



Money makes our world go round – funding landscape for polar early-career scientists in Germany

Lena Nicola^{1,2}, Erik Loebel^{1,3}, and Alexandra M. Zuhr^{1,4}

¹German National Committee of the Association of Polar Early Career Scientists (APECS Germany), Germany

²Potsdam Institute for Climate Impact Research (PIK), Member of the Leibniz Association,
P.O. Box 60 12 03, 14412 Potsdam, Germany

³Institut für Planetare Geodäsie, Technische Universität Dresden, Dresden, Germany

⁴Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Research Unit Potsdam,
Telegrafenberg A45, 14473 Potsdam, Germany

Correspondence: Lena Nicola (lena.nicola@pik-potsdam.de)

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Abstract. A lot of things in life need money and so does polar science: money is needed to participate in conferences, undertake fieldwork campaigns or pay for salaries, such as in PhD projects or permanent research positions. To give an overview on the general funding landscape for polar early-career scientists in Germany, APECS Germany (the German National Committee of the Association of Polar Early Career Scientists, APECS) has started to host a list of grant, fellowship and other funding opportunities at <https://apecs-germany.de/funding/> (last access: 15 October 2022). This is visualized in Fig. 1. Once a suitable funding scheme has been found, grant writing requires good preparation, a well-structured and written proposal, and several back-up plans.

1 The never-ending quest for funding

Taking into consideration the general costs of studying, which can include enormous amounts of tuition fees in some countries, becoming a polar scientist requires funding early on. Up-and-coming early-career scientists (ECSs) eventually see themselves in the situation in which they have to write grant applications or research proposals to acquire data or further their careers. In the beginning, they have to identify suitable funding options in a wide sea of opportunities (i.e., look for an appropriate scheme that could cover (parts of) the desired project). For example, funding is needed for the own research position or those of a group member, for high-

performance computing resources, lab facilities or field campaigns (see Fig. 2).

The need for funding usually starts at the university level, when organizing stays abroad and/or field training. Especially in polar science, field campaigns are often at remote locations and very expensive. One single day of operating RV *Polarstern*, the German research icebreaker of the Alfred Wegener Institute, costs Germany about USD 100 000 to 200 000 (Schiermeier, 2008; Kaiser, 2021). As a scientist there is the possibility to apply for ship time, but especially for smaller graduate projects, you are often left on your own when it comes to the organization and financing of your fieldwork. Here, as well, costs can climb into the thousands of euros. For example, master students wanting to undertake fieldwork in the Norwegian Arctic most often need to apply for funds of up to EUR 10 000 for their final thesis; see, for example, The Research Council of Norway (2022). It is, more often than not, impossible to pay for this out of your own pocket. In addition, expensive equipment is often needed due to the remoteness of many polar field sites. This can pose challenges for undergraduate and graduate students who are not supported by a (professional) institute.

Furthermore, as graduate students, the cost of traveling to and participating in conferences can discourage early-career scientists from having networking and training opportunities, creating disparities in the career advancement between polar ECSs (Bradley et al., 2020). Some conferences and workshops support ECSs with travel grants, but these often do not cover the entire participation and/or travel.

