

# A NEWCOMER'S GUIDE TO THE GERMAN RESEARCH SCENE

*How to navigate the country's diverse academic landscape.*

BY HRISTIO BOYTCHEV

Raúl Rojas, an artificial-intelligence researcher at the Free University of Berlin, came to Germany from Mexico more than 35 years ago. "I wanted to study in Europe, and Germany seemed like an interesting place, especially Berlin," he says. "I came to do my PhD at the Free University but never planned to stay here." However, before even completing his doctorate, Rojas was hired by the GMD National Research Center for Information Technology to work on machine learning. "One contract led to another, and before you realize, you've built your career in another country."

A lot has changed since Rojas arrived in West Germany in 1982, a country that would exist only for another seven years until the fall of the Berlin Wall. "There were not many researchers from other countries [back then]; that has changed now," he says.

Germany offers a vast and varied research landscape, with more than 1,000 public and

publicly funded science and research institutions. Among them are more than 300 universities. In contrast to other countries — such as the United Kingdom with the University of Cambridge and University of Oxford, or the United States with its Ivy League schools — the best research isn't clustered in just one or two exceptional institutes. "There are good universities in all of the German states," Rojas says.

High-quality research takes place even in smaller, less well-known places. In the town of Jena in the east of Germany, for example, research on photonics and optics is clustered. Dresden is becoming a centre for biomedical research, and some of the oldest and most prestigious universities are situated in smaller cities such as Heidelberg, Würzburg, Freiburg and Göttingen.

"A weakness is maybe the fact that the amount of resources available for university projects is much higher in elite American universities," Rojas adds. "Only the Max Planck Institutes in Germany can compete with those."

The Max Planck Society is a network of institutes that focus on basic research. Although publicly funded, the society operates independently of the government. The institutes are a prominent example of the fact that in Germany, strong research is often conducted outside universities. Additional examples of this include the Helmholtz Association, which focuses on large-scale, infrastructure-intensive projects such as aeronautic development, and the Fraunhofer Society, which combines basic and applied research. Other important public institutions include the federal academies of sciences and humanities, academic societies (which in particular fund research in the humanities) and institutions that work directly for the government, such as the Robert Koch Institute in Berlin, which focuses on disease control and prevention.

In 2016, public and private investment in research and development (R&D) in Germany came to more than €92 billion (US\$105 billion) — or more than €1,000 per capita.



GERMANY IS THE WORLD'S  
**FOURTH-LARGEST** ECONOMY  
ON THE BASIS OF GROSS  
DOMESTIC PRODUCT (GDP).



EMIGRATION TO GERMANY BY  
EUROPEAN UNION (EU) CITIZENS  
SINCE 2011 HAS BOOSTED ITS GDP  
GROWTH BY ROUGHLY **€35 BILLION**.



ALMOST **ONE-IN-TEN**  
CHILDREN IN GERMANY  
GO TO A PRIVATE  
SCHOOL.



GERMANY HAS THE  
**THIRD-HIGHEST**  
GENDER PAY GAP  
IN THE EU.



GERMANY CAME  
**SECOND** IN THE  
2019 BLOOMBERG  
INNOVATION INDEX.



**94 MILLION HECTOLITRES** OF  
BEER WAS SOLD IN GERMANY  
IN 2018, AN INCREASE OF 0.5%  
FROM THE PREVIOUS YEAR.



BRITAIN IS  
GERMANY'S **FOURTH-  
BIGGEST** EXPORT  
MARKET.

Only the United States, China and Japan invested more. In terms of R&D spending relative to gross domestic product, Germany is seventh in the world.

The country's product-innovation sector generated a turnover of €719 billion in 2016, more than 12% of the most-cited scientific papers are produced in Germany and the nation ranks highly for innovation.

The German federal and state governments finance almost 30% of research. The government also provides direct, short- to medium-term funding for specific research projects and research conducted at federal research institutions, as well as for large-scale research projects in aviation, space, marine and nuclear research. Germany's main funding body is the German Research Organization (DFG), which is financed by the German states and the federal government but works as a self-governed body. In 2017, it had a funding budget of €3.2 billion.

The remaining two-thirds of German R&D funding comes from the private sector. A major proportion of this goes into the manufacturing industries — automotive manufacture alone receives nearly 35% of industry funding.

**FINDING A LAB TO CALL YOUR OWN**

The generous funding helps to ameliorate one of the traditional weaknesses of the German research system — its comparative lack of permanent positions.

“The German university system is very hierarchical”, Rojas says. “There are not many tenured academic positions; only professors have a position for life.” The small number

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Federal Ministry of Education and Research revealed that around 93% of non-professorial academic staff at German universities were on fixed-term contracts, and about half of those contracts were shorter than one year. Historically, tenure-track positions have not generally featured in the German university system. Although there have been initiatives to introduce more permanent positions over the past two decades, the proportion of such job openings still falls well short of that in other countries with more well-established tenure-track systems.

This is one of the reasons why computational biologist Uwe Ohler decided to temporarily leave Germany. In 2002, Ohler completed his PhD at the University of Erlangen-Nuremberg, but after that, the more interesting projects in his field — as well as the possibility of a tenure-track position — lured him to the United States. “There is a lack of young independent positions with long-term perspectives in Germany”, Ohler says.

of permanent senior positions means that late-career-stage scientists should be prepared to look for research opportunities in industry, he adds.

In 2017, research by the

Many faculties and institutes in Germany are still hierarchical in their organization, and junior principal investigator positions are on limited-term contracts. “In my experience, institutions may advertise positions that appear to offer scientists a tenure track, but the contractual fine print can reveal they are not equivalent to the secure positions available in the United States, for example.”

After 10 years in the United States, and from a tenured position, Ohler decided to come back to Germany as a professor at the Max Delbrück Center for Molecular Medicine in Berlin, a research institute of the Helmholtz Association. Senior positions in Germany have advantages, he says. In particular, he notes that his basic funding for staff is higher than in the United States, making it possible to have a larger group paid for by the institute without exclusively relying on finding further research grants.

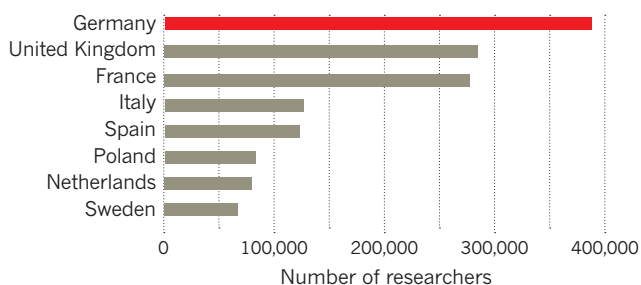
But although Ohler is German, it took him some time to adapt to the system after he returned to the country. “I made myself answer e-mails in English, so people would think I wasn't German and help explain the system to me,” he says. “Learning how it works takes some time for outsiders.”

In the end, however, Ohler thinks that communicating in German is crucial for those looking to stay in the country for the long term. “It's tough to get a university teaching position if you don't speak the language. So my advice is to get practising early on.” ■

*Hristio Boytchev is a journalist in Berlin.*

**RESEARCHER RANKINGS**

Germany has the highest number of researchers working in science and technology industries and academia in the European Union.



**THE GERMAN GOVERNMENT LOVES SCIENCE**

In 2016, researchers working across the natural sciences received more funding than those in other academic disciplines.



**GERMAN R&D UNDER THE MICROSCOPE**

A self-ranked assessment of how public and private research organizations in Germany are funded and their research priorities.

