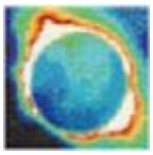
Regional Leaders Summit
Politics for Generations

Partnership world-wide

Bayern | Oberösterreich | Québec | São Paulo | Shandong | Western Cape

International Hands-On Universe Summer Academy for Gifted Students

Munich, August 4 - 11, 2007



JuWis Jugend und Wissenschaft e.V.

TUMLab im Deutschen Museum

ZLL Zentralinstitut für Lehrerbildung und Lehrerfortbildung

TUM Technische Universität München

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The Network of the Partner Regions

The International Summer Academy is a new and unique project within the network of Bavaria's partner regions. On the 11th and 12th of July 2006 the head of state of Bavaria, Upper Austria, Québec, the Minister for the Environment of the state of Sao Paulo, the Governor of Shandong as well as the head of state of the Western Cape met for the third Regional Leaders Summit in Linz. Since 2002 these regions have been closely connected by a strong network. Altogether they are the home of 157 million people living on 4 continents. Each region has powers and responsibilities in their country. They belong to diverse cultures and represent different economic and social structures. What they do have in common is their close relationship to the citizens of the region. For this reason they have committed themselves particularly to political policies that will endure for generations. Key aspects of the summit were the topics renewable energy and energy efficiency as well as education and young people. In this context, at the suggestion of the Bayerische Staatskanzlei, the Bavarian State Ministry for Education proposed arranging a project involving an international summer academy for gifted young people from the partner regions. The association Jugend und Wissenschaft e.V. was commissioned to organize and host the academy. Carefully selected students were to have the chance, before beginning university studies, to establish friendships world-wide. In this way they should have the opportunity to become acquainted with international standards and to learn how important it is to prove one's merit regarding the ability to compete and collaborate on an international level. The work together as a team, on a joint astronomy project, was to enable the students to experience the international collaboration of experts which could influence their later professional development. In building these individual networks at a high level the partner regions hope to obtain mutal advantages, for the participants and for themselves, in international competition.

Source: Süddeutsche Zeitung

Welcome address by the Bavarian State Minister for Education, Siegfried Schneider, at the opening of the International Summer Academy in the Ehrensaal of the Deutsches Museum in Munich on 6 August 2007

Dear Summer Academy Participants,

Ladies and Gentlemen,

It's a great pleasure to be here with you in the Ehrensaal of the Deutsches Museum in Munich. I should like to welcome you to the International Summer Academy 2007. And I should like to pass on to you the very best greetings of the entire Bavarian State Government.

Today is a special day: it is the very first time that the International Summer Academy is being held for pupils from Bavaria's partner regions. I should especially like to welcome the pupils and the teachers who are accompanying them from Bavaria's partner regions. You are coming from far and near to join us here in Bavaria: Young researchers from Upper Austria, Quebec, Shandong and Western Cape have come here to Munich to spend the next few days taking part in the Summer Academy. I am very pleased that you have all accepted our invitation to Bavaria in order to spend an entire week working and researching together.

I 'm sorry to say that it was not possible for our delegation of pupils and teachers from São Paulo to come to Munich. So I should like to use this occasion to send my heartiest greetings to them in faraway Brazil! Perhaps there will be an opportunity to make virtual contact with our partners in Brazil in the course of this week.

Some of you might already have been wondering what it is that connects Upper Austria, Québec, Shandong, Western Cape, São Paulo and Bavaria. Clearly there is a close relationship between Upper Austria and Bavaria because of their geographical proximity. But what have the other regions to do with one another, especially as they are located on different continents? They are all Bavaria's partner regions and belong to those regions with which Bavaria has intensive relations. The fact that these regions are part of different economic and cultural spheres is a special opportunity in itself. By learning how others approach a problem, we can gather important impulses for our own approaches to solutions.

In its still short history, cooperation among the partner countries has developed into a success story that has benefited all partners. Since 2002 there have been conferences for the heads of government of the partner regions. Since the first conference opportunities for an intensive exchange of political ideas and solutions have presented themselves repeatedly. The aim behind this is to encourage cooperation among experts in selected key areas. At the last conference in Linz the heads of government focused on "Education and Youth", among other topics. There was unanimous agreement at this conference that an international exchange among our young people is crucial for early qualification of the up-and-coming generation in international competition. To achieve this, young people from the partner regions need to gather concrete experience. It was decided therefore to hold a one-week international seminar – for pupils between 16 an 18 years of age who are highly gifted in the field of natural sciences.

We have good reasons for deliberately addressing "highly gifted pupils in the field of natural sciences": First of all, we had some catching up to do when it came to specifically furthering those who are specially gifted. Often, equal opportunities in the field of education mainly meant

supporting underprivileged and weaker pupils. Meanwhile people have begun to realise that furthering specially gifted and motivated young people is just as much a core task of our education system as is the support of the underperformers. We need particularly qualified, interested personalities. Because the challenges in our world are becoming greater and greater. What we need are people like you, my dear pupils, people who can think and work with an alert intelligence, a high level of competence and social responsibility. Progress in science and politics, in business, art and culture is possible only if there are people who show particular commitment and who are prepared to take on responsibility for themselves and for others. You, dear pupils from Bavaria and our partner regions, are such people. And so I am very pleased indeed that you are taking part in the International Summer Academy in Munich.Here, you will be able to spend a week working at a high scientific level in an international group. Here, you will be able to examine complex scientific problems in depth.

We have found an excellent partner in the Youth and Science Association - “Jugend und Wissenschaft e. V.” — as the project sponsor of the Summer Academy. In cooperation with the Technische Universität München and the TUMLab – the schoolchildren’s laboratory in the Deutsches Museum – those responsible have put together a sophisticated programme.

During this week you will be introduced to the research fields of astronomy and astrophysics. You will work together with “real” scientists from the TU München. And in the process you will use “real” research equipment and become acquainted with various research facilities in Munich – among them the Max Planck Institutes in Munich and the Research Center in Garching.

The International Summer Academy is embedded in the “Global Hands on Universe” project. This project originated in 1992 in connection with the “Supernova Cosmology Project” at the University in Berkeley, California. The idea was to enable students and teachers to take part in the fascinating scientific adventures of Supernova research. The fact that “Hands-on-Universe” is in close contact with scientific research and has access to scientific resources creates a completely new quality of learning. What is more, the “Hands-on-Universe” project can be found on all of the five continents on which our partner regions are located. This will enable you, my dear participants, to continue working together on a subject even after the Summer Academy. I should like to encourage you all to make use of this opportunity. Understand the Summer Academy in Munich as the starting signal for collaboration among young scientists across borders.

Dear Pupils,

During this week, you will not only acquire new knowledge in the fields of astronomy and astrophysics. You will also get to know each other: You will gain insights into the different school systems, into the different ways of living and traditions of the partner regions. This is intercultural learning in the best sense of the phrase! And you will get to know Bavaria: the organisers have put together an interesting supporting programme. I am certain that you will enjoy your stay in Bavaria and Bavarian hospitality.

Dear Teachers,

There will be a varied and informative programme for you as well: You will, amongst other things, visit the Bavarian State Ministry of Education. And there you will be able to tackle questions of how the gifted can be furthered. You, the teachers, play a key role in developing special talents. It is you who rouse their interest, who motivate your pupils and help them exploit their potential to the full. For this I should like to express my recognition and gratitude.

Ladies and Gentlemen,

Planning and organising a Summer Academy of this quality requires intensive preparations. My thanks go to all who have contributed to making this event a success!

