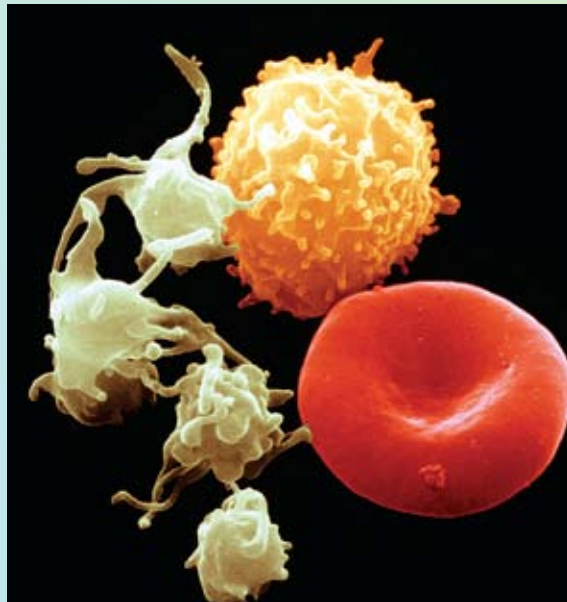
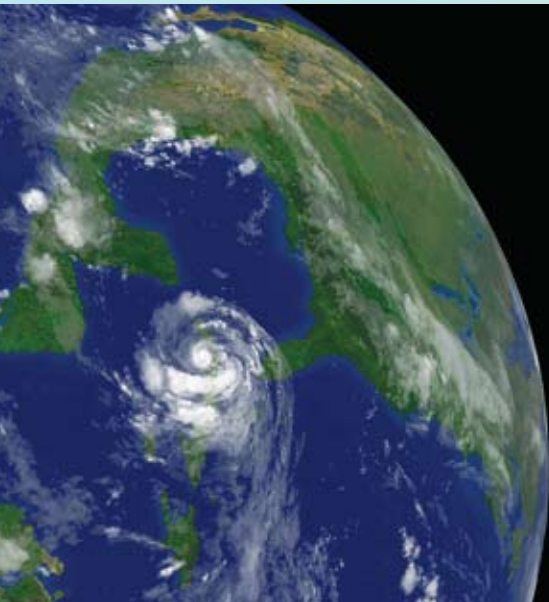


Fit For Life? Explore Science



Fit For Life?

Explore Science

Who? Students (grade 9 -12) in Delhi

When? 26th to 30th October 2009

Under the motto **FIT FOR LIFE? EXPLORE SCIENCE** universities, colleges and universities of applied sciences in Germany were invited to develop original project ideas for popularising scientific concepts, especially among school students, to bridge the gap between universities and schools.

Fifteen projects were selected that vividly demonstrated the practical relevance of science in an imaginative and accessible way.

Five Projects for India

Of the fifteen awarded projects, five were chosen to be presented in Delhi in October 2009 as part of the initiative to enhance the academic, scientific and educational exchanges between India and Germany:

- 1. Unfolding the future – from plant leaves to solar sails:** bionics experiment kit
TECHNICAL UNIVERSITY OF DRESDEN
- 2. The power of manure – experience biomass sensorially:** use of biomass and resource chains
UNIVERSITY OF HOHENHEIM
- 3. Encounter YOUR immune system:** insights into the human immune system
UNIVERSITY OF FREIBURG
- 4. Quo vadis - geoinformatics shows the way:** computer-based navigation
UNIVERSITY OF MUENSTER
- 5. A sip from the ocean:** more water from sea water
TECHNICAL UNIVERSITY OF MUNICH

Secondary schools in Delhi, especially the PASCH schools with a special focus on Germany in their curriculum, are invited to participate in these five educational projects. The five German groups of scientists are coming to India to interact with Indian school students for five days from 26th to 30th October 2009.

The objective is to encourage young people with a scientific bent to develop a fascination for science and research. This activity is a follow-up of the Science Express, an Indo-German science exhibition on wheels that toured India for seven months in 2008 and recorded more than two million visitors, mainly young students.

As a part of Indo-German research cooperation the project will help motivate Indian students to find solutions jointly with the project supervisors to present-day global issues, such as climate change, energy security or overcoming diseases before their outbreak. It also provides an opportunity to reflect on the impact of science on society and how scientific discoveries, inventions and new intellectual approaches influence and change our everyday lives.

