ATTACHMENT to press release "How is this relevant?"

Overview and contact information: winning projects of the university competition within the "Science Year 2009 – Research Expedition Germany"

Acting by numbers, University of Bamberg

Pupils and university students from Bamberg are working on a theatre project that blurs the lines between art, theatre and science.

What do Nietzsche, numerology and love have in common? How many different forms of understanding are there? To find answers to these questions, pupils and university students from Bamberg are taking part in the University of Bamberg's project "Understanding Love Cubed", in which they will stage a play that brings together great emotions and scientific thinking. They will learn about different theories from the social sciences and humanities and bring them to bear on their rehearsal work by means of verbal expression, physical and vocal articulation and adaptation to different formats. Nine topics from the areas of culture and science – so-called cluster fragments – will form the basis of the play and the starting point for its plot. One of them is a painting by René Magritte. Nietzsche too will make an appearance as one of the characters in the scientific play.

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Interpreter sought: German – teen talk, Free University of Berlin

The Free University of Berlin is trying to encourage young people to become more aware of the way they speak and to start analysing their language.

"This CD is wicked!" – Most adults would understand this to mean that the compact disc in question does not conform to the highest moral standards, but to young people, it often means something completely different. The Free University is investigating this phenomenon in its new project on youth language. Young people are invited to submit their own expressions on an Internet portal and analyse those entered by others. The portal also contains interesting exercises and riddles designed to motivate teenagers to engage with their own language. Another aim is to encourage young people and teachers to exchange ideas and engage in discussions. To this end, there will be school visits and workshops, both at schools and at the university.

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The project will be supported by scientists. The insights, results and ideas will be published online in the form of a reference work.

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The house of the future, Technical University of Darmstadt

The Technical University of Darmstadt's "Construction site open day" will provide information to experts and the general public about ways of generating energy while living.

What happens in a house that produces more energy than it consumes? What functions and systems would such a house require? A "plus energy house" is currently being built on the campus of the Technical University of Darmstadt and will soon be open to the general public. The idea is to promote viable and environmentally friendly construction methods. About 50 percent of all energy consumed is used in buildings, and only few of the existing concepts for climate-friendly construction are implemented on a grand scale. The Department of Architecture at the University of Darmstadt aims to change that by including approaches for environmentally-friendly yet cost-effective construction in its architecture courses. There will also be a special children's programme for very young visitors.

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XXL construction projects, Technical University of Dortmund

The Technical University of Dortmund is giving pupils in their last years of secondary school insights into property and urban development.

Large-scale buildings such as shopping centres, warehouses, multiplex cinemas and high-rise office buildings play an important role in our lives, but we rarely get a chance to look behind the scenes and often only have a vague notion of how they are developed. For many upper secondary school pupils, this will soon change, thanks to the University of Dortmund's project "Properties up close". The pupils will look into the question of what it takes for large-scale buildings to become profitable and how they can be made more socially and ecologically friendly, among other issues. The participants will initially be given a scientific introduction to property development and will then visit buildings in the Ruhr, such as the CityForum in Duisburg.

The tours of the buildings will be given by practising professionals – estate agents, urban planners, centre managers or project developers. This will enable the pupils to experience how diverse and multi-faceted property and city planning work can be.

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Beech leaves and sun shades, Technical University of Dresden

A project group at the Technical University of Dresden is developing a bionics experiment kit for schools.

Many inventions were inspired by nature: Velcro®, for example, is modelled on burdock, and the properties of lotus leaves gave rise to the idea of developing self-cleaning surfaces. Learning from nature: that is the guiding principle of bionics. Convinced that this approach could be of great interest to young people, a project group at the TU Dresden is developing new teaching material. The area of bionics is particularly relevant to natural scientists and engineers, but also to architects, designers and philosophers. Thanks to its interdisciplinarity, bionics lends itself to practical, cross-subject teaching activities. One example is the experiment module "Folding techniques in nature and technology", in which pupils first examine the buds of different plants and describe the way the leaves or petals are folded together and rolled up. The chaos of the folds contains a certain order. In addition to the practical exercises, the students learn how insights about these regularities have found practical application – for example in space travel.

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A journey into the human body, University of Freiburg

A collaborative research centre at the University of Freiburg is developing a game to promote a better understanding of the human immune system.

