

RSC 5: IAMT PostDoc Expectations and Process

The aim of this document is to explain the expectations of PostDoc periods at IAMT and to reflect on those goals intended to i) enable effective progression into research independence, ii) establish of an own research group and iii) a successful academic career. This is a distinct level up from PhD training. Please consult the 'RSC 4 PhD Expectations' document as a foundation and starting point of the postdoc phase that contains relevant information that is not repeated in this document.

PostDoc @ IAMT – What is offered?

IAMT is a great environment for PhDs and the same is true for PostDocs in that there are top facilities and an approach of enabling a career. For the ambitious PostDoc, this is a superb jumping board for a productive research period, to prepare funding applications and qualify for an independent career in research and/or academia. By nature, the postdoc period is limited and continuous employment is not a model IAMT supports.

PostDoc @ IAMT – Application process

Selection of PostDocs is an ongoing process at IAMT with employment possible throughout the year. There are three main employment routes;

- i) **Guest scientists:** international researchers used to be able to come to IAMT for a period of 1-2 years. This scheme was great for international postdocs but has been discontinued at KIT end of 2023, while schemes such as the Humboldt or various country specific fellowships (e.g. Office of the China Postdoctoral Council (OCPC)) are available. This requires a research proposal – as any other application for IAMT. Little guidance is provided in the research proposal as this is a selection process and 'RSC 2 How to write a PhD proposal' contains the key requirements and a round of general feedback will support revision.
- ii) **Research fellows who apply for their own funding with IAMT as the host:** Any fellowship or sabbatical visit requires a research proposal and both candidate and proposed research need to match the IAMT research priorities (hosting even a self-funded researcher requires resources and IAMT research is expensive). If the topic and quality are appropriate then an interview is scheduled (typically Teams/Zoom/Skype). If this is positive then support for a fellowship application is offered (guidance and host letter). Postdocs who would like to stay longer at IAMT will be required to apply for research funding through various research grants.
- iii) **Employment contract as a postdoctoral researcher:** this is typically linked to a specific project while a proposal will still be required to evaluate the postdoctoral skills and the personal goals of the candidate. According to the 'RSC 4 PhD Expectations' research independence is required with an ability to plan, carry out and publish research independently, while a postdoc is required to be able to manage research (including budget and administrative reporting which involves liaising with funding agencies, industry partners and administration) and supervise. Even more so than a PhD candidate this requires independence, organization skills, getting things done no matter what (including getting others to deliver when they don't always reply to a request) and may require driving so a drivers license is necessary.

PostDoc @ IAMT – Publication requirements

Publication is instrumental in career progression, which builds on strong experimental research and an ability to write effectively. Contrary to a PhD candidate who is expected to produce a minimum of 4 quality journal publications over a period of four years, a PostDoc is expected to publish about 3 papers a year. This assumes that the publication capability has been established and the increased output is now achieved through student supervision which requires a new skill set in getting funding and attracting students.

PostDoc @ IAMT – Supervision!?

A PostDoc is expected to work more independently and after an initial period of learning the ropes of IAMT will very actively supervise her/himself a growing team. This will normally start with master students and at some point, include the contribution to PhD supervision. The 'supervisor' is now much more a colleague and collaborator who offers guidance but with much more focus on enabling the career than teaching basic skills.



A good postdoc gets involved in many opportunities, is delegated a lot of responsibility and contributes significantly to shaping the projects at IAMT. This also means giving a lot of feedback to students and no longer just being friend and peer but becoming 'boss' and this takes a bit of getting used to. Demands on time get rapidly more and soon the ability to prioritize and manage the many opportunities and responsibilities will determine success.