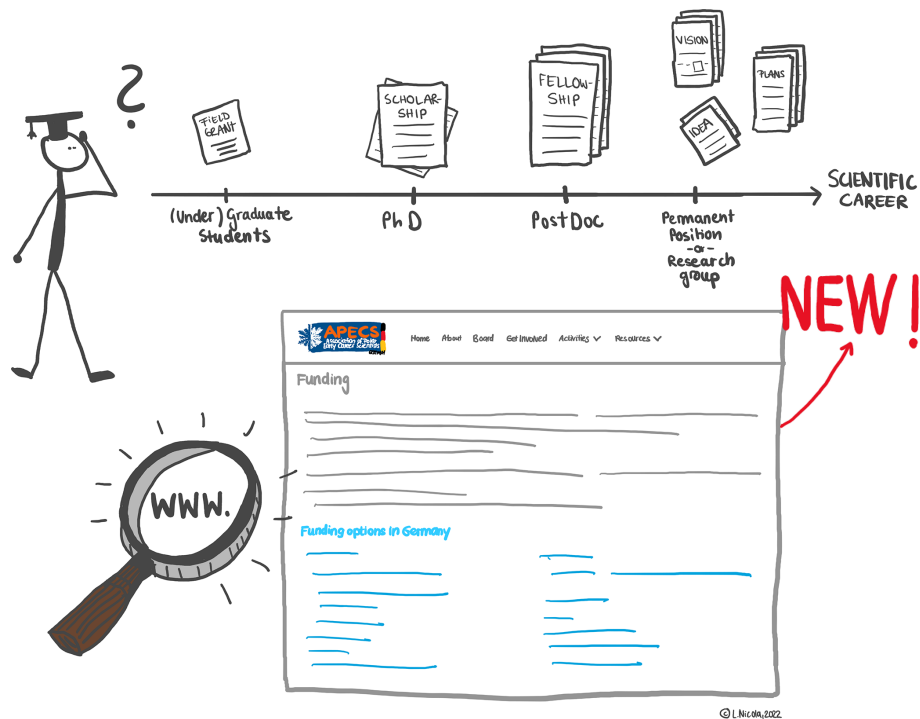


Figure 1. This figure schematically illustrates the stages from undergraduate student to professor, with the different challenges of finding suitable project partners and funding. Funding opportunities for different career stages are listed on <https://apecs-germany.de/funding/> (last access: 15 October 2022). The home page focuses on early-career scientists based in Germany and lists a variety of opportunities, especially for polar-interested fellows. Sketch by Lena Nicola.

After graduation, the search for an interesting PhD project begins. At some institutions and in some countries, funding for PhD projects, due to limited positions, requires applying for PhD/doctoral scholarships offered by external (science) foundations. This generally requires intense preparation, including composing a grant proposal which lays out the PhD project. The step of writing your own PhD proposal can be good training at an early stage of an academic career, but it also requires (unpaid) time, which can pose a challenge for ECSs. Even when having acquired initial funds for their projects, PhD performance or success can be linked to funding availability (Wright and Cochrane, 2000; Wao, 2010; Horta et al., 2018). What constitutes PhD success is however highly subjective, and that in itself can be a barrier to many early-career scientists. For example, paper publications are viewed as a form of success more or less dependent on the country.

When having a PhD position paid for by household or project money, the question of writing grant proposals may surface with the search for a post-doctoral position. Post-doctoral fellowships are one way to secure funding, but in general, most of the available post-doctoral positions are only limited to a few years. Studies have shown that short-term contracts limit the general output of ECSs and negatively affect mental well-being (Brasier et al., 2020) as does the gen-

eral pressure to win funding in a very competitive landscape (Forrester, 2021).

Job insecurity, which is strongly linked to funding availability, is generally seen as a top barrier in academia in general – but also specifically in polar research (Figuerola et al., 2021). What is more, the lack of funding and opportunities to conduct research or to undertake fieldwork in remote places, as for instance Antarctica, has been, and still is, a key barrier for women in polar science as reported by Nash et al. (2019).

Funding is needed at almost every step of a career in (polar) science. Knowing where to search for funding is therefore key to an ECS.

2 Navigating the funding landscape

When searching for funding, ECSs, and especially undergraduate and graduate students, might quickly get lost in the overwhelming abyss of the World Wide Web. Inspired by two workshops attended by APECS Germany board members in 2022, APECS Germany collected the necessary information and has started to host a list of grant, fellowship and other funding opportunities at <https://apecs-germany.de/funding/> (last access: 15 October 2022).

This list is seen in addition to already existing databases, such as a funding database on the home page of APECS International (APECS International, 2022) or that of the Ger-