Bacteria, fungi and viruses attack our bodies practically around the clock. Fortunately, the immune system is able to neutralize most of them. This complex protective mechanism is vital for our health and wellbeing. But how can the functioning of the human immune system be explained effectively? Scientists from the University of Freiburg have developed a game designed to promote understanding of these complex processes. Its name is "Virus attack – a game to illustrate the functioning of the immune system". The rules are simple: different types of cells that have different roles in the immune system are represented by players wearing differently coloured T-Shirts.

The processes that make up the immune system are then re-enacted and depicted visually. In this way, players and the audience are given an insight into the complex processes of our body's defence mechanisms. Scientists are actively involved in the game. It does not require significant investments or preparation and is thus ideal for use in schools.

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Garden expedition for treasure hunters, University of Freiburg

Pupils of all ages can explore the world of plants at the Botanic Garden of the University of Freiburg.

Plane trees on the playground, geraniums on the balcony, grass in the park and spinach on our plates – we are constantly surrounded by plants. But only few people realize how many plants there are and how diverse the field of botany is. To introduce this area of research to young people, the Botanic Garden of the University of Freiburg has developed a playful expedition for children. What plants do we encounter in our everyday lives and what properties do they have? What do plants in other parts of the world look like? What do plants need in order to survive, and what threatens their survival? The project staff will address these questions during the students' exploration of the Botanic Garden, which contains approximately 5,000 different species of plants. A treasure hunt will form the central element of the tour for children and young people. Topical issues such as environmental protection and bionics – the use of "ideas from nature" to create technology products – will be integrated into the games. The organizers will construct special game installations for the treasure hunters and are even planning a special plant area for the pupils.

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The power of nature, University of Hohenheim

An activities day organized by the University of Hohenheim will give pupils an opportunity to learn about the use of biomass and about different resource chains.

Fossil fuels such as oil and gas are becoming increasingly scarce. As a result, the use of biomass for energy production is rapidly increasing in importance.

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It is now more important than ever before for pupils to be familiar with new methods of energy production and to learn to accept responsibility. That is why the Faculty of Agricultural Sciences of the University of Hohenheim is organizing an activities day entitled "A cow pat full of energy – experiencing biomass up close". It will give young people the opportunity to update their knowledge on the subject. Professors will explain the resource chains of three materials: vegetable oil, biogas and wood. The pupils will also learn about the opportunities, benefits and risks associated with scientific and technological developments in this field.

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A sip from the ocean, Technical University of Munich

The Technical University of Munich is inviting pupils and university students to develop their own sea water desalination plants.

We cannot live without water. According to the United Nations, two thirds of the world's population will be without access to sufficient drinking water by 2025. Ideas that will help avert this catastrophe are therefore urgently needed. The Technical University of Munich is proposing a challenge to 15 teams of young people from schools and universities: Who can build the most efficient sea water desalination plant? The criteria are clearly defined: The small-scale plants must work without the need for fossil fuels, they must be cost-effective and easy to operate, and they must produce as much drinkable water as possible. Desalination technologies cannot be used in developing countries unless these criteria are met. The best solution will be chosen in August 2009. The aim is to promote scientific exchange and show young people that science and technology can be fun.

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Sleeping at school – now encouraged!, Ludwig Maximilian University of Munich

The Centre for Chronobiology at the University of Munich's Institute of Medical Psychology shows pupils how our body clock works.

Early bird or late riser? Why are people's sleep-wake cycles so different? The answer: Because we have different body clocks, which are encoded in our genes. In a mobile sleep laboratory, pupils can find out which group they belong to.

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Some people wake up at seven o'clock every morning and are full of energy to start the day, while others find it difficult to even open their eyes before eleven. These people exhibit different chronotypes – this means that their body clocks are not in sync. The Centre for Chronobiology at the Ludwig Maximilian University of Munich is sending its mobile sleep laboratory to schools, together with tests to determine individual chronotypes. Young people between the ages of 13 and 20 can spend one or more nights in the sleep lab – a converted ambulance – to find out more about their mental and physical processes while they are asleep. The factors measured and described include the muscle tone and brainwaves as well as cognitive processes.

