

Talented junior researchers

"Jugend forscht" is Germany's foremost science competition for school-age students. Young people who excel in math, IT, the natural sciences and engineering can enter to test their ideas and experience what it means to explore new territory as researchers. Many of Bayer's research scientists took part in "Jugend forscht" in their youth as well.



The mathematics of cables: for their "Jugend forscht" project, Laura Mähler and Sebastian Kassing from Aldgrever High School in Soest turned their attention to the mathematics of the special "cablecam" cameras used in soccer stadiums. Their formulas can also be applied to solve much more abstract problems in mathematics. The two 18-year-old "Jugend forscht" participants won a prize in the national finals for their work.

Finding and promoting young talents: "Jugend forscht" is Germany's foremost youth competition, and its aim is to get young people excited about math, IT, the natural sciences and engineering. The competition encourages the creativity of committed junior researchers, giving them the freedom they need to develop their skills. Over 100 local and regional competitions are held every year across Germany. All young people from the fourth grade up to age 21 are eligible to participate. Those interested in getting involved can select their own interesting topic for a research project. The winners receive cash and material prizes, including exciting research trips to China, Aus-

tralia and the United States, or to Stockholm for the Nobel Prize award ceremony. To mark the company's 150th anniversary, Bayer hosted the 48th national finals for the fourth time. Its involvement closely reflects the company's philosophy: Bayer supports young people throughout their entire education with a variety of programs, because involvement in education – a segment that includes "Jugend forscht" – is an investment in the future. "Germany's most important youth competition produces the scientists of tomorrow. And that is a benefit to our society," says Dr. Marijn Dekkers, Chairman of the Board of Bayer AG.

Polymer expert with a global focus

The whole world is his playing field: Dr. Hermann Bach, Head of Industrial Marketing & Innovation Polyurethanes at Bayer MaterialScience, tracks down markets for innovations.

"Innovations are inventions that people really need and are also willing to pay for," Dr. Hermann Bach explains. For the Head of Industrial Marketing & Innovation Polyurethanes at Bayer MaterialScience, the term "innovation" is always associated with strategic and economic considerations. He is driven by one main question: "Where can we, as a company, offer solutions?" One area that most interests the 44-year-old doctor of chemistry at present is energy efficiency in building construction, and he has some immediate solutions: "Polyurethane can be used to build ultra-efficient building shells." Thermally insulated prefabricated components in particular can be installed quickly and cost-efficiently as soon as they reach the construction site. For this and other projects, Bach and his team are on the lookout for potential partners.

Even though his current job has little to do with laboratory research, Bach's career as a chemist had an almost classic beginning. In 1988, he made it to the finals of "Jugend forscht" together with a school friend. Using a donated spectrometer, the two analyzed the reaction process of chemical complexes. To be able to precisely process the volumes of data, they connected the machine to a computer. The circuits they needed were simply built by the budding scientists themselves. In the end, the two high school students won second place with their project. "The experience I gained back then helped me to choose a major in college," Bach says today, 25 years later.



The global market in view: chemist Dr. Hermann Bach dedicates his skills today to new marketing and innovation concepts, for instance in building construction. He sees this work as a critical link in the innovation process.

Bach has been employed in a number of different business positions in his career. "Research is an important building block. But the aspect of market opportunities is just as important for innovations." Today he sees his task in developing marketing and innovation concepts for the global market.

Detective in the circulatory system

Our health is based on good blood circulation through the body's organs. Dr. Eva Becker-Pelster, a researcher at Bayer HealthCare, is fine-tuning innovative treatments for re-expanding constricted arteries.



Researcher with a passion: Dr. Eva Becker-Pelster began her career in research as a teenager in "Jugend forscht." Today the pharmacist hunts down active substances to treat vascular diseases.

