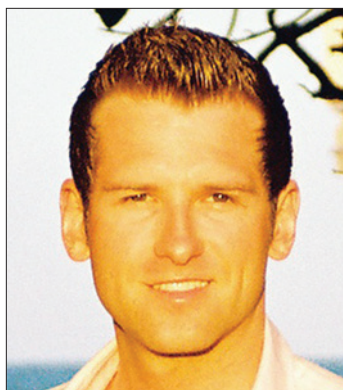


Germany: Experiencing a New Age of Research and Teaching

Besides the Oktoberfest, beer, and the Autobahn, what else does modern Germany have to offer to cell biologists who would like to join in from abroad? Since the establishment of the Nobel Prize in 1901, Germany has brought forward 102 Nobel laureates, of whom 85 received this prestigious award in Physiology or Medicine, Chemistry or Physics. Among them are such renowned scientists as Nüsslein-Vollhard, zur Hausen, Delbrück, Bosch, Hertz, Röntgen, and Einstein, to name but a few. Furthermore, Germany offers more than 100 state universities, of which 10 had been established before 1600, with the University of Heidelberg being the oldest (1386).



Dennis Zimmermann

History and Structure

Germany's academic system has evolved over the centuries by adapting its needs to the current scientific and economic circumstances, yielding universities with strong expertise. However, a common phenomenon for such long-standing and established institutions is that scientific competitiveness, flexibility, and innovativeness repeatedly fell by the wayside in the past. Luckily, major efforts have been undertaken in recent years to make the academic research landscape more attractive.

In general, Germany's research landscape is subdivided into universities, non-university research institutes, and industry; university research can be considered the backbone of German science. Universities represent the link connecting research, research-oriented training, and teaching—the three pillars of the German research system. It is worth mentioning that academic research in Germany is not only characterized by basic research, but also promotes application-based research and development.

Altogether, there are four publicly funded non-university research institutions that jointly promote basic and application-based research. While the Max Planck Society concentrates on

cutting-edge basic interdisciplinary research, the Fraunhofer Gesellschaft focuses on applied research and the translation of results into innovative products. The third essential component of German research is represented by the Hermann von Helmholtz Association of National Research Centres. It deals with complex scientific as well as technical issues. The fourth publicly funded research institution is the Leibniz Association, which is mostly dedicated to fields of applied research.

Research Funding

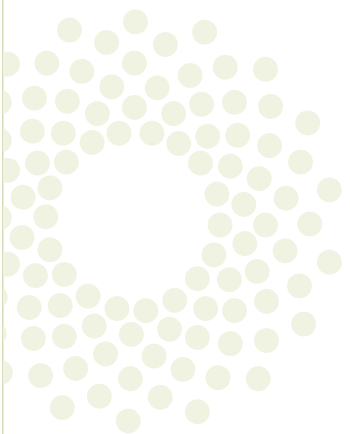
When pursuing a career in academic research, either as a postdoc, group leader, or professor, funding is an essential issue. Germany's

research relies on four big national funding agencies. Foremost, the Deutsche Forschungsgemeinschaft (DFG) is the central and self-governing research organization that promotes research at universities and other publicly financed institutions. One of the many funding programs of the DFG is called Sonderforschungsbereich (SFB). It represents an excellent funding source, not only for established labs but also for new research groups. Such SFBs are designed to fund labs located in one place for up to 12 years. An extended model of the SFB is the Transregio, for which collaborating labs from different universities and locations can apply for funding.

The second funding body, the Federal Ministry of Education and Research (BMBWF), supports innovative projects, including basic research and development. The Volkswagen Foundation represents the largest private-funding foundation and financially supports academic institutions. It has a long-standing reputation and was the essential financier during the first five years of the European Molecular Biology Organization (EMBO) back in the 1960s. Fourth, the Alexander von Humboldt Foundation, a nonprofit



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organization, promotes international research cooperation by providing foreign scholars a place to work for extended periods of time in Germany. As Tony Hyman stated in the October 2010 issue of the *ASCB Newsletter*, the diversity in funding agencies leads to a certain lack of transparency. On the other hand it is the diversity which gives rise to alternatives in funding.

Over the past years, an often-heard-of term in German academics was Excellence Initiative. The Excellence Initiative is funded by the DFG and was designed to strengthen Germany's global position in research and to promote the best-performing universities and research areas. Luckily in 2009 the DFG decided to extend the initiative until 2017, supporting Germany's academic research with an additional 2.7 billion euros (U.S.\$3.7 billion).

