs to support applications and career development.

Online Job Postings

Websites like the National Postdoctoral Association (NPA) or institution-specific job boards often list available positions, similar to platforms promoting job opportunities in tertiary education fields.

Useful online job search boards for life sciences positions are:

Science Careers – A specialized job board focusing on scientific research and academic positions.

BioSpace – A comprehensive platform with over 4,000 job listings, primarily in the US, covering various roles in the healthcare and biotech industries.

New Scientist Jobs – Offers a wide range of scientific positions globally, with a strong focus on life sciences.

PharmiWeb – A leading job board for life science positions in Europe, covering various disciplines from R&D to sales.

Indeed – A major general job board that also includes numerous life science positions.

LinkedIn – While not specific to life sciences, it's a valuable platform for job searching and networking in the industry.

Biospace.com – A dedicated life sciences job board with a focus on biotechnology and pharmaceutical positions.

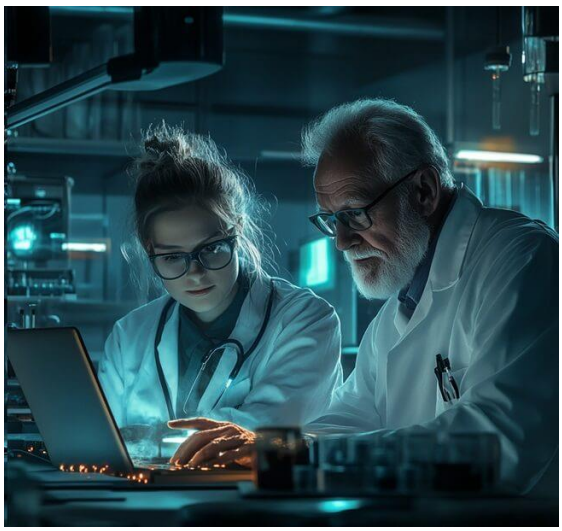
ScienceJobs.org – Offers a variety of science-related job postings, including those in life sciences.

The application process for a postdoctoral appointment involves securing funding, often from external fellowships or grants provided by organizations such as the National Institutes of Health (NIH). This funding serves as a crucial financial support system, enabling young researchers to focus on their work.

10. WHAT ARE THE BENEFITS OF POSTDOCTORAL TRAINING?

In my opinion, postdoctoral training offers multiple advantages – provided you aspire to a future career in academia:

- **Skill Development:** You hone technical skills, gain grant writing expertise, and build leadership qualities. These skills are transferable to broader educational programs or vocational schools.
- **Professional Networking:** Collaborating with experienced researchers expands your academic network and broadens your professional and personal horizons.
- **Career Opportunities:** Postdoc fellowship programs and research positions can lead to permanent positions in academia or industry, particularly in specialized fields like health care or pharmaceutical science.



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11. WHAT ARE THE CHALLENGES OF BEING A POSTDOC?

While rewarding, postdoctoral studies come with challenges:

- **Funding Uncertainty:** Securing reliable research grants or funding sources is often a major concern. This mirrors the challenges faced by students in bachelor's degree programs and two-year colleges managing student loans.
- **Work-Life Balance:** Long hours and high expectations can affect personal well-being, as seen across many postsecondary education paths.
- **Career Uncertainty:** Transitioning from a postdoc to an associate professor or assistant professor position in academia or the private sector can be competitive and unpredictable, especially in fields tied to STEM subjects or medical school.

12. WHEN IS DOING A POSTDOC A MISTAKE?

Ph.D. graduates often find themselves at a crossroads after completing their doctoral studies. While some choose to enter the job market immediately, others pursue postdoctoral fellowship programs to refine their expertise and gain specialized training in their area of expertise. This may be a mistake!

When you are not pursuing an academic career to become a tenured professor, spending time as a postdoc can be very expensive in the long run.

A study in Nature Biotechnology revealed that **a postdoc might decrease your market value when pursuing a non-academic career!**

Compared to peers who entered the workforce immediately after earning their PhDs, ex-postdocs earn lower wages well into their careers. On average, **they sacrifice about one-fifth of their earning potential in the first 15 years after completing their doctorates, which amounts to $239,970** for those who end up in industry.

The financial sacrifice begins during the postdoc period. A typical biomedical postdoc lasts 4.5 years with an annual salary of about $45,000, compared to the $75,000 median starting salary for PhDs in industry. This pay gap persists for 8-9 years after entering the non-academic workforce, **indicating that postdoc experience has little value outside academia**.

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Furthermore, the belief that a postdoc is necessary for industry jobs is misguided. About three-quarters of life sciences postdocs believed postdoctoral research was important for getting a job in industry, but the study suggests this is a false approach.

This financial disadvantage is compounded by the fact that postdoc salaries have not kept pace with the rising cost of living. By April 2023, the prices of essential needs had increased by 13% since 2021, while the NIH-recommended minimum wage only increased by 4% in the same period.