I should like to thank most warmly the association “Jugend und Wissenschaft e.V.”, which has arranged the International Summer Academy, for its great commitment. My special thanks go to Mrs Reich. Dear Mrs Reich, without you the Summer Academy would not exist in this form. I should also like to thank the TUMLab in the Deutsches Museum and the Technische Universität München for their support of the Summer Academy. My thanks also go to the Bavarian State Chancellery, which generously provided funding for the Academy. On its behalf I thank Mr Hinterdobler, who provided us with support in the planning.

Dear Pupils,

There is a real gem awaiting you when you start working on the astronomy projects. The Astrocom company is making a telescope available to you for night observation.I’d like to thank the representative of Astrocom for the support your company has provided for our young researchers with this professional instrument.

The motto of our project sponsor, the “Jugend und Wissenschaft e.V.” association, is a quotation by the great French Renaissance writer, François Rabelais. It says: “Children are not casks to be filled but fires to be ignited.” I am certain that the International Summer Academy will kindle many new fires. It would give me great pleasure if, next year or the year after, I could see this fire spread from Munich to another partner region.

I now wish all the pupils and the teachers accompanying them an interesting and informative week. And I hope very much that you will feel at home with us in Bavaria. I wish you all a great deal of fun and success in your research – and a clear starry sky for the planned night observation!

Opening ceremony in the Hall of Fame in the Deutsches Museum with State Minister for Education S. Schneider

Prof. Dr. W. Huber

Chairman of Senate of the TU Munchen

Minister Schneider,

Mrs. Reich,

Dr. Hauser and dear colleagues, dear guests,

it is a pleasure to welcome you all here in the name of our president at the TUMLab of the Technische Universitat München and of the Deutsche Museum to host the Hands-On Universe International Summer Academy. We are glad to welcome the highly gifted students from all partner regions of the Bavarian State which is supporting this conference.

Our university has a range of science subjects unrivalled in Europe: natural and engineering science, medicine, life-sciences - our 'four-leafed clover'. The traditions of each separate discipline deserve our respect, but we expect interdisciplinary co-operation in teaching and research, simply because the influence of modern sciences goes far beyond technologies; it shapes our thoughts and influences our cultural conditions.

Besides high quality research, we are proud that we have programs already for very young people. We are convinced that the young generation in Germany, which don't like natural sciences and engineering very much, should get the possibilities to come together with such subjects in an open atmosphere. Therefore, we have established the TUMLab and we are planning additional TUMscience labs in Garching and in Weihenstephan, two of the main locations of our University, to improve the practical working conditions for all high school students as well as for the highly talented ones.

Here I would like to point out that it is important that the TUMLab and the TUMScience Labs will be open not only to students of Bavaria but also to the international community of students - so the new generation of international scientists is already at their starting blocks. Our achievement in engineering, science, medicine and teacher education do not strive to be at the top for their own sake, but to improve the quality of human existence whilst at the same time protecting the environment that nurtures us. But while doing this, we also want to be attractive for the new generation, which we are equipping with the best scientific and technological competences. This is the only way to develop the future technologies.

The Technische Universitat München does accomplish the basic conditions of modern education. We have just dedicated a new chair position to High School Teaching. We will start a Professional School of Education to improve the teacher education at our University with additional chairs in various subjects of education. Especially, in this spirit I would like to express my hope for further co-operations with all of you with regard to teacher education and training.

Thanks for coming here to join the Hands-On Universe International Summer Academy at the TUMLab of the Technische Universitat Munchen! I wish you all a good time and a fascinating week. Have some nice days in Munich and, hopefully, find some new friends.

Thank you for your attention!

Dr. Hauser, Deutsches Museum

Ein herzliches Grüßgott,

State Minister Schneider for the State Government of Bavaria,

Professor Huber for the TU München,

Mrs Reich from Jugend and Wissenschaft e.V.,

Dear participants of the International Summer Academy,

Ladies and Gentlemen,

welcome to the Deutsches Museum.

We are glad to host the 2007 International Summer Academy for Gifted Students and I am happy to receive you, especially the participants of the Academy, today as our very special guests.

Let me send you also the welcome and all the best wishes on behalf of Professor Wolfgang Heckl, the General Director of the Deutsches Museum, who unfortunately is unable to attend today.

Anecdotal tradition of the museum should be a promise for your future. Often scientists in their later years come to us remembering with bright eyes their first visits at the Deutsches Museum as a young boy or girl. It was, they tell us, through their rainy holiday afternoons passed at the Museum, that their enthusiasm for science and technology was ignited. Quite a few of them had later become famous or even Nobel prize winners.

Paving the way for a scientific career is perhaps the most noble mission of the Deutsches Museum and so we were especially happy to accept the idea of an Academy for Gifted Students within the Museum. Look around here, in this "Hall of Fame" of the Deutsches Museum, to see some quite pertinent role models for you. Fortunately in one respect things happen to change quicker in reality than in such a time-honored Pantheon: It is just a few years ago that finally the first woman came in.

Since its founding the Deutsches Museum ever aimed for the active visitor exploring with minds and hands rather than just contemplating the master pieces exposed. We have been continuously looking for new formats of presentations and programs within our exhibitions or by outright new offerings like visitor labs. There people can conduct their own experimental work, ranging from the classics of science up to state of the art science and technology.

To this effect the Museum has always been tying multiple co-operations with companies or universities. The "TUMlab in the Deutsches Museum", where you'll spend most of your time this week, is the result of an especially fruitful and successful collaboration between the Deutsches Museum and the Technical University of Munich - a cooperation which dates back to the very beginnings of the Museum. The TUMlab exists only thanks to the initiative and the commitment of the Technical University, especially the ZLL, providing us with a wonderful supplement to exhibitions like the Astronomy Department.

Looking at your academy schedule I am sure that you'll live to see an exciting week full of fascinating experiences. Enjoy the wonders of science and the wonders of the universe, and don't miss enjoying also the "universe" of the Deutsches Museum - a really unique three-dimensional encyclopedia of science and technology, where there is so much to explore.

So, have a good time here, and - last not least many thanks for the organizers of Jugend und Wissenschaft e.V. and the TUMlab staff, who did a great job in preparing the academy.

Thank you!

The Participants

Western Cape

Upper Austria

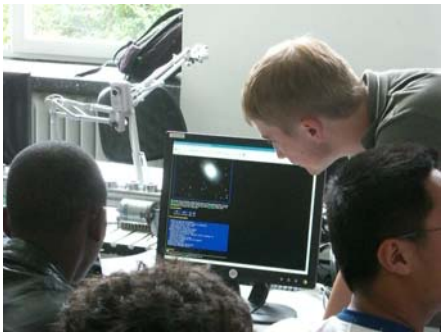
Bavaria

Shandong

Québec

Working on the international Hands-On Universe project in the TUMLab

Discussion with scientists in China via video conference



Working together across borders

Discussion with scientists at the Max-Planck-Institute

Searching for co-ordinates of planets

Press release from South Africa 3.8.07

Young Western Cape Scientists Reach for the Stars

Two young scientists from Western Cape schools will jet off on today (Friday, 3 August 2007), to explore aspects of the universe at an international scientific forum in Bavaria, Germany, next week.

Dineo Grove and Bomi Cholidizo, both 17, are learners at the Cape Academy of Mathematics, Science and Technology in Constantia, and the Centre of Science and Technology (COSAT) in Khayelitsha, respectively.

Nombeko Ngubeni, a teacher at Percy Mdala High School, Knysna, will accompany them. Ms Ngubeni received the National Award for Excellence in Secondary School Teaching in 2006. She was a finalist in Telkoms National Award for Excellence in Mathematics and Science Teaching in 2005.

The Western Cape Education Department (WCED) selected the learners after a rigorous selection process. The learners will attend the International Hands-on Universe Academy for Gifted Students in Munich. The academy takes place from 4 to 11 August 2007.