Partners of this project

This school project **FIT FOR LIFE? EXPLORE SCIENCE** is conducted in Germany under the title "ALLTAGSTAUGLICH?" and is part of the SCIENCE YEAR 2009 – RESEARCH EXPEDITION GERMANY of the German Ministry of Education and Research (BMBF). It commemorates the 60th anniversary of the founding of the Federal Republic of Germany and the 20th anniversary of the fall of the Berlin Wall. The partner institutions for the Science Year 2009 are the SCIENCE IN DIALOGUE (WID) initiative, the German Academy of Sciences Leopoldina, Robert Bosch Foundation and the Donors' Association for the Promotion of Sciences and Humanities in Germany. The India programme of "ALLTAGSTAUGLICH?" entitled **FIT FOR LIFE? EXPLORE SCIENCE** was conceived by the German Embassy, New Delhi.

Unfolding the future – from plant leaves to solar sails

A project group at the Technical University of Dresden is developing a bionics experiment kit for schools. Many inventions have been inspired by nature. Velcro, for instance, is modelled on burdock burs, while self-cleaning surfaces imitate the lotus plant. Learning from nature is the principle behind bionics.



Bionics is of relevance not only for scientists and engineers, but also for architects, designers and philosophers. It is precisely this interdisciplinary aspect of bionics that lends itself to hands-on teaching modules across subject boundaries. One example is the experiment module “Folding techniques in nature and technology”, in which students examine buds of different plants and describe the way in which the petals and leaves are folded and rolled up. The miraculous unfolding patterns reveal a definite, sequential order. During the practical exercises, students learn how the understanding of these processes has important applications, for instance in space research.

Prof Dr Christoph Neinhuis is a Professor of Botany at the Technical University of Dresden and Director of its Botanical Gardens. After receiving a PhD in 1993 he was appointed Professor of Botany at the University of Cologne in 2000, then in 2002 Professor at the Technical University of Dresden. In 1999 he was honoured by the Philip Morris Foundation Research Award for the discovery of self-cleaning mechanisms of the lotus plant. Professor Neinhuis focuses his research on bio-mechanics and structure formation of plant cuticles, and self-assembly of waxes, among others.

Thea Lautenschläger went to Ecuador to study Spanish before she started her studies in Biology. After extensive field experience in ecological systems and developments in various regions of the world, she started her PhD research in 2007 and is presently engaged in studies of “bio-mimetics in schools” at the Technical University of Dresden.

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The power of manure – experience biomass sensorially

School students learn about the use of biomass and different resource chains. Fossil fuels such as oil and natural gas are becoming increasingly scarce. Obtaining energy from biomass is consequently of growing relevance. Today it is more important than ever that students are informed about new methods of energy generation and learn to take responsibility.



The Department of Agricultural Sciences at the University of Hohenheim has developed a project for schools under the theme “Electricity from cowpats. Getting touchy-feely about biomass” which explains the resource chains for three materials: vegetable oils, biogas and wood. The students also learn about the opportunities, benefits and risks of scientific and technical developments.

Prof Dr Wilhelm Claupein holds the chair for General Crop Farming at the Institute for Crop Production and Grassland Research at the University of Hohenheim. Prof Claupein has research experience at the University of Goettingen and the University of Natural Resources and Applied Life Sciences (BOKU) in Vienna/Austria. He specialises in energy plant crop systems, conservation tillage and precision farming.

Dr Sabine Gruber presently is a junior associate scientist and lecturer at the Institute for Crop Production and Grassland Research at the University of Hohenheim. Her research focus is on bio energy and risk assessment of genetically modified crops, among others. Dr Gruber has international teaching experience at agricultural universities, for example at CAU in Beijing/China, and ČZU in Prague/Czech Republic.

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Encounter YOUR immune system

A special research unit at the University of Freiburg is developing an action game that makes it easier to understand the human immune system. Bacteria, fungi and viruses attack the human body practically round the clock. The body's immune system is able to neutralise most attacking agents. This complex defence mechanism is key to our health and well being. How can the functioning of the human immune system best be explained?



Scientists at the University of Freiburg have developed a game to shed light on these complicated processes. It is called “Virus attack – an action game to illustrate the functioning of the immune system”. Different types of cells in the immune system are represented by players wearing differently coloured T-shirts symbolising various cell types and in a playful dramatisation interact with each other. The processes by which the immune system functions are then re-enacted and made easier to understand. Since no significant investments are required this interactive game is ideal for performing in schools.