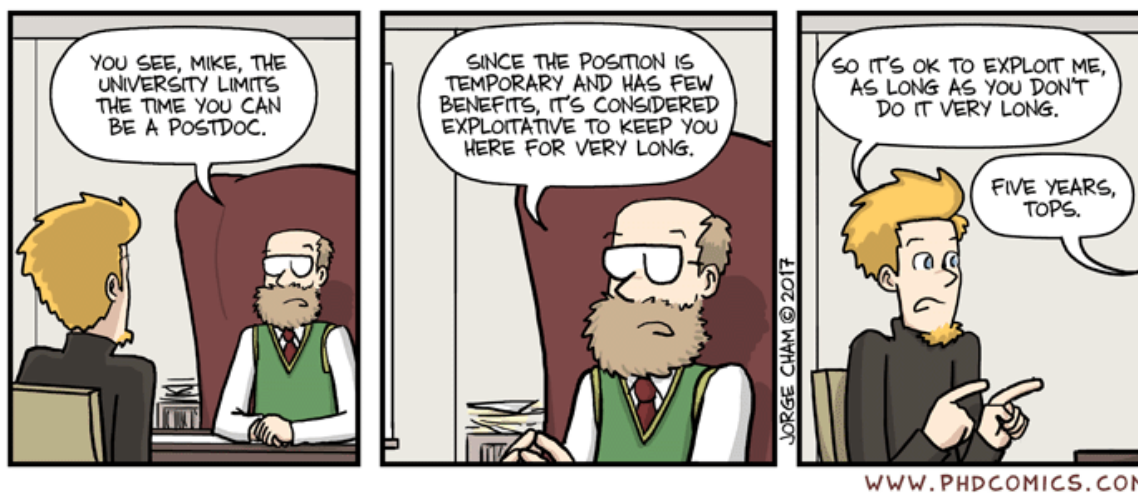


What is a good PostDoc period?

A postdoc is normally a fixed-term contract that is – like the PhD – a qualifying step for an academic (or research) career. Many fellowship applications have a time constraint on them such as being to apply up to a certain number of years from PhD. As such the choice of a postdoc period should be strategic in that it adds a certain skill or experience to a CV. Working with a famous professor (hopefully) adds another supporter to the career path and a postdoc period should of course be a very productive phase with a clear step change in output. Seeing a different research environment and a different country can be very enriching and the typically challenging adaptation opens the mind tremendously. Neither too short nor too long is helpful. Too short (a 6-12 month period) will rarely result in very productive research. Getting used to a new lab (and country), attracting students to supervise, acquiring new skills, learning or even setting up new methods, all require time and this is long before a publication will result. A healthy postdoctoral period is probably 2-5

years – similar to a typical research project. With 3 publications a year this quickly exceeds the research done in a PhD and the career is taking off rapidly!

A postdoc phase is a qualifying period and the career progression expectations are country-dependent. In the US the postdoc period is typically short (or even absent) and PhDs apply immediately for Assistant Professorships followed by the 6-year tenure process. In Germany with junior professorships being a rather new career option, prestigious fellowships are sought after from more research-focused institutions, while the process can be extended through a process of ‘habilitation’. Positions are comparatively sparse and in either case international mobility is a great idea. Sitting comfortably for many years hoping to become permanent is not a wise career choice and the German restriction of 12 years should not be exploited to its limits if a professorship is the aspiration. It is natural and healthy that a university trains researchers to highly qualified skills and that these trained researchers move on to pursue their own careers elsewhere. While this is of course a loss to the host, moving on and up is brilliant news for all involved!



The departure can be tricky and it is wise to prepare by talking about expectations openly. The proposal that was applied for jointly, who owns this, can this be taken when leaving or is it fair to share resources and work collaboratively for an interim period? There is no one solution fits all, but discussing this openly and finding a workable solution will avoid straining relationships and this should – and normally can - be avoided. Good bosses take pride in their researchers to be successful, help with placing them in good positions and become great collaborators. Honoring their contributions in career success is in most cases warranted and following careers – and being there when help may be needed - one of the most satisfying aspects of being an academic. Training and working with researchers who have better skills than oneself can be challenging for some to tolerate, but is the greatest compliment to one’s skills. It is great when postdocs have the courage to disagree and dare to engage in good scientific discussions, in a complex field no one can master everything and everyone is a lifelong learner!