The event forms part of a programme by six partner regions to promote education and to build networks. The regions are Bavaria, Quebec, Upper Austria, Sao Paulo, Shandong and the Western Cape.

The learners and Ms Ngubeni will work together on a project while in Bavaria, and will learn more about the cultures of the partner regions.

Participants will meet at the TUMlab of the Technical University of Munich (TUM). The TUMLab is housed in the Deutsches Museum, one of Germanys most popular museums, which presents how modern-day culture is shaped by science and technology.

The topic of the academy is Hands-on Universe. Topics will include the life cycle of stars, supernova light curves, supernovae cosmology, the Perlmutter Supernova Cosmology project of the University of Berkley, California, and measurement of distances in deep space.

The Western Cape learners have prepared thoroughly for the trip, with the help of the WCED, the Department of Astronomy and Astrophysics of the University of Cape Town and the South African Astronomical Observatory (SAAO).

The SAAO hosted the delegation at the Observatory in Cape Town and in Sutherland, where they visited the South African Largest Telescope (SALT) and engaged in some night viewing of stars and galaxies. Astronomers and engineers described the construction of the SALT and how it is contributing to our understanding of the universe.

Prior to their departure, the team will present what they have learned to date to top management and officials of the WCED, and guests from UCT, the SAAO and the media. They are scheduled to provide feedback on their trip to their peers at the SALT in Sutherland on their return.

The WCED established the Cape Academy of Mathematics, Science and Technology and COSAT to increase the number of learners from poor communities who excel in Mathematics, Science and Technology. They are among a wide range of projects designed to develop the human capital of the Western Cape.

Press release from Germany: Münchner Merkur 8.8.2007

Hochbegabte holen den Kosmos ins Labor

München - Schüler von vier Kontinenten holen sich in München die Sterne vom Himmel. Noch bis zum kommenden Samstag nehmen die 16- und 17-jährigen Stipendiaten an der "Internationalen Sommerakademie 2007" teil. Organisiert wird dieser Treff für Hochbegabte von dem Verein "Jugend und Wissenschaft", der TU München und dem "TUMLab" des Deutschen Museums.

Melanies Augen leuchten: "Es ist großartig zu sehen, wie unterschiedlich wir alle lernen." Begeistert untersucht sie mit ihrer Freundin Pascale die technische Ausstattung ihres Computers. Gemeinsam mit acht anderen Schülern mussten die beiden Mädchen aus Quebec ein schwieriges Auswahlverfahren überstehen, um an die Isar kommen zu dürfen.

Mit Unterstützung des Kultusministeriums können Hochbegabte aus Bayern und dessen Partnerregionen Oberösterreich, Shangdong, Quebec und Westkap an der astrophysischen Forschung aktiv teilnehmen.

Eine Sonnenfinsternis am Bildschirm: *Andreas Kratzer von der TU (Mi.) mit den Schülern Dong Jing (l.) und Dineo Grove.* MS

Das Aufregendste für die jungen Astronomen ist der Kurs im Labor des Deutschen Museums. Unter der wissenschaftlichen Begleitung von Dr. Andreas Kratzer von der TU München werden die jungen Leute eingeführt in die Geheimnisse der Astronomie.

Der Kurs ist eingebettet in das Programm "Global Hands-On Universe", an dem Schüler, Lehrer und Wissenschaftler aus inzwischen 14 Ländern beteiligt sind. Die Schüler sollen Asteroiden finden, die unseren Planeten gefährden könnten, weil sie die Erdbahn kreuzen. Diese Aufgabe erfüllt die Stipendiaten mit ganz besonders großem Stolz, denn sie würden dann als offizielle Entdecker der Sterne in die Geschichte eingehen. "Das ist meine Motivation", sagt Sophie aus Germering. Die 16-Jährige findet es "toll, etwas finden zu können, das so bedeutend ist".

Die Chancen dafür stehen gut: Die Gruppe arbeitet vernetzt mit Sternwarten in den USA und Australien. So könne sie selbstständig "riesige Teleskope auf anderen Kontinenten steuern und Bilder auswerten", erklärt Kratzer. Sophie ist davon begeistert: "Hier im Labor haben wir richtig freie Hand."

Ein weiteres Ziel des Projekts ist noch ehrgeiziger und laut Kratzer auch noch nicht so bald zu erreichen. Die hier in München gelernten Methoden könnten angewendet werden, um eine besondere Super-Nova-Explosion zu erforschen. "Das ist die einzige Möglichkeit, in die Zeit des Urknalls zu blicken und vielleicht zu klären, woher die Erde kommt."

SOPHIE ROHRMEIER

Scientific Programme

Goals:

The academy was intended as a workshop to prepare an ongoing co-operation between the participants (students and teachers), contact persons in Munich and also a number of scientists world-wide from *Global Hands-on Universe.*

In the beginning a number of projects were proposed. All of them are able to implement international co-operations:

- The „Solar System Simulator“ project is the computer implementation of a planetarium with the special feature of being prepared for translation in any language. Furthermore, it can easily be redesigned to meet the needs of a special audience. The software was developed in Tokyo, Japan. The developers are working within the global Hands-on Universe project.
- Participation in the “International Asteroid Search Campaign”. This campaign is being organized by (HOU-) colleagues in Abilene, Texas, USA. Our group would participate as international „search team“.
- Participation in the measurement of so-called light curves of star explosions („Supernovae light curves”). A dedicated internet portal is being provided by the polish HOU-group. Data taking might be possible using telescopes in Arizona and China.
- Especially interesting is the collection of historical data and myths concerning astronomy. This allows access to different cultures around the world. Additional participants could be found already in Penzberg, Germany and Nairobi, Kenya.

All participants were to fulfil the following tasks during the workshop:

- Preparation of a presentation for their teachers. Teachers would have the opportunity to learn about the achievements of their students and they were to become motivated to participate in the projects themselves.
- Most important: Becoming friends!

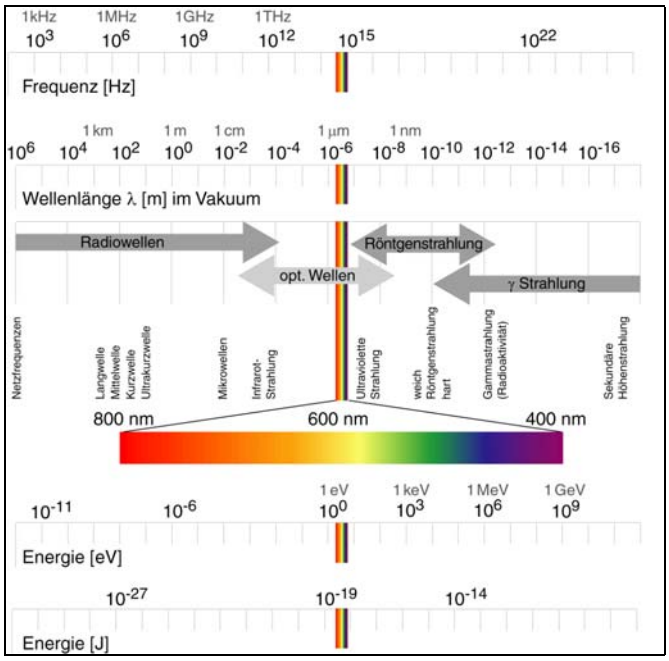
Introductory Lecture:

In the beginning the basic knowledge of the participants had to be defined. An introductory lecture dealt with physics phenomena which we assumed to be known in later stages of the workshop.

Obviously, the topic had to be „light“, because light gives us much essential information about the universe.

We discussed the nature of light.