Prof Dr med Hans-Hartmut Peter is Director of the Department of Rheumatology and Clinical Immunology at the University Medical Center and Medical Director of the Excellence Center for Chronic Immunodeficiency (CCI), both at Freiburg University. Prof Peter received various prestigious honours and awards for his outstanding research in the field of immunology and is member of the boards of top-level immunological institutions, as well as being on Editorial Boards of scientific magazines for immunology and allergology.

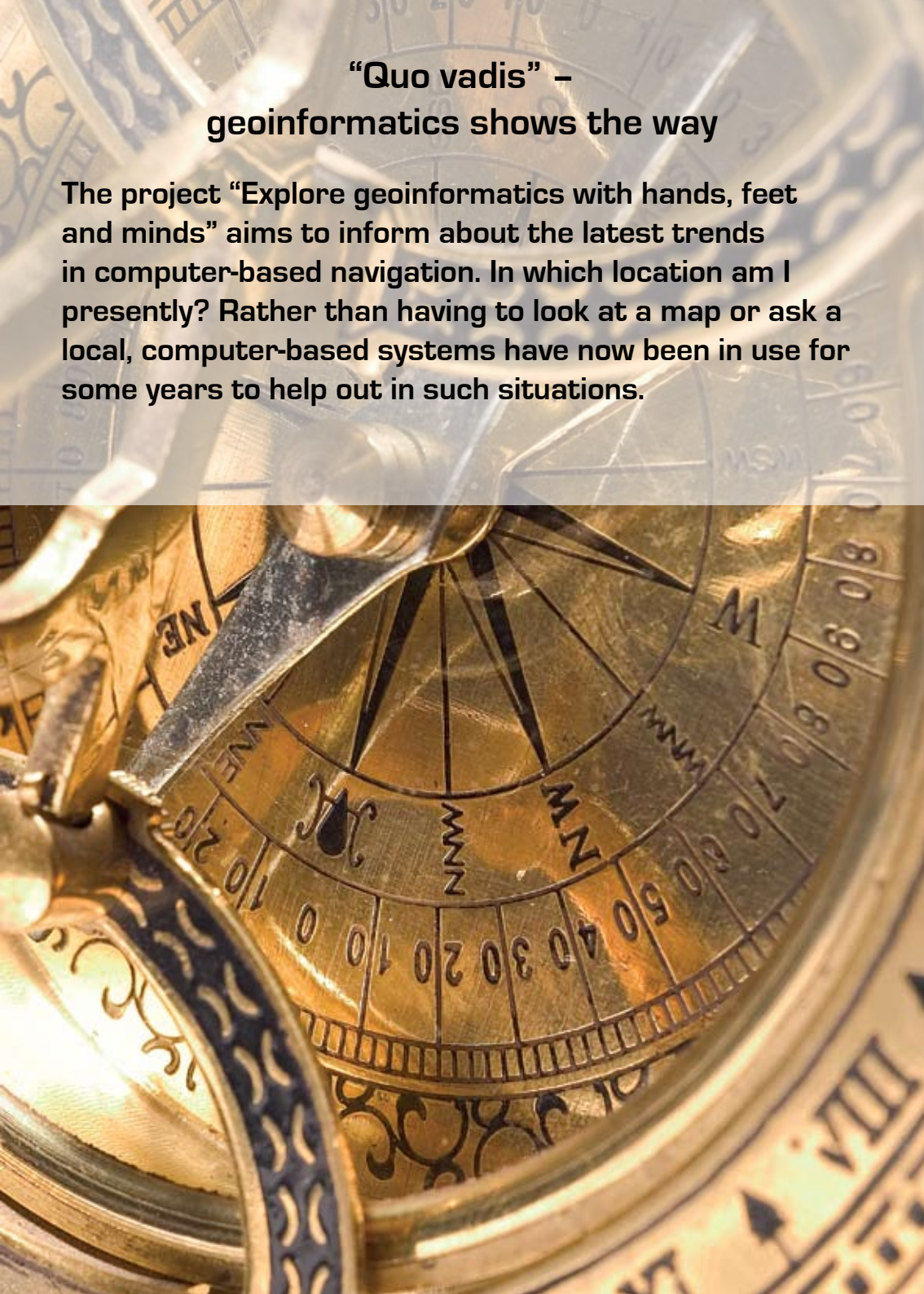
Dr Magnus M. Gees works as a coordinator of the research and treatment focus “immunodeficiency” at the University Medical Center Freiburg. He manages the Excellence Center for Chronic Immunodeficiency (CCI) and the Collaborative Research Center 620 (CRC). He is in charge of the immune game concept and coordinates the public relations of the CCI as well as the CRC. He received several German and European awards for the immune game concept.