Modernization of Academic System

Until 10 years ago, for researchers pursuing an academic career, the Habilitation posed a major hurdle. The Habilitation is the official and highest ranked university examination in Germany; it was originally introduced in 1819 to examine the ability to work and teach independently. However, as the process of habilitating nowadays focuses primarily on the researcher's scientific performance (i.e., publication record), it does not serve its original purpose any longer. Therefore, the Habilitation has turned into an often unnecessary and rather time-consuming process that has prevented many Germans and, in particular, foreigners from pursuing an academic career beyond the postdoc stage in Germany. Thus they have been forced to search for alternatives abroad.

To stop this brain-drain (losing excellent scientists to foreign countries), and to provide an alternative track toward a professorship, in 2002 the Junior Professorship was introduced. This new position was supposed to foster an earlier independence of young researchers by lowering the age of promotion to a professorship and thereby increasing Germany's academic competitiveness. Unfortunately, it was a largely unsuccessful attempt to implant one aspect of the American into the otherwise unchanged German system. To become as attractive as the

Assistant Professorship in the U.S., the Junior Professor's opportunity to be offered a tenure-track position after six to seven years of service has to be leveraged far beyond the current 8%.

Doing Research in Germany

It should be noted that certain issues of the German academic research system still need to be improved—such as the low number of offered tenure positions, the Habilitation hurdle, the disparate funding sources, and, of course, the still quite hierarchical university system. On the other hand, Germany's central position in Europe makes it easy for scientists to establish and maintain international collaborations throughout Europe. For instance the European Research Council offers an assortment of funding sources and thereby adds

significantly to the numerous funding bodies of the individual countries. Germany hosts the big (and small) biotech companies, and thereby provides an extended platform of research collaborations, in particular, in the field of applied research.

Especially for young researchers, but also potential Junior Professors, the SFB and Transregio programs allow individuals to establish more than short-term research projects. Therefore, for future postdocs, it is advisable to screen for labs that are part of one of those programs. The Excellence Initiative added an important facet to Germany's academic attractiveness and promotes especially young researchers (from Germany and foreign countries). The Excellence Initiative fostered PhD graduate programs into Germany's university landscape. In addition to extra travel money, such graduate programs provide PhD students with an excellent platform for establishing connections throughout the scientific community. Therefore, for students who plan on doing their PhD in Germany, a good piece of advice would be to find a group and institute that are incorporated in such a program.

A grand plus of Germany's academic system is its insistence on the combination of teaching and research, as initially proposed by Humboldt. Teaching at German academic institutions takes a higher portion of time than at U.S.

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universities, so one should decide up front whether to apply for a position at a university or at one of the non-university research institutions.

The decision to leave one's home country can be accompanied by certain fears and worries. From several discussions that I have had with foreign scientists, who made the Big Move into German research, I can put your minds at ease. Although Germans are typically rather reserved toward newcomers, they will quickly become open-minded and friendly. Being willing to learn German will always make daily life easier; however, speaking German is hardly ever a requirement for a job in a research institute. For those who would like to improve their language skills, most universities offer language courses. Additionally, almost every university operates foreign affairs offices where students and employees from foreign countries can seek help concerning work permits, accommodation, fellowships, etc.

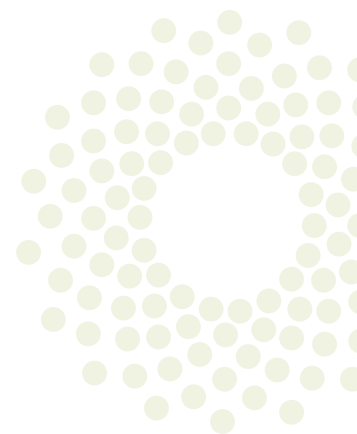
To those scientists who are pondering spending some time in Germany, I would like to bring up one last point. After a hard and strenuous day in the lab, you can watch the sun set in a Bavarian-style Beergarden. ■

—Dennis Zimmermann, Ludwig-Maximilians University, Germany

Useful Links

- German Academic Exchange Service (DAAD)
www.daad.de/deutschland/index.en.html
- Max Planck Society (MPG)
www.mpg.de
- Max Planck Institute of Molecular Cell Biology and Genetics
www.mpi-cbg.de
- Fraunhofer Gesellschaft
www.fraunhofer.de/institute-einrichtungen
- Helmholtz Association of National Research Centres
www.helmholtz.de/en/helmholtz_centres
- Leibniz Association
www.leibniz-association.eu

- German Research Foundation (DFG)
www.dfg.de/en/research_funding/index.jsp
- Federal Ministry of Education and Research (BMBF)
www.bmbf.de/en/1398.php
- Volkswagen Foundation
www.volkswagenstiftung.de/funding.html
- European Molecular Biology Organization (EMBO)
www.embo.org/programmes.html
- Alexander von Humboldt Foundation
www.humboldt-foundation.de/web/sponsorship.html
- German Society of Cell Biology (DGZ)
www.zellbiologie.de
- European Research Council (ERC)
<http://erc.europa.eu>



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