Light was discussed as a wave. The properties of light are typical for waves. These properties we know from water waves (diffraction, interference). We found that light



was an electromagnetic wave. The spectrum of light waves extends from a low-frequency regime (radiowaves) to a high-frequency regime (x-rays, gamma rays).

But, we can also find experiments inconsistent with a continuous electromagnetic wave. The most famous of these experiments is the so-called photoelectric effect. Albert Einstein could explain the results of the experiment in terms of light quanta which we call photons.

In summary, we realized that propagating light behaves as a wave and during the interaction with matter (atoms) it behaves as a particle (photon).

Absorption and emission of light by atoms is an important source of information in astronomy. With the help of spectral lines we can find out what elements make up the atmosphere of a star. We discussed emission and absorption lines in the context of Bohr's atomic model.

If we look at the spectrum of light which is emitted by a star we find a continuous spectrum. This can be understood within the model of a „black body" which is an object that absorbs all light that falls on it. The calculation of the spectrum by Max Planck is known as the beginning of quantum mechanics. From the spectrum we can learn about the temperature of the star.

Introduction to the Presentation Tools:

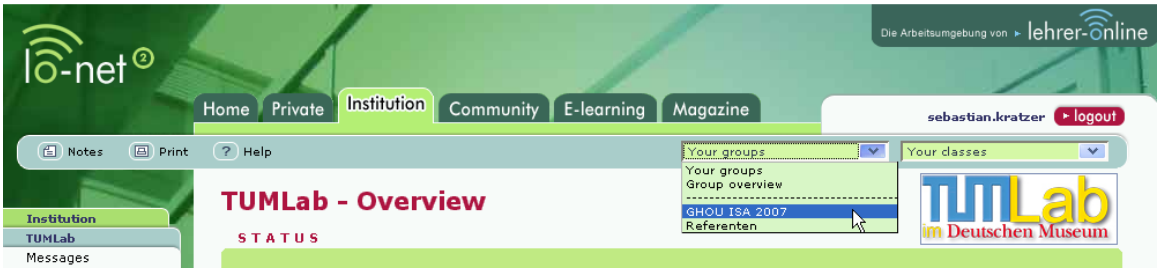
During the following part of the workshop the tools used for the preparation of a presentation were introduced:

- IrfanView is used for images. Images can be acquired via the webcam which is connected to the computer or by making a screen dump. After processing the image in IrfanView it can be copied to MS Power Point.
- MS Power Point is used for finishing the presentation.
- Microsoft „Lernen und Wissen" is used as a encyclopaedia and as an atlas.
- Google Maps can also be used especially when satellite images are needed.

Using these programmes, participants created a presentation for introducing themselves, their country and their town. In the ongoing workshop the tools were used without any further instruction.

Introduction to Communication Tools:

Lo-net2 was selected as the major communication tool. It is a web portal of the German organization "Lehrer-online" (teachers online). The URL is www.lo-net2.de. All participants and teachers were given accounts within the portal. A user group „GHOU ISA 2007" was created.



We practised how to create news and how to use directories.

As another communication tool „Skype“ was introduced. It allows free-of-charge telephone calls. As an example we used it to contact a scientist in Beijing (Hongfeng Guo). Mrs. Guo is working at the national observatory of China. She is also our contact for using a remote telescope in China.

Asteroids

Johannes Kepler suspected that there was a planet between Mars and Jupiter. Later on this idea was supported by the discovery of the Titius-Bode law, which gives a rule for the planets' orbits. This lead to the discovery of Ceres by Giuseppe Piazzi. Ceres has a diameter of 975 km.

Today, Ceres is not called a planet any more. It is one of the asteroids. Asteroids are also called planetoids or minor planets. They are mainly found between the orbits of Mars and Jupiter (asteroid belt). Jupiter's gravitation did not allow a planet to accrete within that region. The asteroid belt consists of many small objects. Ceres is the biggest object. It is assumed that within the solar system one can find up to 1 or 2 million objects having a size exceeding 1 kilometer.

Not all of the objects stay between Mars and Jupiter all the time. Asteroids crossing the orbit of our earth can be very dangerous. There is still a theory saying that an impact 65 million years ago (crater in Yucatan, Mexico having a diameter of 180 km) could have been the reason for the extinction of dinosaurs. Therefore, it is really important to know all the asteroids and their orbits. All discoveries are collected by the *Minor Planets Centre*.

Our goal is a contribution to the asteroid search.

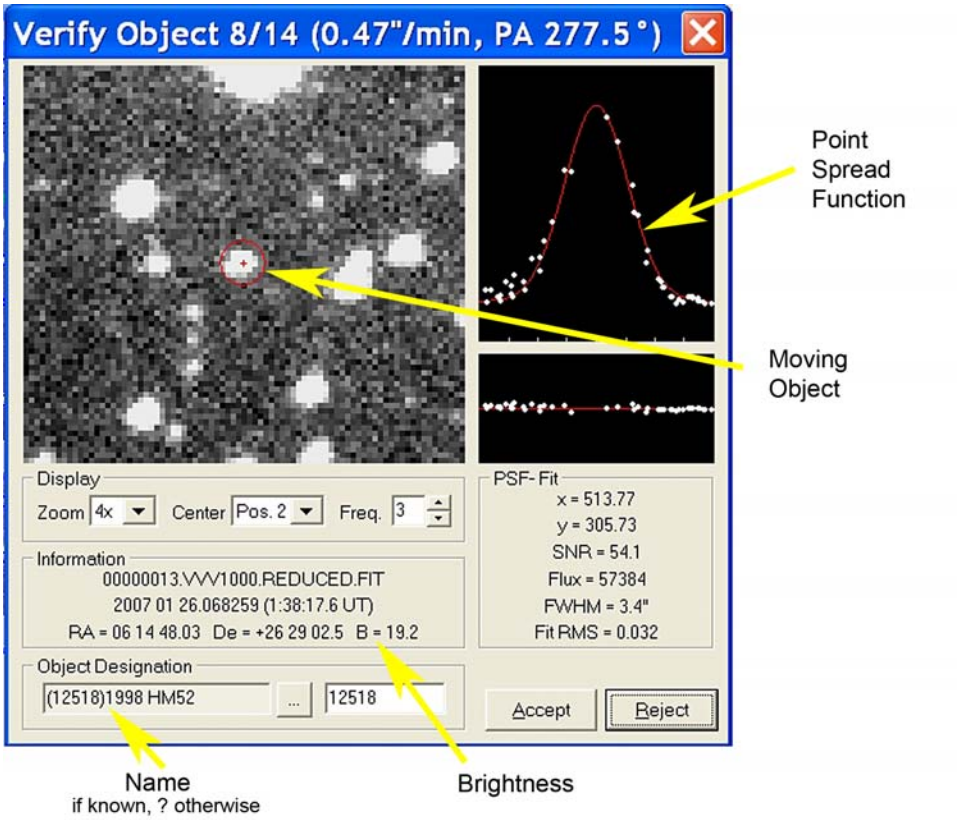
How to discover an asteroid

In order to approach this question, we used a computer planetarium called „Redshift“. The students created an animation (animated GIF) which shows part of the orbit of Ceres versus the background of fixed stars. It turns out that Ceres shows up as a fast moving object. Obviously, we have to have a sequence of images which we can use to look for moving objects.

We participated in an international project for asteroid search. Images are provided by Hardin-Simmons University in Abilene, Texas, USA. Our contact persons there prepare images of the ARI telescope (Charleston, Illinois, USA) for the asteroid search. Our software (Astrometrica) can do part of the job automatically. Frequently, the scientist has to intervene to decide whether an object might be an asteroid. He or she uses information provided by the software for the decision (see image below).