PostDoc Performance Criteria

Some, but still very few recruiters will quantify expectations in terms of performance. This is often argued to be field-dependent and one Nature paper is worth so much more than any number of ordinary papers. True, yet Nature papers are reasonably scarce in experimental engineering research. As limited as the H-factor may be, it is an indication of activity as is the journal impact factor for the quality of research publications. There is no replacement for looking at the contributions, diversity and novelty of the publications in more detail, when evaluating intellectual productivity and skill. Productivity related to opportunity is another factor often considered, although maximizing opportunity one should consider when choosing host institutions.

The numbers provided here are intended to help and will not replace a balanced performance over a range of criteria for academic positions including funding acquisition, ability to develop and set up methods, student supervision and teaching. Most important is of course a matching skill set that is compatible with the

needs of the recruiting department. It always helps to be clear about what one can bring and contribute. Tentatively one may suggest that 5 years from PhD a good candidate for a junior academic position may have 15 to 30 journal publications. Of those, there is a balanced mix of first-authored papers, papers written by supervised students (where the postdoc is the middle author), collaborative papers and some that were last authored (indicating a lead role and a degree of independence). 10 years from PhD one might expect 30 to 50 publications that should allow to compete for an associate or full professorship.

PostDoc @ IAMT – Evolution of expectations along a 5-year PostDoc phase

Year	Expectations	Comments
	<ul style="list-style-type: none"> ◆ Research Proposal with literature review, research questions and work plan ◆ Assess novelty, focus, feasibility and fit to IAMT 	This research proposal aims to i) assess candidate ability to conceptualize research (admission), ii) select a suitable (general) topic, iii) apply for fellowships
1	<ul style="list-style-type: none"> ◆ Refine PostDoc topic on the opportunities at IAMT at the time of arrival and make a plan for first 'CON' from planning through to submission ◆ Effective reporting, self-management, presentation and writing; participation in group and postdoc meetings and discussions; team integration ◆ Take on master students (in Germany these are 6-month projects) and small projects to enhance research volume ◆ Get involved in research proposals and actively seek research opportunities 	<p>The expectations of a new PostDoc at IAMT are very similar to a PhD candidate although a very fast adaptation in the first couple of months is expected</p> <p>Submit Humboldt Fellowship application in the first 6 months if coming from abroad</p> <p>While 3 papers in year 1 are often difficult to achieve, the plans should be in place for this to be possible and this may include finishing ongoing (or orphaned) projects.</p> <p>Writing a review article may be a good strategy while setting up new methods and learning new skills takes time</p> <p>Identify simple proposals (e.g. DFG international collaboration) and scholarships schemes to attract PhD candidates</p>
2	<ul style="list-style-type: none"> ◆ Submissions of publications ◆ Write research proposals (e.g. DFG, Fellowships, BMBF, EU); usually several per year ◆ Participate in conferences ◆ Set up collaborations (internal, national, international) 	<p>Conference participation requires first paper to be submitted and travel funding to be applied for</p> <p>Funding success is typically low so many proposals are required to i) practice and ii) succeed (a good success rate may be 20-25%)</p> <p>Network with research support and funding bodies and seek information about forthcoming funding calls</p>
3	<ul style="list-style-type: none"> ◆ Reflect on research strategy and career direction (academia, habilitation, industry, etc) ◆ Gain teaching experience and supervision skills (participating in formal training is a good idea) ◆ Take part in reviewing publications, committee work, selection committees ◆ First invited talks ◆ Run a workshop or a conference 	<p>Take an active role in career development, find role models, seek mentors, take part in training offers and leadership skills</p> <p>Design a new teaching course</p> <p>Embrace responsibility to prepare for an independent academic position</p> <p>Apply for positions and arrange a well-managed departure in a new role that, if possible, deals with the continuity of your responsibilities and allows a good start</p>
4	<ul style="list-style-type: none"> ◆ More of the same at ever-increasing productivity, responsibility and inevitably workload 	Balance the research output with life goals to ensure that scientific curiosity remains the driving force rather than status and power
5	<ul style="list-style-type: none"> ◆ More of the same at ever-increasing productivity, responsibility and inevitably workload 	Remember that you tend to get more productive the more you do, but if it is not fun then it just is not worth doing!