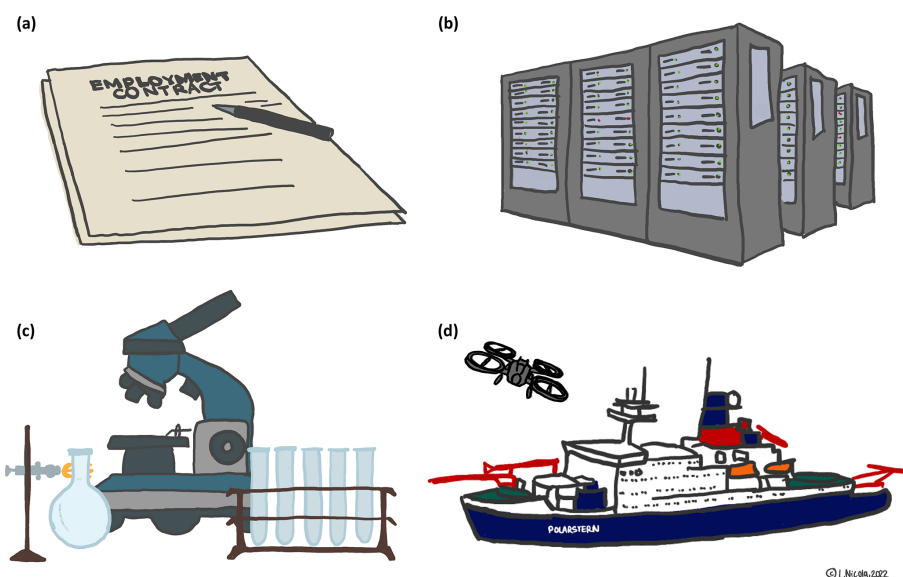


Figure 2. Example illustration of what grants or fellowships are needed in polar science: funding for (a) own position or research group members, (b) high-performance computing resources, and (c) lab facilities or (d) field campaigns. Sketches by Lena Nicola.

man Academic Exchange Service (DAAD) with more than 170 entries to search through (DAAD, 2022). The information on the APECS Germany website complements an overview of fieldwork opportunities on the site, which in turn originated from a seminar held in March 2021 on the occasion of the International Polar Week (Loebel et al., 2022).

With the new overview on funding options, APECS Germany wants to facilitate the search for funding within Germany and internationally. It is seen as a constantly growing list that is by no means intended to be exhaustive. We also acknowledge a bias in the list as we do not cover all regions of the world and focus on those regions the APECS Germany board members have experiences with themselves or have heard from colleagues and friends who received funding (i.e., Germany and within Europe).

Fellowships from the Scientific Committee on Antarctic Research (SCAR) are one example of the mentioned list. This scholarship offers financial support to undertake research in a SCAR member country to develop links and partnerships within the Antarctic community. For this specific fellowship, APECS Germany co-organized a webinar to help future applicants by giving information on and advice to the application process.

When having identified a suitable funding source, the grant writing process begins, which can highly profit from tips or “best practices” provided by former applicants or through webinars, graduate school courses or the like.

3 Best practices

In general, there are a few things to keep in mind for a successful grant proposal and overall application (for this, see

also Sohn, 2020). Invited panelists from the workshop “How to find funding” at the European Geosciences Union (EGU) General Assembly 2022 (EGU, 2022) agreed that a key to success is a timely and good preparation for receiving funding. A further fundamental factor is the proposed project idea itself. Keeping track of grant ideas and potential collaborations with other scientists will help to find creativity when the pressure for writing/funding increases. Besides the well-known large grants, it can also be useful to use multiple small grants to cover costs for, for example, field campaigns during the master level or measurements of samples during a (post-)doctoral fellowship. However, applying for multiple smaller grants could significantly increase the time which is spent writing proposals.

When writing, it is helpful to ask colleagues for successful applications to the same grant or funding agency. Additionally, larger grants or fellowship organizations often provide online tutorials and/or workshops that give insights on the application process. These provide valuable advice for writing the proposal, often including details on what is specifically asked by the application scheme. It is essential to pay attention to these and to cover all important requests in the proposal. According to the EGU workshop panelists, mentioning the risks involved in a project is important while highlighting how to (potentially) handle them effectively.

Even within the proposal text, some details may be important to take care of: emphasizing important phrases in bold or using boxes to highlight specific definitions or concepts can be useful to focus the readers’ attention to the main ideas.

Furthermore, one panelist concludes that it is best to not take it personally when proposals get rejected. Prestigious and highly competitive grants, for instance by the European

Research Council, have success rates of less than 10 % for new applicants (Crow, 2020). To overcome the frustration after a rejection, Crow (2020) recommends asking for constructive feedback and to take time to recover from setbacks.

In summary, the APECS Germany website offers a starting point to navigate the funding landscape for polar early-career scientists in Germany and can hopefully facilitate the necessary quest for funding within an academic career. Money “makes our [scientific] world go round”, but in the end, life is not only about money, but also about life itself. Knowing where to look and whom to ask could be one step towards making the funding process easier, especially for early-career scientists.

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