Astrometrica is also able to contact the database of the Minor Planets Centre in order to find out whether the object is already known. If it is unknown we give that information back to Hardin-Simmons University for a few further steps if necessary. If our object becomes part of the database the name(s) of the discoverers will be included.

During the workshop we practised the use of Astrometrica using “old” data (images). All participants received a version of Astrometrica and a description and we planned to participate in the following search campaign starting in October 2007. We also discussed and started to organize the analysis via our portal lo-net2. Outwards our international group should be able to act as any local group.



Remote Telescopes

One way to acquire images in astronomy is the use of so-called remote telescopes. This type of telescope is able to work on obesrervation requests automatically, or they can even be directly controlled via a “web interface”. We practised on an virtual telescope called the „Red Mountain Simulated Observatory“. It uses the Software ACP for controlling the telescope which can be found on many real telescopes.

The goal of this part of the workshop was to learn how to plan a telescope session and how to use the telescope.

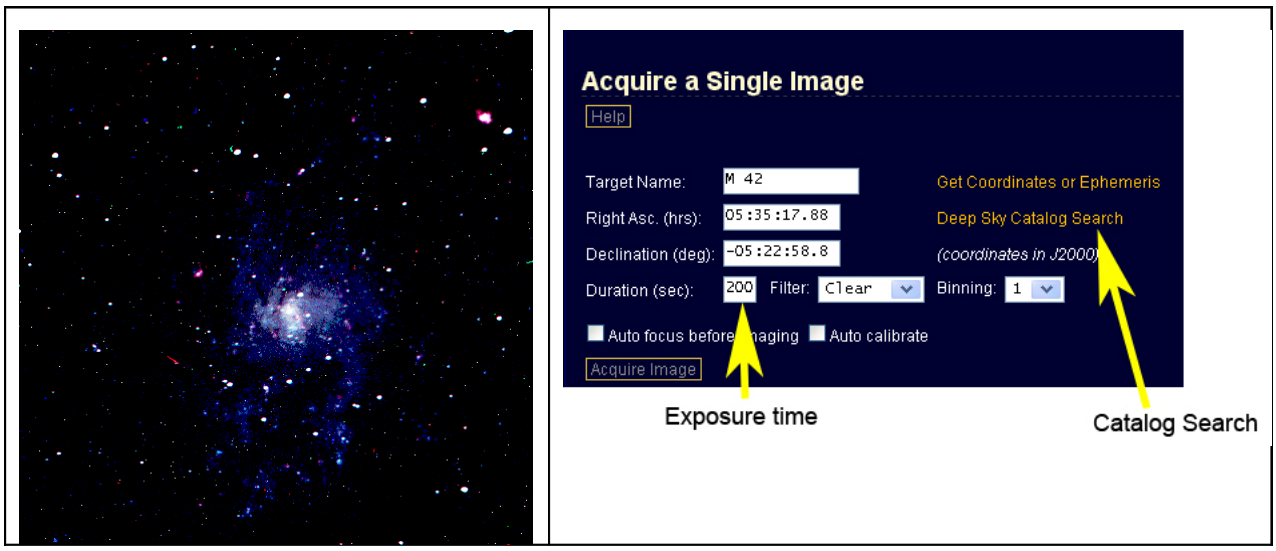
Planning a session requires the following considerations:

- The object must be more than 30° above the horizon (why?).
- Optimum use of the field of view of the telescope.
- The earth’s moon should be far from our object (>30°).
- The apparent brightness of the object should be known.

Of course, the location of the telescope must be known:

USA	N 33° 47’ 00”
	W 111° 56’ 00”
	Elevation 2225 m
http://www.simulator.my-sky.com:9080/index.asp	

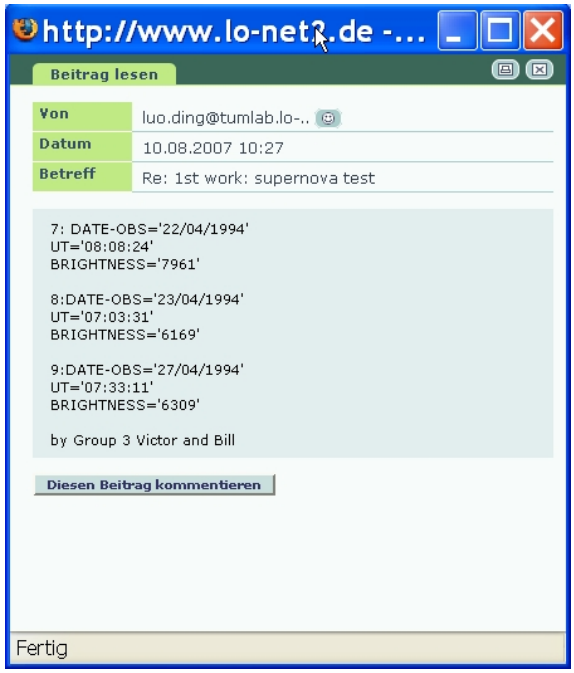
Objects of interest could be found with our computer-planetarium „Redshift“. Afterwards the observation session took place at the virtual observatory.



Supernova Light Curves - SN1994I

Supernovae are exploding stars. They are the brightest objects that we can find. One supernova can be as bright as an entire galaxy consisting of millions of stars. This leads to a method for measuring very large distances in the universe. Some years ago, measuring supernovae allowed us to show that the universe's expansion is still accelerating – this result was completely unexpected and lead to many new questions.

Measuring distances with supernovae requires a specific type of supernova. It is essential that the intrinsic brightness of the supernova is known. In that case the apparent brightness (the one we can see) allows us to calculate the distance. We call the change of brightness versus time a light curve. We can determine the type of supernova by measuring the so-called light curve.



The results were exchanged via the forum of lo-net2

A HOU group from Poland created an internet portal dealing with supernovae. The portal gives information about observable supernovae. Students can measure their light curves and they can publish them on the portal. Of course, a telescope is needed to do that.

During the workshop we practised the calculation of light curves. We analysed a set of images provided by the „HOU Curriculum". Twelve images had to be analysed. This gave us a good chance to practise working with the internet based group work (lo-net2) as well.

The workload was to be equally distributed among the students. One of the students was to act as a moderator. The moderator was responsible for the strategy, data collection and submission of the report.

Comparison of brightnesses requires images that have been taken exactly under the same conditions. This is practically impossible. Therefore, a correction is necessary before it is possible

to compare results. A normalization has to be done. To be able to do that, one has to select specific reference stars which we expect not to change their brightness during the entire period of observation. The moderator decides on the reference stars and organizes a team to put all data together in a final presentation.

Further Steps – Success and Problems

At the end of the workshop all participants has become members of a group. The group had the common experience of a very exciting week, the result of which were many ambitious plans for the future. All participants wished to meet again in the following year. The meeting place was found instantaneously – the solar eclipse beginning of August 2008 in China.

On the other hand, it was obvious that it would not be easy to maintain the group and the groups' spirit. Everybody had to go back to her/his daily business. Students had to catch up with the school curriculum and partly, they missed several exams. Teachers and students did not work at the same school in all cases.

Of course, we made up a mailing list and prepared our portal lo-net2 accordingly. In order to start activity immediately, we asked everybody to provide personal data at the internal pages of the portal.

Results until November 2007:

Bavaria, Upper Austria and Western Cape became active very quickly. We had some problems with the portal partly because error messages were not implemented in English but in German only.

