

Guide to decision-making in the search for a PhD position in chemistry in Germany



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PhD – yes or no: considerations and alternatives

PhD – Yes or No?

A doctorate is a long-term commitment and should be well thought out. The decision depends on personal goals, interests and the willingness to familiarize oneself with a complex topic over several years. It is worth considering carefully whether a doctorate really suits your own professional and academic goals.

Requirements for a doctorate

- **Independence & self-organization:** You must be able to work independently for years and make your own decisions.
- **Time management:** The ability to prioritize different projects and tasks and work through them in a structured manner is essential.
- **Practical laboratory skills:** Experimental laboratory experience is essential, especially in experimental sciences such as chemistry.
- **Sense of responsibility:** You are largely responsible for the success of a PhD, which requires a high degree of responsibility for your own project.
- **High frustration tolerance:** Setbacks and problems are inevitable during the doctorate. Perseverance is crucial here.
- **Resilience & work-life balance:** The doctorate is often stressful and time-consuming. It is therefore important to find a balance to avoid burnout.
- **Self-interest and enthusiasm for the topic:** There must be a deep motivation and passion for the chosen field of research in order to maintain intensive work over several years.
- **Organizational skills:** The ability to structure one's own project and drive the research forward is particularly important when there are several tasks running in parallel.

Self-reflection: Am I suitable for a doctorate?

- **Scientific interests and career goals:** What do I want to achieve in the long term? Do I want to stay in academia, go into industry or pursue a career as a civil servant?
- **Motivation:** A doctorate should not be pursued solely for reasons of prestige or salary. An interest in research and a passion for the chosen subject should be at the forefront.
- **Creativity and innovative ability:** Can I imagine developing new scientific ideas and dealing creatively with problems?
- **Current research trends:** Which topics are particularly relevant in chemistry at the moment, and in which areas are there funding and jobs available?
- **Specialization:** In which area do I have experience and expertise? Is it better to stay in this field during my doctorate or do I want to specialize in a new area to expand my knowledge?

Doctorate at university, in industry or research institutions?

- **University:** Greater freedom in the choice of research topic and focus on basic research. The work is strongly research-driven, but there are often also teaching obligations.
- **Industry:** Application-oriented research, often linked to the economic goals of the company. However, there is a risk of conflicts of interest between the company's innovation strategy and scientific publication goals. A tighter timeline is often specified.
- **Research institutions:** Combination of applied and basic research. Here, work is often project-based, frequently in cooperation with industry.

Doctorate abroad?

- **Advantages:** Experience abroad and international networking, access to other research areas and technologies. Promotes intercultural skills, which are becoming increasingly important in the globalized scientific landscape.
- **Challenges:** Adapting to new cultures, research systems and possibly bureaucratic hurdles (e.g. visas or funding).

Important aspects when choosing a doctoral program

- **Working group atmosphere:** Success and satisfaction during the doctorate depend heavily on the working group. It is advisable to get to know the working environment and group atmosphere before starting by doing an internship or talking to former doctoral students or doctoral candidates at the end of their time.
- **Industrial doctorate:** An industrial doctorate can lead to conflicts of interest between scientific goals and business interests. It is important to be clear about the company's priorities and expectations in advance.
- **Funding:** Financial security must be clarified for the entire duration of the doctorate. This includes scholarships, funding programs or employment contracts, which can vary depending on the country and institution.
- **PI:** The PI has a major influence on your doctorate, both through academic supervision and through their management style and presence in the workplace. A supportive PI fosters a productive working atmosphere, while an authoritarian or less present PI can affect motivation and collaboration. It is important to clarify the PI's working style early on to ensure successful and harmonious collaboration.

Special features of a doctorate in industry or research institutions

- In the case of doctoral projects in industry, it is possible that, in addition to your own research work, you will also have obligations for the company. This requires a high degree of organization and flexibility, as projects for clients can often take priority.
- PhD positions in industry often offer more attractive remuneration compared to university or public research institutions.
- Only in rare cases is teaching required in addition to research in industry, which means less time commitment and not everyone sees themselves as being called to teach.

A doctorate is not a must for a successful career. Alternatives in industry, the public sector or consulting also offer exciting prospects. The decision for or against a doctorate should be carefully considered and tailored to your own interests and long-term goals. Self-reflection and thorough research into various options are the key to finding the right path.

Alternatives after the Master's degree: a doctorate is not a must

- **Entry into the industry:**

- a. Traditional large chemical companies and government agencies often prefer PhDs.
- b. However, with a Master's degree you have better chances with small and medium-sized enterprises (SMEs) or American companies, which are often more flexible in their hiring policies.

