

# WINNING OVER THE WORLD

*German research collaborations are spread across the globe.*

BY EVA WOLFANGEL

1

## UNITED STATES

Future technologies, such as electric vehicles, require high-performance, affordable batteries. But conventional lithium-ion batteries do not yet have the capacity. Lithium-air batteries could provide a solution. In 2015, researchers at Offenburg University of Applied Sciences in Germany received €40,000 (US\$45,000) from the Federal Ministry of Education and Research (BMBF) to work for two years with the Colorado School of Mines in Golden to better understand the chemical reactions in lithium-air batteries and bring the product closer to market.

2

## CANADA

Scientists from the Fraunhofer Institute for Cell Therapy and Immunology in Leipzig, Germany, and McMaster University in Hamilton, Ontario, are working together to develop manufacturing processes for cell therapeutics that can be used to treat severe diseases. They are also developing diagnostic systems that can be used in a hospital or doctor's surgery, without the need for a laboratory. Can\$25 million (US\$18.8 million) has been raised from various Canadian funding agencies, McMaster University, the governments of Ontario and Hamilton, and a number of industry partners over the past 5 years to fund the work.

3

## COSTA RICA

Costa Rica wants to achieve a net zero carbon footprint by 2021. Since the late 1980s, the Central American country has been reducing the extent of its deforestation and in February 2016, scientists from the National High Technology Center (CeNAT), among others, began working with the German Aerospace Center (DLR) to document land use and its condition. The teams analyse data generated by the European Earth observation programme Copernicus, an Earth surveillance system that provides information about protected areas in Costa Rica.