However, in my experience, there may be exceptions; for example, postdoc experience can be advantageous for transitioning to lucrative industry roles that need specific technological expertise (e.g., biotech or specialized R&D).

In summary, pursuing a postdoc can result in lower earnings both during and after your postdoc period. It may lead to significant financial losses throughout your career outside of academia.

Sources: https://www.science.org/content/article/price-doing-postdoc; https://www.nature.com/articles/nbt.3766)

13. GLOBAL VARIATIONS IN POSTDOCTORAL POSITIONS: SIMILARITIES, DIFFERENCES, AND THEIR IMPACT ON CAREER DEVELOPMENT

Unsurprisingly, postdoctoral positions vary significantly in structure, funding, expectations, and career prospects across the globe.

One of my British colleagues sarcastically mentioned that postdocs in the US are considered “lab rats” who must do all the experimental work. In contrast, they are considered rather scientific middle management in Europe. I am unsure whether he is right – he had a bad boss in the US, while I was treated very nicely. Thus, it is only anecdotal evidence.

Securing health insurance and other employee benefits is an important aspect of being a university employee in a postdoc role.

For international candidates, working as postdoctoral associates may require obtaining appropriate work permits and navigating immigration processes, such as securing an H-1B visa or equivalent in the country of research.

I will try to compare the situation of postdocs in the US, Europe, Canada and Australia. I do not have sufficient insight to write about Asia, South America, or Africa.

Postdocs in the United States

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In the US, postdoctoral roles are predominantly temporary, often funded by stipends, fellowships, or grants. The emphasis is on building a strong publication record and gaining specialized research experience, often in preparation for a tenure-track or industry role.

US postdocs are typically regarded as trainees rather than employees, which limits their benefits (e.g., retirement or long-term contracts).

- **Strengths**: High research intensity, strong focus on publishing and networking, and access to cutting-edge technology and resources.
- **Drawbacks**: Lower job security, intense workloads, and limited benefits compared to full-time employees.

Postdocs in Europe

In Europe, postdocs are more often employed as staff members with fixed-term contracts, offering benefits like pensions, healthcare, and paid parental leave.

The culture places a stronger emphasis on work-life balance compared to the US, and labor laws generally provide better job security. Funding often comes through national or European grants, such as those offered by the European Research Council.

- **Similarities to the US**: Like in the US, postdocs are expected to produce high-quality research outputs, and competition for permanent academic positions is intense.
- **Key Difference from the US**: European postdocs are typically treated as employees, not trainees,

and a robust benefits package and job stability reflect this status.

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Postdocs in Canada and Australia

I have learned from my Canadian and Australian colleagues that postdoc positions in their countries combine features of both the US and European systems. They are often employed on contracts that provide benefits, but the funding landscape is smaller, and fewer academic positions are available compared to the US.

- **Similarities to the US**: High competition for limited academic roles and an emphasis on publishing and research excellence.
- **Key Difference from the US**: Contract-based employment offers slightly better job security and benefits.

14. KEY TAKEAWAYS FOR ASPIRING POSTDOCS

Before pursuing a postdoc, consider the following:

Clarify Goals: Understand whether a postdoc aligns with your long-term career goals. This may involve reflecting on your experience in formal education, such as graduate degrees or four-year programs.

A postdoc is probably not the best choice if you want a non-academic career. However, it is probably a must when you want to pursue an academic career and become a professor.

Choose Wisely: Select a postdoc position that provides the right mentorship, research environment, and funding, similar to choosing between certificate programs or bachelor's programs. Read more here: How to choose the best postdoc position?

Maximize Opportunities: Use the postdoc years to publish excellent papers, network, and become an expert in your field.

15. SUMMARY OF KEY POINTS

- A postdoc is a temporary period of mentored research for individuals holding a doctoral degree or Ph.D. to refine their research independence and academic skills.
- Postdocs are essential for exploring research careers, pursuing tenure-track roles, or transitioning to non-academic opportunities in vocational schools, community colleges, or industry.
- Challenges include funding uncertainties, work-life balance, and transitioning to a position as a permanent member of the academic staff.
- Postdoctoral training provides further expertise, independence, and

professional development for careers in academia, research institutes, or the private sector.

ACKNOWLEDGMENTS

I have used AI systems, including Grammarly, ChatGPT, Perplexity, and Google Gemini, to enhance the English and comprehensiveness of this article.

RECOMMENDED READING

The following articles may also interest you:

- For how long should I be a postdoc?
- Should I quit my postdoc?
- How to become an expert in your scientific field?
- What is tenure?
- Assistant professor and associate professor – what is the difference?
- Do I really have to work abroad as a scientist?
- 9 reasons not to go abroad – and how to handle them!
- Should I Become A Professor? Success Rate 3 %!
- How to become a professor?
- Scientific independence – how to develop and demonstrate it?
- Why salary matters in science careers
- Best books on salary negotiation and getting a raise