- **Founding a startup:** Starting your own business, e.g. by founding your own company in the field of chemistry, environmental technology or materials science, can be an exciting alternative.

- **Probationary doctorate:** If you are unsure, you can “try out” the doctorate for up to six months, as employment contracts include a probationary period. This time is often enough to determine whether you can cope with the demands and working methods of a doctorate in the long term and whether you want to live with this way of working.

- **Research assistants at institutes:** These positions are rare, but possible. You work as a research assistant without a doctoral obligation, often with research and teaching duties.

- **Scientific journalism or editing:** A career as an editor at scientific journals, popular science magazines or in technical documentation is an interesting alternative.

- **Professional fields in the public sector:**

- a. Work in environmental agencies, the police or government research and monitoring institutions.
- b. Working in non-governmental organizations (NGOs) that specialize in environmental protection, healthcare or development aid.

- **Technical consulting:** Consulting jobs in industry, for example in the fields of environmental technology, patent law or safety consulting, are also interesting alternatives.

Financial considerations before/during the doctorate

The financial situation during the doctorate should be carefully considered before signing an employment contract or a scholarship. Even if the salary may initially seem high compared to being a student, the decision should still be carefully considered. Here are some important considerations:

General information:

Gross does not equal net

- Contributions for health insurance, pension insurance and taxes are deducted from the gross amount in the employment contract.
- Use gross-net calculators on the Internet to get a better idea of how much net is left over from the gross amount.

Rent and cost of living at the doctoral location

- Can you finance your desired lifestyle with your net salary?
- In expensive cities like Munich, Stuttgart or Hamburg, it is often difficult to find affordable housing. How far would you commute if necessary?

Salaries in industry vs. university

- Salaries in industry are often higher for regular jobs (not necessarily for an industrial doctorate) than at university.
- Consider whether you are prepared to accept a lower income during your doctorate.
- Ask yourself whether a doctorate is necessary for your future position and whether it will pay off financially.

Various financing options at universities

There are various funding options for a doctorate at universities. However, the obligations associated with this differ:

Employment at the university:

- Financed via the basic funding of the chair or project funding.
- Check what percentage you are employed for (often 50% or 60% contracts in chemistry).
- These part-time contracts reduce the salary despite a high pay scale group (TV-L, E13, level 1 at the beginning).

Questions you should clarify:

- How many hours of your working time are paid?
- What contracts do your colleagues have?
 - Do they earn more or less for the same work?
- What obligations are stipulated (e.g. teaching obligations, administrative tasks)?
- How long does the contract run for? Are you expected to complete your doctorate during this time?
- Will you be paid during the dissertation writing phase?

Doctoral scholarship

Another funding option is a doctoral scholarship. Scholarships have both advantages and disadvantages, which should be carefully weighed up:

Advantages of a scholarship:

- More independence in the choice of research topic.
- Additional funds for travel expenses to conferences or small purchases (depending on the scholarship)
- No group money required for conferences, as you can finance yourself.
- Possibly no teaching obligation, depending on the university and the working group
- Writing the proposal forces you to develop a clear plan for the PhD.
- A scholarship can be helpful in an academic career (scholarships increase the chance of further funding).

Disadvantages of a scholarship:

- Writing a scholarship application is time-consuming and often needs to be completed before you start your doctorate.
- The assessment can take months, during which you may not be paid.
- The monthly installments vary greatly and are often lower than for employment.
- Insurance (health, pension and unemployment insurance) must usually be paid by yourself.
- If you do not make any payments, you will not be entitled to unemployment benefit after your scholarship ends.
- Scholarships have a limited duration and often cannot be extended.

Before deciding on a doctoral position or scholarship, you should carefully consider all aspects of your funding. Whether it is employment or a scholarship, plan ahead so that you are financially secure during your doctorate. In some cases, it is possible to take on a job at the university for around 5 hours a week alongside the scholarship. This can mitigate the financial disadvantages of a scholarship alone.

Working group leadership and election of the working group

Choosing the right working group (German: *Arbeitsgruppe*, AG or *Arbeitskreis*, AK) and supervisor (PI - Principal Investigator) is crucial for the success of your doctorate. There are many factors that influence whether you are in good hands in a working group and whether the collaboration is effective. Here are some important points to consider when choosing a PI:

Selection of the PI

External employees: If a working group has many external or short-term employees, this could be an indication of a poor reputation at the home university. Find out whether former doctoral candidates are still in contact with the research group and the PI after graduation. Alumni networks can also provide a good insight into how the collaboration was during the doctorate.