4

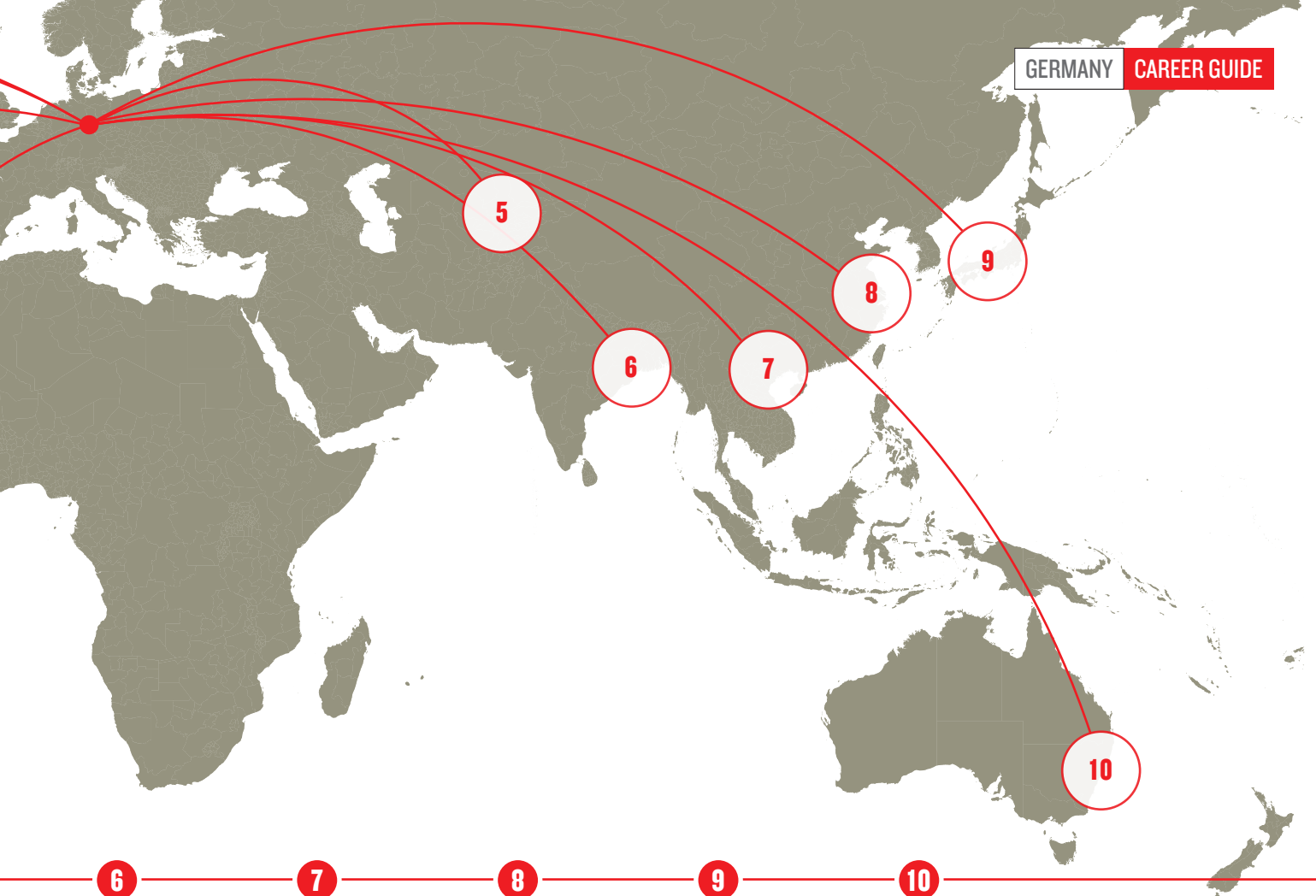
## SENEGAL

In 2012, the BMBF and Alexander von Humboldt Foundation, a German government body that encourages international scientific collaborations, began funding a programme to attract five talented scientists to build research groups at mathematical sciences centres in Senegal, Ghana, South Africa, Cameroon and Tanzania — and the sixth chair will soon be created in Rwanda. The BMBF has so far put €10 million towards the programme, which is designed to address local problems. For example, a centre in Senegal created an app for fishermen that uses game theory to simulate overfishing scenarios and define criteria for the long-term safeguarding of fish stocks.

5

## UZBEKISTAN

Outbreaks of leishmaniasis are a problem in Uzbekistan. The tropical disease, which is spread by the bite of infected sand flies, causes 20,000 to 30,000 deaths worldwide each year. Researchers from the Technical University of Applied Sciences Wildau in Germany have joined forces with scientists from the Isaev Institute of Medical Parasitology in Samarkand, Uzbekistan, and others, to research the origin and pattern of leishmaniasis infections. Researchers are keen to understand the relationship between the spread of the disease, which thrives in hotter climates, and the rise in global temperatures.



6

**INDIA**

India's cities suffer from chronic traffic problems and poor air quality. Researchers from the Technical University of Munich in Germany and the Indian Institute of Technology Kharagpur have been working together to investigate technologies, such as autonomous and electric vehicles, that could solve these problems. Based at the Indo-German Research Centre for Intelligent Transport Systems in Kharagpur, the project aims to draw on the expertise of the two countries: Germany is a pioneer in automotive technology and India has an enormous software sector.

7

**VIETNAM**

Researchers from Hanoi and Tübingen in Germany are working together to develop diagnostic systems that can identify infectious diseases quickly to enable rapid treatment, and thus reduce the spread of disease. In 2015, scientists from the University of Tübingen and the 108 Military Central Hospital and Military Medical University in Hanoi established a facility for biomedical research. The site will also act as a rapid response unit in the case of future disease epidemics. The BMBF is providing €542,000 to the collaboration over two years.

8

**CHINA**

The Clean Energy Research Initiative (CERI) is a research collaboration between Aachen University in Germany and Tsinghua University in Beijing. CERI explores challenges in the field of energy technology, such as how to develop highly efficient and low-emission power plants to ensure sustainable power generation. Researchers work together on projects, hold joint workshops, and encourage students and teachers to move between campuses to share ideas. The BMBF has provided a two-year grant of €136,000 towards the project until July 2019, with the prospect of an extension for another three years.

9

**JAPAN**

In 2017, scientists from Germany and Japan came together to launch a collaborative centre for neuroscience research in Kobe, Japan. The joint research project is focusing on improving the diagnosis of and therapies for neurodegenerative diseases, and the researchers are particularly interested in the role of inflammation in the development of conditions such as dementia.

10

**AUSTRALIA**

Since 2017, the Fraunhofer Institute for Chemical Technology in Pfinztal, Germany, and the University of New South Wales (UNSW) in Sydney, Australia, have been working together to research systems that can store large amounts of energy generated from renewable sources. They have established a joint international research centre for stationary energy storage at UNSW called CENELEST, and have a budget of €200,000 from the BMBF. ■

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