Contacts to Shandong seem to be dominated by two problems:

- Access to the internet seems to be a problem
- The students had to participate in other activities (olympic games of physics)

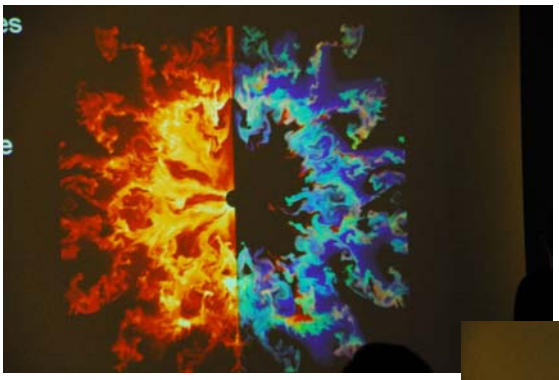
Possibly, there is also not enough time left during school.

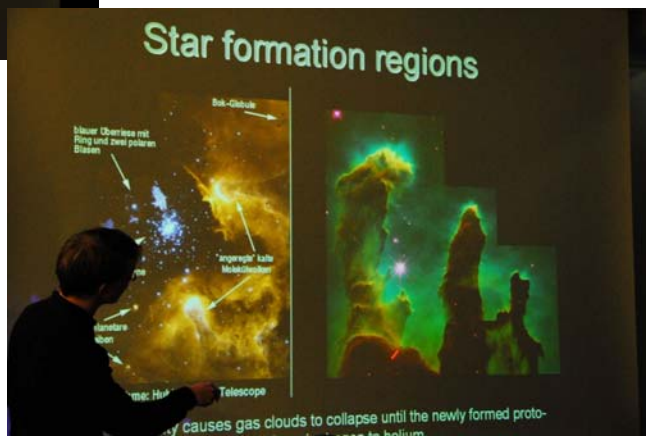
The group participated in the international asteroid research. The search was successful. Michael Dönhöfer discovered asteroid K07T15W. This was very encouraging for the group.

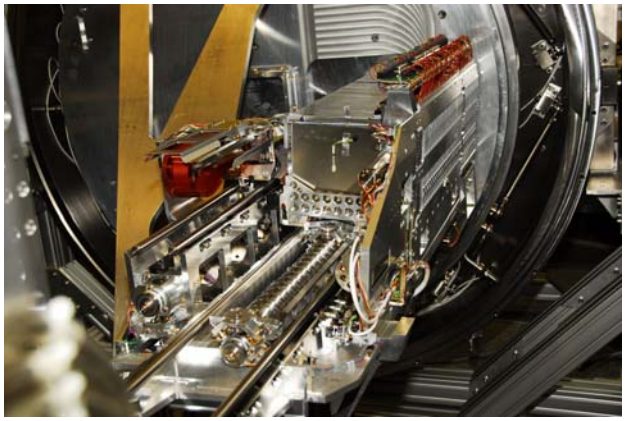
In November the students from Bavaria and Upper Austria were helping the Technische Universität München with an event in Berchtesgaden where we have founded a cluster of high schools. The high schools will work closely together in the future and they will be in close contact to the university.

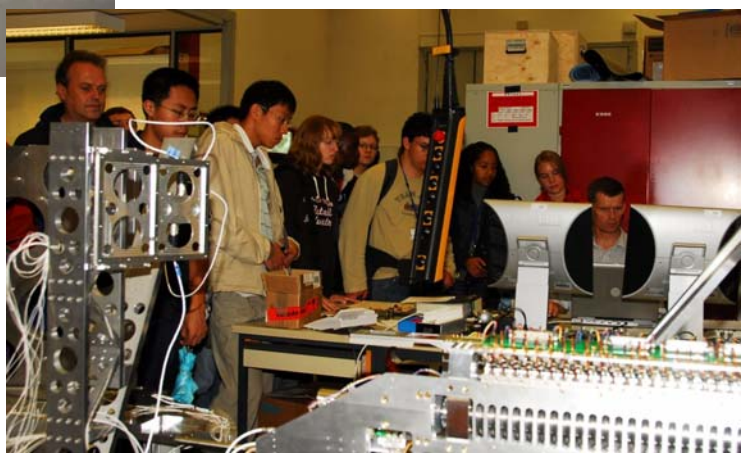
In summary we can say that it was possible to maintain an international group of students. Our activities and the common effort in solving all arising problems show that a continuation of the project is possible as it was planned. As expected a continuous interaction with the project leader in Munich is necessary. Further support by the partner regions would be extremely helpful. The long-term character of the project should be emphasized.

Excursion to the Max-Planck-Institutes at the Campus in Garching









Max Planck Institutes

During the course, data from optical astronomy were evaluated. One topic dealt with the the explosion of stars (supernovae). In some cases, the evolution of the brightness of a supernova (lightcurve) makes it possible to calculate the distance of the supernova from earth. However, how can we know the shape of the lightcurve? How can we understand supernovae?

For this reason we took advantage of the location of Munich and made an excursion to Garching which is the location of one of the most important astrophysics centres in the world. Our first intention was to find out more about the work being done by the people who develop theoretical models of star explosions. Then we wanted, of course, to see what was currently going on in the field of observation and ultimately we wanted to actually bring the stars down to earth which is why we took a look at fusion research.

The programme on our excursion day included visits to 3 of the Max-Planck-Institutes. Here is a short introduction to them.

The scientists at the Max-Planck-Institute for Astrophysics (MPA) work on different topics in the field of theoretical astrophysics. Among other things they concern themselves with the life cycle of stars, with supernovae, that is the death of certain stars and even with the development of the entire universe. Theoretical models are developed and calculations are done on large computers which are then compared to observations that have been made.

While at the MPA the main focus is on the development of theoretical models, the Max-Planck-Institute for Extraterrestrial Physics (MPE) delivers experimental data. The emphasis is, therefore, on observation and here in turn the focus is on the non-visible part of the electromagnetic spectrum (infrared, X-ray and gamma ray). The instruments, which are developed here, are frequently not used with telescopes on earth but rather with satellites, for example.

Nuclear fusion is the energy source of stars. At the Max-Planck-Institute for Plasma Physics (IPP) the fundamentals of a nuclear fusion power plant on earth are being investigated. In a fusion power plant it should some day be possible to produce energy resulting from the fusion of light atomic nuclei. The IPP runs two institutes at 2 locations – Garching and Greifswald. In Garching the researchers work with a special technology – the Tokamak (ASDEX Upgrade).

For further information about the institutes look at the Websites:

www.mpa-garching.mpg.de

www.mpe.mpg.de

www.ipp.mpg.de

Programme for the Teachers

Lectures about the different school systems in the partner regions were held at the Ministry for Education.