Opinion of people on site: Ask current doctoral candidates or members of the student council for their opinion on the working group and the PI. The JCF (JungesChemieForum) can also give you important information. Be careful here: Some PIs present themselves as friendly and supportive, but the reality of day-to-day work can be different. Honest feedback from people who work or have worked there is valuable.

Team-building events: Does the PI organize regular team events such as Christmas parties, barbecues or team-building days? Such events often contribute to the atmosphere in the working group and are a sign that value is also placed on interpersonal relationships.

Career status of the PI: Find out about the current career status of your PI. For example, are they about to move to another university or retire? Such changes could mean that you may have to change working groups during your doctorate or face uncertainties regarding supervision and financial resources. Also clarify whether an extension of your doctoral period would be possible under such circumstances.

Support with other interests: Check whether your PI will support you in pursuing your other interests. For example, can you attend JCF conferences or other subject-specific events and count these as working time, or would you have to take leave to do so? Such aspects can be decisive for how flexibly you can organize your doctorate.

Selection of the working group

Sympathy and interest: You should not only be interested in the research topic, but also enjoy working with the people in the WG. Take the time to talk to the WG members on site. It is often only through direct exchange that it becomes clear how well you fit into the group. Regional JCF meetings are also a good opportunity to meet other doctoral candidates from the working group and to get first-hand information.

Reputation of the university vs. reputation of the working group: A good reputation of the university or department does not automatically mean that the working group also has a good reputation. Cooperation within the group must work, otherwise the doctoral process can

become very laborious. Therefore, find out specifically about the working group and not just about the university.

Size of the working group: The size of the working group can bring both advantages and challenges. Larger groups often offer more resources and diverse opportunities for cooperation, but it can be more difficult to build a close relationship with all members. Consider whether you would prefer to work in a small, intimate group or a larger, more diverse environment, and find out how the group structure is organized.

Support and working atmosphere

Availability of the supervisor: How often is the PI or supervisor (whether professor, PI, postdoc or academic advisor) available? How often do group meetings, discussions or seminars take place? Here you should make sure that there is a good balance between support and independence.

Micromanagement vs. freedom: Some PIs tend to micromanage their doctoral candidates, which can restrict the freedom of research. Think about how much freedom you need for your work and whether the working atmosphere in the working group gives you enough room for this.

Expertise of the supervisor: Does the supervisor have enough experience in the field in which you want to do research? A postdoc who has a lot of synthesis experience, for example, could be useful for a doctorate in this field, while someone with only spectral expertise could be less helpful here.

Equipment and resources

Laboratory and equipment: Is the necessary equipment available that you need for your work? If not, how easy is it to obtain them and what delivery and commissioning times can you expect? Who is responsible for maintaining the equipment and are there any long waiting times to get access to the machines?

Career opportunities after the doctorate

Career paths of alumni: What jobs did former doctoral students of the AG take? Did they end up in industry or academia? The AG website and platforms such as LinkedIn can provide helpful information here.

Promotion of inclinations: Are PhD students supported according to their interests? Do they have the opportunity to take part in conferences or attend special seminars? To what extent does the university or working group support doctoral students' special needs?

For a career in academia

Publications and network: If you are aiming for an academic career, the publications of the research group are an important indicator. Analyze how many and in which high-ranking journals the group publishes. Are research prizes won? Regular conference participation not only promotes the visibility of your work, but also your personal network - clarify how often doctoral students in the working group can take advantage of such opportunities.

Integrity of publications: Make sure that the working group does not distinguish itself through unethical behavior, such as participation in citation rings or excessive self-citations. While such practices may give the impression of high visibility in the short term, they are detrimental to your scientific reputation in the long term and can have a negative impact on your career.

Industry collaborations: For those looking to go into industry, it is important to know if the AG has industry connections. These collaborations can make it easier to join a company. Pay attention to how often stays abroad or conferences are supported during the doctorate, as this is often important for industrial networks.

Relocation and care issues

Relocation of the working group: In some cases, a working group moves or changes location. Such a move can take a lot of time, which delays the progress of your work. If the working group is spread across several locations, it is important to know how often the person in charge is present and how well communication works.

Success rate of the group

Completion rate: Do the members of the working group successfully complete their doctorate? How high is the drop-out rate, especially at the beginning of the doctorate? A high drop-out rate can be an indication of structural problems within the group.

By conducting careful research and obtaining feedback from the network, you can make an informed decision and find a research group that suits you both professionally and personally.

Where can I find advertised doctoral positions?