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Quo vadis – geoinformatics as a guide, University of Münster

The project "Explore geoinformatics with your hands, feet and mind" shows new trends in the area of computer-based navigation.

Where on earth am I? To help people answer this question, computer-based navigation systems have emerged in recent years, offering an alternative to the more conventional approaches of consulting a map or asking a local. Scientifically, such systems are based on geoinformatics. Thanks to geoinformatics, it is possible to calculate the best route online before travelling or look at remote regions of the world. But how do these computer-based aids actually work? Geoinformatics students have developed the project "Explore geoinformatics with your hands, feet and mind" to give the people hands-on experience of the subject. The module "Explore geoinformatics with your hands" offers an opportunity to look at the different ways in which interactive technical elements such as touchscreens are linked with geographical information. In the module "Explore geoinformatics with your feet", participants can let off steam by surfing the virtual planet of the three-dimensional computer program "NASA World Wind" using an interactive Balance Board. In the Model "Explore geoinformatics with your mind", participants go on a treasure hunt.

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Knee-deep, University of Regensburg

Pupils from secondary schools in Regensburg will be given a chance to watch a computer-assisted knee operation live.

Knee replacement surgery is high-precision work. The Orthopaedic Hospital of the University of Regensburg is giving young people a chance to learn more about this subject by watching surgical operations via live video transmission. During the course of people's lives, their knees do a lot of work – they carry the body's weight and absorb shocks with every step. No wonder, then, that knee joints often wear down as people get older, which is known as gonarthrosis. In serious cases, part of the knee can be replaced with an artificial joint. Often, further replacement operations become necessary at a later stage, which is an additional burden for patients. The computer-assisted procedure developed in Regensburg reduces the need for such follow-up operations. It provides precise measurements to help surgeons position their saw cuts. The pupils will have an opportunity to ask the surgeons questions in the operating theatre. They will also be allowed to try their own hand at knee replacement surgery using the computer-assisted method.

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Broadening horizons, University of Regensburg

With the project "Where is Labinot from?", the University of Regensburg is trying to help young people learn more about other countries and cultures.

What is the capital of Bulgaria? Who is Hungary's most famous composer? Not all pupils in Regensburg know much about central, eastern and south-eastern European countries, even though many of them go to school with children from these regions. The aim of the project "Where is Labinot from?" is to close these knowledge gaps. Lecturers at the University of Regensburg are organizing lectures together with the children from the countries in question. These will include linguistic, cultural, political and economic information.

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All the world's a stage, Liszt School of Music Weimar

With the help of a joint theatre project, the Liszt School of Music in Weimar wants to promote understanding between people with and without hearing impairments.

The project "Pipka" at the Liszt School of Music in Weimar is designed to help people with hearing impairments and hearing people understand each other more effectively. The main objective is to sensitize children and young people to this topic. The participants will learn about audiology and about the different ways in which people with hearing impairments articulate themselves and communicate with each other and their environment. In the practical part of the workshop, all the participants will jointly perform a play written especially for the project. The leading character, Pipka, has a hearing disability and is played by a deaf-mute actress. The project leaders' objective is to teach children and young people in particular about interaction between people with hearing impairments and hearing people.

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Swarm with the bees, University of Würzburg

Thanks to HOBOS, pupils from across the world can follow the lives and flight patterns of honeybees.

Researchers of the BEEgroup at the University of Würzburg may not be able to fly with the bees, but they have developed high-tech instruments that enable them to study colonies of bees in more detail than would be possible through direct observation. Honeybees play a decisive role in many ecosystems. Their greatest significance for humans is the fact that they pollinate flowers in their search for nectar, which makes it possible for fruits and other plants to grow. As a result, 30 percent of our food directly depends on the existence of honeybees. This is why the honeybee features in the syllabuses of most schools worldwide. However, it is not often possible to study their way of life by visiting a colony of bees directly. Thanks to HOBOS (HoneyBees Online Studies), selected classes of pupils can follow colonies via the Internet, enabling both simple observation and longer scientific projects. The colonies are equipped with high-tech devices that continuously transmit data from the entire colony, separate groups of bees, and each individual bee. After the 2009 pilot phase, the program will be made available to all those interested.

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Further information about the winning projects of the university competition as well as print quality photographs are available at: **www.forschungsexpedition.de**

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