Andrea Martin – Bavarian Ministry for Education

Zheng Chengguo - Shadong

Jutta Wirth – Upper Austria

Nombeko Ngubeni – Western Cape

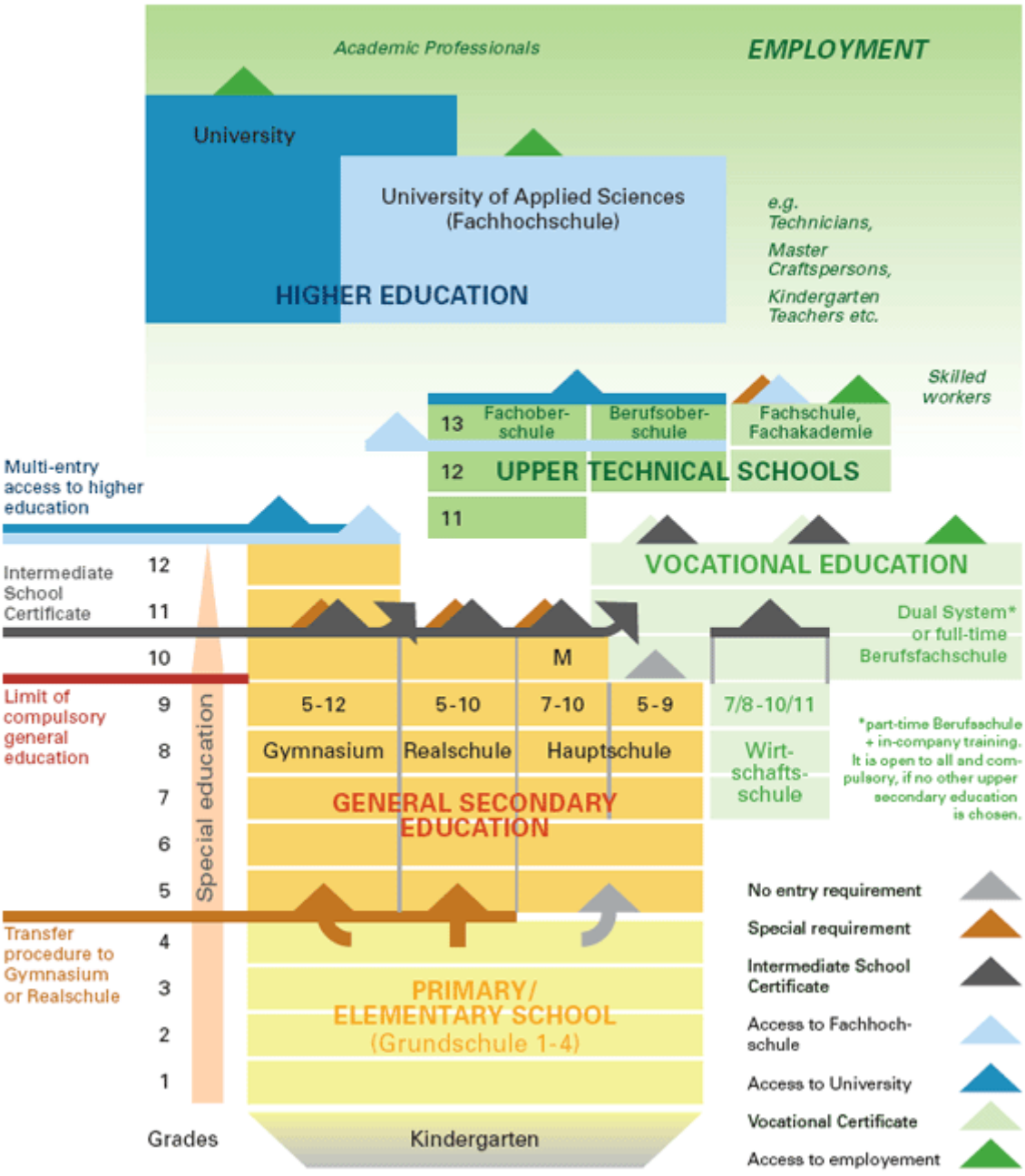
Martin Hofreiter - Bavaria

Dr. Karl Glöggler – ZLL, TU Munich

Pierre Latulippe - Québec

Lecture by Andrea Martin, Bavarian State Ministry For Education

General and Vocational Education Integrated in One Formal System



source: website of the Bavarian State Ministry for Education

KINDERGARTEN

Kindergartens are generally run by communities, private or non-profit organisations, and have to follow state-set Standards. Attendance is from 3 years to the beginning of compulsory education at 6 years. The educational aims at kindergarten level are personal development and to provide the first learning experience.

PRIMARY EDUCATION

Grundschule is normally attended by all children who have attained their 6th birthday by a given deadline in the year. In grade 4, parents wishing their children to be enrolled in a Gymnasium or Realschule apply for a Transfer Report.

SPECIAL EDUCATION

Preparatory measures for school entrance are followed by special primary, secondary and vocational education. In as far as the child's handicap permits, Integration in general schools and respective certificates can be achieved.

GENERAL SECONDARY EDUCATION

Secondary education offers streams for different educational aspirations and personal abilities. These streams are organized as separate schools with different educational approaches. Each stream features various subject group options internally.

Hauptschule (grades 5 - 9 or 5-10 with Option M) is the compulsory stream of secondary education. Pupilswith vocational orientation reach the Dual System through grade 9. Those attaining the Intermediate School Certificate through course M (7 -10) enjoy the same educational mobility as Realschule graduates.

Realschule (grades 5 -10) aims at the Intermediate School Certificate. It has an important distribution function for upper secondary education, especially for the Fachoberschule. Students entering the work force with this certificate often prefer office-related careers.

Gymnasium (grades 5 -12, outphasing course 5 -13) aims at the General Higher Education Entrance Certificate (Allgemeine Hochschulreife), which provides access to higher education, normally without further entrance exams. The upper secondary level (grades 11 -12, outphasing 12 -13) allows students to set individual priorities when selecting their courses.

VOCATIONAL EDUCATION

First stage:

Part-time Vocational School (Berufsschule) and part-time Company training complement each other in the Dual System. It mainly provides two corresponding learning locations: the school for job-related theory, and the Company for on-the-job-training. Trainees come from every type of school, including the Gymnasium. They graduate as skilled workers and are free to choose an employer.

The Berufsfachschule offers full-time courses as an alternative to the Dual System. The Wirtschaftsschule prepares students in particular for Office careers.

Technical schools:

Further professionalization

Fachschule and Fachakademie lead to middle management (e.g. as state-licensed technician or master craftsperson), to free-lance occupations or advanced careers in the social Services.

Access to higher education

The Intermediate School Certificate is required for the Fachoberschule and for the Berufsoberschule (for this school, a Vocational Certificate is also necessary). Access to higher studies is also open to Fachschule and Fachakademie graduates through additional examinations.

HIGHER EDUCATION

(Under the responsibility of the State Ministry of Science, Research and the Arts)

Bavaria's dynamic tertiary sector features international comparable Standing through-out all its institutions. There are 11 universities (9 state-run, 2 private). 19 universities of applied sciences (2 of them private) cooperate closely with the private sector. Academies of the arts and various other Colleges (for philosophy, theology, political science etc.) complete the academic institutions. Bachelor's and Master's degrees are gradually being introduced, as well as courses of study offered in the English language.

Enrichment Programmes in Bavaria

GIFTED STUDENTS IN BAVARIA

Here two questions arise: How do we define giftedness? and
How do we identify gifted students?

1 DEFINITION OF GIFTEDNESS

Research in the area of giftedness has suggested that demonstrable intellectual performance alone is not an adequate definition. The multifaceted nature of giftedness leads to a much broader definition which encompasses the notion of “potential” across many areas of human endeavour.

Thus here in Bavaria we relate to Professor Heller´s model of giftedness which is often referred to as the “Munich Model of Giftedness”. I suppose that you are familiar with that model which focuses on a broader definition of intelligence but I would rather not go into any further details here.

2 IDENTIFYING GIFTED STUDENTS

Let us now turn to the second question: How are pupils who are gifted identified?

- **parents**
  parents are in a position to observe the behaviour and responses of their child in a range of environments and a range of situations;
- **teachers**
  teachers are often in an ideal position to make a determination about the presence of giftedness in pupils under their care;

- **educational counsellors – school psychologists**
  each school in Bavaria is provided with an educational counsellor; there is a network of school psychologists who are allocated to schools within a certain area;

  in addition to that there are nine regional educational counselling centres;

  parents or teachers can contact either educational counsellors, school psychologists or the regional educational counselling centres in order to identify gifted pupils;

  the system of educational counsellors, school psychologists and regional educational counselling centres is a service provided and financed by the Bavarian Ministry of Education;

  there are also other independent highly specialised institutions in Bavaria that offer counselling for gifted students:

- **counselling institutions for high ability**
  at the Ludwigs-Maximilians-Universität in Munich and the Julius-Maximilians-Universität in Würzburg (in the north of Bavaria);

3 SUPPORTING GIFTED PUPILS AT SCHOOL

Many gifted children do not have any problems at school. The Bavarian system of provides a wide range of different measures:

3.1 PRIMARY AND SECONDARY EDUCATION (GENERAL SUPPORT)

- ***School psychologists*** give advice to pupils and parents, discuss these problems with teachers;
- ***Vorzeitige Einschulung*** (early (premature) enrolment): highly talented children can attend school one or two years earlier than other pupils;
- ***Drehtür-Modell*** (revolving door model): children can attend certain subjects of a higher age group;
- ***Überspringen*** (grade skipping): a pupil moves through the curriculum at rates faster than typical;
- ***Innere Differenzierung*** (inner differentiation)*:* within a lesson groups of pupils are given different tasks according to their ability;
- ***Pluskurse*** (advanced courses)*:* special courses with demanding subjects.