There are various places where you can search for advertised doctoral positions:

1. University websites: Many universities have special job boards where doctoral positions are also advertised. Check the websites of the universities you are interested in regularly.

2. Professional associations: Platforms such as the GDCh (German Chemical Society) offer job markets specifically for the field of chemistry. You will often find academic vacancies here:

- [GDCh Stellenmarkt](#)

3. LinkedIn and Xing: These professional networks offer many filter options for jobs in science and industry. Xing is more focused on German-speaking countries, while LinkedIn is more international.

- [LinkedIn](#)
- [Xing](#)

4. Social Media: Many researchers and working groups use “Science Twitter” or similar platforms to share current publications and job vacancies. You can also find scientific groups advertising vacancies on Instagram or other social media channels.

5. Job portals: Platforms such as Stepstone offer vacancies in both industry and science. It is also worth checking here regularly, especially if you are looking for industrial doctorates.

6. Conferences: Scientific conferences are a great opportunity to make contacts and find open positions directly. PhD opportunities are often advertised at such events and you can talk directly to researchers.

Application deadlines and lead times

Doctoral positions have different application deadlines, depending on the advertisement and the university. As a rule, you should apply early:

- **Deadlines:** Deadlines can vary greatly. Some calls for applications run for several months, while others are only open for a few weeks. Therefore, inform yourself early and keep an eye on relevant pages.

- **Lead time for applications:** As the application process can often take 6 to 8 weeks (after the selection process), you should apply while you are still working on your Master's thesis. This way you can ensure that you have a job after graduation and the transition is seamless.

- **Take time out:** Taking targeted time off after your Master's thesis can help you recharge your batteries and start your doctorate with a clear focus. This recovery not only boosts motivation but also promotes a better balance during the doctoral period.

Typical academic application procedure

- **Application:** Submit the requested documents, which usually include a CV, a letter of motivation and your certificates. A letter of recommendation is often also required, which you must request from your Master's supervisor or other academic contacts.
- **Preparation for the interview:** If you are invited, prepare a short presentation on your Master's thesis. You can also include relevant experience from your Bachelor's thesis or internships.
- **Timetable:** You should submit applications well in advance. Even if the position is awarded at short notice, there may be delays due to the selection process. A clear plan of when you are ready and available will help you and the potential supervisor.

In retrospect:

You can attend conferences during your Master's thesis to familiarize yourself with researchers and their work. Travel grants for conferences are often awarded if you submit a poster. This allows you to get to know interesting research groups and find out more about open doctoral positions.

Promotion in the industry

Industrial doctorates are usually carried out in cooperation with companies and universities. The positions are often advertised on company websites and on platforms such as LinkedIn.

Unsolicited applications and scholarships

Another option is to submit an unsolicited application to a professor, especially if you would like to propose your own research topic. Scholarship support is often helpful here. Your future supervisor will then help you to formulate your research proposal.

Tips for your application: Academic CV vs. industry CV

- **Academic CV:** Publications, conferences and research experience are important here. You should clearly emphasize your academic achievements and research experience.
- **Industry CV:** In an industry CV, the focus is more on practical skills and results. Mention relevant practical experience and projects that are of interest to the potential employer.

Who can help?

- **Young Chemist Network (JCF Network):** Here you can get help with questions about doctorates, applications and networking with other doctoral students.
- **University-specific offers:** Many universities offer special career planning advice.

Mental health during the promotion

It is important to know that you are not alone during your doctorate. The doctoral process can be challenging and it is completely normal to experience uncertainty in between. Networks such as the JCF, your supervisor or mentors at the university can help you deal with the ups and downs. **Remember: You are not your doctorate!**

Change of research group within the doctorate

If you want to change research groups during your PhD, even within the same university, it's important to take the right steps:

- **Be proactive:** Talk early with your supervisor if you're dissatisfied with certain aspects of your current group or if you're pursuing other research interests. An open conversation can help clarify misunderstandings and find solutions.
- **Align research interests:** Check if the new group better matches your scientific interests. If so, you can highlight your strengths and interest in the specific projects of the group.
- **Use your network:** Networking is also important within your own university. Attend relevant seminars, conferences, and connect with other researchers. This way, you can discover which groups offer interesting projects and may have available positions.

Resources

https://issuu.com/zeitmagazine/docs/zcr_promotion_1-21

The free ZEIT CAMPUS Guide PhD 1/21 – updated with a Corona update; The ZEIT CAMPUS Guide PhD is aimed at both students considering a PhD and those already pursuing one. The 164-page guide provides information on the proper planning and execution of a doctoral thesis, topic selection, dealing with writer's block, funding issues, or difficulties with the supervisor. Service texts are complemented by specialized dossiers, personal testimonials, as well as photos and illustrations. Exclusively in our updated edition, there are helpful tips addressing the major challenges the target audience faces during the Corona pandemic.

