



McMurdo Station
Antarctic



A paradise in white and blue

Max Planck scientists cooperate with partners in around 120 countries all over the world. Here they write about their personal experiences and impressions.

Konrad Meister from the Max Planck Institute for Polymer Research in Mainz spent four months in the Antarctic conducting research in cooperation with the Universities of Oregon and Illinois (U.S.). He tells of long working days, explains the connection between his research and ice cream, and why the Antarctic is a place full of contradictions.

It was the moment when the first fish took the bait and I thought, “That can’t be true. All around you, there’s nothing but ice and snow. And you’re sitting there, fishing,” that I realized that now I really was in the Antarctic. The southernmost continent on Earth, and 16,796 kilometers away from Mainz.

I had undertaken an arduous journey to get here. From Frankfurt, the first stop was Christchurch in New Zealand. From there, I flew with an LC-130 U.S. Air Force plane to the Antarctic, to the McMurdo Station, an old navy base which at certain times of the year houses several hundred scientists, depending on the season.

I can best describe everyday life there as “eat, sleep, science.” Since it never gets dark, it’s by no means unusual to work from 8 in the morning until 11 at night. The daily routine is pretty much the same: load up the PistenBully, drive to the fishing spot, and drill a hole through the ice, which is several meters thick. Then the first task is to catch fish! Once my colleagues and I have caught enough fish, we drive back to the station. There, we take a small amount of blood from the fish and place them in special aquaria in order to prepare further tests.

The focus of my research is on why fish don’t freeze in the Antarctic. The American Arthur DeVries is considered a pioneer in this field. In the 1960s, he discovered that these fish have special proteins that act as a type of natural anti-freeze, which is why DeVries called them anti-freeze pro-



Dr. Konrad Meister, 36, studied biochemistry at the Ruhr-Universität Bochum and gained his doctorate in physical chemistry. Following a stint as a postdoc at the AMOLF research Institute in Amsterdam, supported by a Marie-Curie scholarship, he has been a Group Leader at the Max Planck Institute for Polymer Research in Mainz since summer 2018. In his work, he focuses on proteins with unusual properties.

teins. Since then, quite a lot has been learned about how they function. If a fish absorbs small ice crystals, anti-freeze proteins dock onto them and prevent the ice from further increasing in size. Here, I am particularly interested in the molecular mechanisms. How do these proteins bond with the ice crystals? Do they change their structure during the process?

For this reason, I moved to the Department for Molecular Spectroscopy at the Max Planck Institute for Molecular Research, which with its state of the art spectroscopy methods and outstanding ice laboratory offers ideal conditions for my research. Now the only thing that was missing were the proteins, and I am grateful that Director Mischa Bonn gave permission for me to go on this expedition for several months.

One important area of application for my research is cryopreservation, with the aim of freezing organs and other tissue. However, anti-freeze proteins are also used in the food industry, where they ensure, for example, that ice cream stays creamy. They are also of interest as a very powerful anti-freeze for a large number of industrial surfaces, such as the blades of large wind turbines.

The Antarctic is a place full of contradictions: the endless expanse of the ice often gave me a feeling of boundless freedom, while at the same time, you are a prisoner on this continent and are reliant on the base station. Although the Antarctic is one of the most remote regions in the world, you are constantly surrounded by people at the station. There isn't any such thing as your own private space.

Also, life in the Antarctic is very monotonous. For a start, there's the everyday fishing expeditions; then there's the constant brightness and the fact that you can hardly smell or hear anything. Also, I spent months on end living with the same people, who are also all approximately the same age. Under those conditions, you long to see someone different once in a while.

However, there are some routines that I never tired of. Who wouldn't love to see whales, seals or penguins right up close on a regular basis? And with time, I began to pick out increasingly subtle differences in the landscape, which at first sight seems to consist of nothing but ice and snow. For that reason, I will always remember the Antarctic as a special place: a paradise in white and blue.