Kathrin Woltering, a secondary school teacher for English and Biology, was intensively involved in the development of the immune game concept, especially its adaptation for students, designing the bi-lingual English-German teaching concept for different age groups.

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**“Quo vadis” –
geoinformatics shows the way**

The project “Explore geoinformatics with hands, feet and minds” aims to inform about the latest trends in computer-based navigation. In which location am I presently? Rather than having to look at a map or ask a local, computer-based systems have now been in use for some years to help out in such situations.

Thanks to geoinformatics it is possible to work out the best route on the Internet before travelling or to take a look at distant regions on the globe. But how do such computer-based tools work? The project “Explore geoinformatics with hands, feet and minds” gives laypersons an insight into this subject. The module on “Explore geoinformatics with hands” examines ways in which interactive technical elements like touchscreens can be linked with geographical information. Participants in the project can play to their heart’s content in the “Explore geoinformatics with feet” module and surf the virtual globe of the three dimensional programme NASA WORLD WIND on an interactive Balance Board. Finally there is a treasure hunt in the “Explore geoinformatics with minds” module.

Thomas Bartoschek, awarded a diploma in Geoinformatics in 2007, is a PhD student and Research Associate at the Institute of Geoinformatics (ifgi) of the University of Muenster. Having been a Research Associate in Geostatistics at Universidade Nova de Lisboa at Lisbon/Portugal in 2005, he founded the GI@School initiative at ifgi in 2006, under which he conducted projects with high schools and teacher training seminars. Since 2007 he is a lecturer at ifgi and the Institute for Didactics of Geography in Muenster.

Johannes Schoening, awarded a diploma in Geoinformatics, University of Muenster in 2007, is currently working as a Senior Consultant at the Innovative Retail Laboratory at the German Research Centre for Artificial Intelligence (DFKI) in Saarbruecken. His research interests are new methods and interfaces to intuitively navigate through spatial information, among others.

Maria Clingen, Bachelor in Mathematics and History, University of Muenster in 2008, is currently involved in a masters degree programme to become a teacher for secondary schools.

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A sip from the ocean – more water from sea water

Technical University of Munich is calling on students to develop desalination plants for sea water. Human beings cannot survive without water. According to the United Nations, two thirds of the world's population will not have adequate access to drinking water by 2025. Ideas are needed on how to avert this water crisis.



The Technical University of Munich (TUM) initiated a project with 15 schools and university teams in Germany to think about how to build the most efficient sea water desalination plant. The criteria have been clearly defined. The small-scale plant must run without using fossil fuels, be low-cost, simple to operate and deliver large quantities of drinking water. The aim is to demonstrate that science and technology can be fun.

Dr-Ing Markus Spinnler

Dr-Ing Markus Spinnler graduated in Mechanical Engineering at the Technical University of Munich (TUM). In 2001, he received his PhD with a research on COMBINED HEAT TRANSFER IN HIGH TEMPERATURE THERMAL INSULATION SYSTEMS. Since 2002 he is Head of the Solar Research Center at the TUM Institute for Thermodynamics. His areas of research include solar thermal sea water desalination, battery-operated cars, post-treatment of liquid manure for biomass plants, among others.

Vanja Ugresic

Vanja Ugresic graduated 2008 in Engineering Science (Chemical Engineering) at the University of Western Ontario, London/Canada. Since November 2008, she is working as a Research Assistant at the Institute for Thermodynamics at the Technical University of Munich, where she was head of the project on DEVELOPMENT OF A LIQUID MANURE PROCESSING PLANT BASED ON THE HUMIDIFICATION/DEHUMIDIFICATION (HD) TECHNIQUE. Other fields of her research include sea water desalination plants, gasification of coal and biomass.

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Acknowledgements:

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India and Germany

Strategic Partners for Innovation

Research in Germany



Land of Ideas



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