Ever since her childhood, she has known that science was her calling. Back in 1987, Dr. Eva Becker-Pelster, a researcher at Bayer HealthCare in Wuppertal, participated in the state "Jugend forscht" competition for the first time at the age of 15, with a project on "Radioactivity and Our Environment." In 1988 she even won first place with her research into "Alkaloids in Snowdrops." "The prize was a research residency in the Pharmaceutical Biology Department of Tübingen University," Becker-Pelster says. Afterwards, she decided to major in pharmacy. Once she had earned her degree, she applied for a doctoral position at Bayer HealthCare in the laboratory of Professor Johannes-Peter Stasch, and got the job. "When asked about my special qualifications, it probably helped that I had participated in 'Jugend forscht' so frequently," the Bayer researcher says. She entered the state competition a total of five times and won it no less than four times. As a fledgling PhD, Becker-Pelster first went to Columbia University in the USA. Since 2001, the 41-year-old has been back at Bayer in Wuppertal, searching for new active substances to treat pulmonary hypertension and peripheral occlusive disease. One of the substances she focuses on in her work is soluble guanylate cyclase

(sGC). This enzyme, in conjunction with nitrogen monoxide (NO), triggers a chain of signals that expands the blood vessels. If there is a lack of NO, sGC is not activated and circulatory disorders result. Becker-Pelster was a post-doctorate student in the team headed by Professor Johannes-Peter Stasch (see "Patient lung",

research 24) that discovered NO-independent sGC stimulators, which contributed to the development of the active substance riociguat, a drug that is used to treat two forms of pulmonary hypertension. Becker-Pelster's main goal is to promote further projects on sGC.

Crop protection specialist with an eco-strategy

Global responsibility for all living creatures is important to Dr. Sascha Eilmus. At Bayer CropScience in Monheim, he studies the interactions between crop plants and their pests to develop ecologically compatible methods.

At present, the vinegar fly is his "favorite" pest. A good day at work begins for Dr. Sascha Eilmus, researcher and Head of the Pest Control laboratory at Bayer CropScience in Monheim, with a visit to this tiny creature in the laboratory. Eilmus plans to test some biological weapons against this fly, also called *Drosophila suzukii*, in the near future, because the insect makes life difficult for fruit farmers in Europe and the United States. The 35-year-old insect specialist usually shies away from dividing the creatures into "pest" or "beneficial" insect categories. He prefers to look at the overall picture of ecological relationships between insects,



Searching for ecological balance: in his research, Dr. Sascha Eilmus tries to keep an eye on the big picture, meaning interactions between all life forms in an ecosystem.

A benefit to society




Recognition: Maximilian Reif (2nd from left) and Michael Stark (right), national winners in the category Engineering, present their invention – a quadricopter whose software helps protect against pilot errors – to Dr. Marijn Dekkers (left) and Professor Johanna Wanka, Federal Minister of Education and Research.

Bayer AG hosted the national "Jugend forscht" competition for the fourth time in 2013. A total of 188 talented junior researchers with 107 projects took part in the final round of Germany's most distinguished youth competition. "The 'Jugend forscht' competition makes an important contribution to promoting talented young scientists to the benefit of society," said Professor Johanna Wanka, German Federal Minister of Education and Research and Board Chairwoman of the Jugend forscht e.V. foundation, at the kickoff to the finals.

plants and microorganisms. "Only if we understand these interactions can we develop environmentally compatible and specific crop protection agents," the researcher explains. "For that we need new technologies and breeding methods." And this is precisely what Eilmus does, in the laboratory, greenhouse and in field trials.

The entomologist already started collecting animals as a kid taking walks with his parents. At age twelve he started rearing spiders, bugs, cockroaches and grasshoppers. Today the young researcher keeps some 40 different insect species in his terrariums at home. While taking his high school finals, Eilmus participated in the "Jugend forscht" competition, taking one of two second-place prizes with his project on stick insects – there was no first place that year. After gaining his undergraduate degree and PhD in biology from Cologne University, a friend told him that Bayer was looking for an "insect guy." Just four days after the job interview, he was hired.

 www.research.bayer.com/jugendforscht
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