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Illustration: Thomas Langner

<https://bts-sciecon.de/scieguide>

ScieGuide - Research group database; Find the lab that sparks your curiosity.

<https://www.chemie.nat.fau.de/studium/promotion/haeufig-gestellte-fragen/>

Friedrich-Alexander University, Faculty of Natural Sciences FAQ (from A to S)

<https://www.academics.de/themen/promovieren>

The Guide for the PhD (Only in German)

Artikelinhalt

Promovieren: ja oder nein?

Gehalt, Finanzierung, Stipendium

Die Dissertation

Ablauf und Dauer der Promotion

Bewerbung Promotion

Arten der Promotion

PhD und Dokortitel

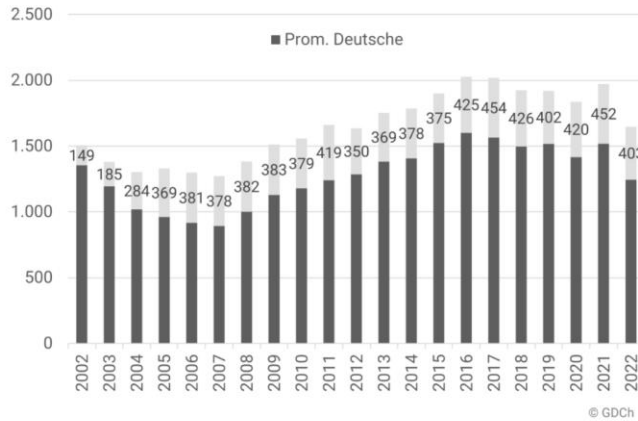
Promotion nach Fachbereichen

Nichts mehr verpassen?

Statistics of the GDCh

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Statistik Promotionen Chemie*



2022: 1.648 Promotionen, inkl. Biochemie 1.826

Finanzierung bis zum
Abschluss gesichert?

Chemie
8,1 Semester**

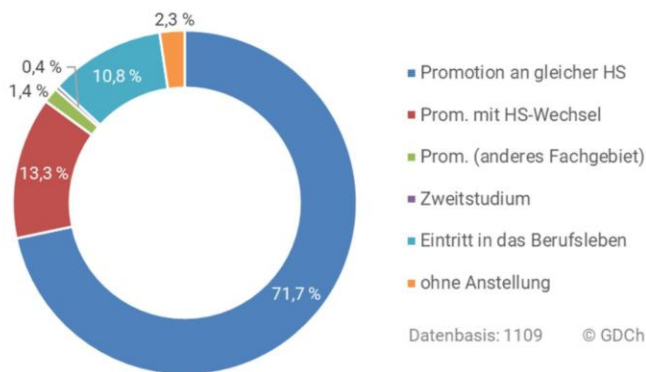
Biochemie
9,3 Semester**

**durchschnittlicher Median

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* ohne Studiengänge Biochemie, Lebensmittelchemie, Lehramt Chemie
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Statistik Verbleib der Masterabsolvent:innen Chemie*



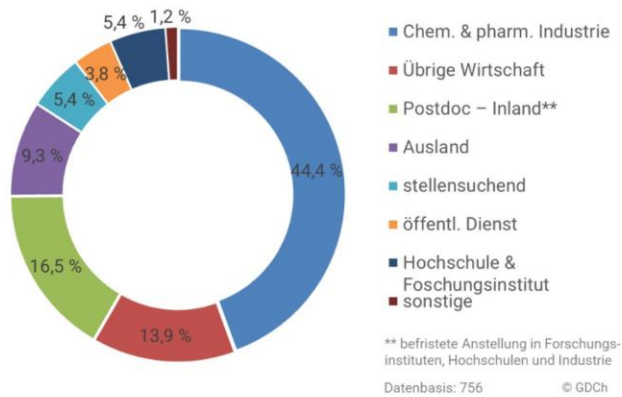
Berufseinstieg als Master?
Ja, aber...

Berufseinstieg als Bachelor?
Ja, aber...

* ohne Studiengänge Biochemie, Lebensmittelchemie, Lehramt Chemie

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Statistik Erster Berufsschritt promovierter Absolvent:innen*



* ohne Studiengänge Biochemie, Lebensmittelchemie, Lehramt Chemie

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