3.2 PRIMARY EDUCATION

- *Projekt "Besondere Begabungen an bayerischen Grundschulen finden und fördern"*
  The past few years we have been working on a very interesting project. The project was launched by the scientific institut of the Bavarian Ministry of Education. The aim of this project is that primary schools within an area are provided with a counsellor for high ability. → This means gifted children are identified at an early stage and can then be supported accordingly.
  The advanced training for such counsellors (teachers) is held at a teacher training institution in Dillingen (Akademie für Lehrerfortbildung).

3.3 SECONDARY EDUCATION

- ***Educational system***: provides early selection
- ***Classes for gifted students***: in secondary education there are already classes for schools in Bavaria which provide classes for very gifted children;
- ***Schülerakademie (freiwillig)****:* in some parts of Bavaria able pupils can attend certain courses once a week throughout the year;
- ***competitions****:* competitions on a regional and national level in a variety of subjects;
- ***Summer camps***: every summer there are summer camps for gifted students;
- ***Frühstudium an Hochschulen***: very able pupils can start studying, that means they attend lectures at university but go to school at the same time;
- ***Talent im Land***: this is a programme that aims at pupils whose parents have migrated to Germany;
- ***Elite Network of Bavaria***: all Bavarian students with excellent results in their leaving certificate are invited to participate in a special exam, if they pass they belong to the Elite Network of Bavaria.

4 SUPPORTING GIFTED STUDENTS WITHIN HIGHER EDUCATION

The Elite Network of Bavaria is a programme intended to support gifted students and in parts it has recently been restructured and reformed. The objective of this programme is to support gifted students with individually designed ways to develop their full potential. The Bavarian Elite Support Law (Bayerisches Eliteförderungsgesetz/ 'BayEFG') has introduced a support programme which is based on the individual demands of gifted students and graduates.

4.1 APPLICATION

This programme supports

- Bavarian students with excellent results in their leaving certificates which allow them to enter university (a grade average of at least 1.3) and
- students enrolled at Bavarian universities

The programme is merit-based, not need-based. Students who meet the requirements for support must be nominated either by their headteacher or a university professor.

University graduates and postgraduates with excellent academic performance enrolled at a Bavarian university may also be recommended by their tutors. The student has to participate in a doctorate programme in order to be eligible for support.

4.2 SUPPORT

The support for highly gifted students, graduates and postgraduates is mainly based on academic assistance. The programme focuses on the students´ participation in excellence programmes. Mentoring and tutorial programmes are included. Financial assistance can be given for a term abroad.

Students are supported for the duration of their periods of study. Doctorate students may receive support for a maximum of three years. Postgraduates are normally supported from six to twelve months, but no longer than two years.

The BayEFG grants support only for Bavarian students and students enrolled at a Bavarian university. Foreign students who meet the requirements are also eligible for the programme.

Speech by Jutta Wirth M.A., Teacher from Upper Austria

Ladies and gentlemen!

I was asked by Mrs. Reich to tell you about measures and aims which are set in my region to support highly gifted and talented young people.

First I´d like to introduce myself. My name is Jutta Wirth. I studied mathematics and physics in Linz in Upper Austria. I teach these subjects and the subject science lab at the Europagymnasium Auhof in Linz. I still enjoy working with children and young people.

I have experience in training pupils for the competitions of the Olympics in physics for about 20 years.

Let me give a short summary of the Austrian school system. (ev. OH).

We have a compulsory education from 6 to 15 degree. Children usually start with the primary school which lasts for 4 years.

Afterwards there are two possibilities for further education depending on the special needs of every child: The general secondary school (Hauptschule) or the academic secondary school (Gymnasium). Let´s take a more detailed look at this school type. The academic secondary school comprises a four-year lower level and a four-year upper level terminating in the matriculation exam (Reifeprüfung). There are different types of academic secondary schools setting up priorities for example on science and mathematics, foreign languages or home economics und nutrition. After the lower level pupils can change to secondary technical or economical vocational colleges. The matriculation is the entrance exam for universities, higher technical colleges and all kinds of academies.

The followings remarks will deal mainly with measures which are set in the academic secondary school.

The main purpose of my speech is to give you an overview of the programmes for gifted and talented pupils in Austria especially in Upper Austria.

A decree which was sent out by the Federal Ministry of Education in the year 2005 says that every school has to develop an individual plan for supporting its pupils. Apart from preventing the failure of students this plan has to include also steps to extend thesupport of gifted and talented learners. Every school has to evaluate this supporting programme periodically.

There are 2 basic opportunities:

Intensive individualisation and differentiation of education in the classroom on the one hand and additional offers on the other hand. As you can imagine the first possibility is not so easy to realize in a class with about 30 pupils. Therefore you have to practice new ways of educational training such as open learning, e-learning, working on projects and so on.

Now let´s move on to the additional offers which Austrian schools provide in particular. I have prepared a transparency. (OH)

Children are allowed to start with primary school one year earlier provided their parents submit such a request and the children are not overtaxed by the requirements of the first grade.

For very talented learners skipping one grade or two is possible. Grade-skipping is now also possible when it involves a change of school type. So it may happen that a student finishes academic secondary school already at the age of 16.

A very interesting and popular concept is the revolving door model. That means that students leave their classrooms during some periods and work in the library or in the computer room. They work on a special topic they have chosen before. They are coached by teachers. At the end of the year the results have to be presented as a written paper or as a verbal presentation in the student´s class.

"Pupils attending university": The project offers highly gifted pupils the opportunity to enrol at university and take courses while still attending school. After their matriculation exam, these pupils receive full credits for completed courses. Some benefits of this project are: early chance for orientation, shortening duration of studies, getting to know university life, recognition of special talents and strengthening the cooperation between schools and universities. One of my pupils who was very talented in physics attended physics lectures already at the age of 15.

In February this year the "Nanotechnology-week" took place for the third time. 5 students of the 6th or 7th form of our school were invited to spend 5 days at the Johannes- Kepler-University in Linz. They were introduced into topics like scanning-tunneling-microscopy, atomic-force-microscopy, organic solar-cells or photolithogravy. Every day they got to know a different institute. In the morning one of the students had to talk about the theoretical background of one of the topics. In the afternoon the students made experiments coached by university teachers or university students.

The Federal Ministry of Education offers interested pupils the opportunity to participate in several contests and Olympics (OH). There are the sectors sciences (mathematics, physics, chemistry, information science), humanities (classical and modern languages, philosophy), economic and technology (one project is called "Youth innovative") and music and sports.

In Upper Austria an association called Stiftung Talente has been founded which is a cooperation of our school authority with some economic and industrial institutions. It has the intention to support highly gifted pupils. It should provide information at schools and does general PR-work. Different firms are sponsors of workshops, academies, contents and Olympics. The association offers service, information and help for parents, who also get the opportunity to come together in special groups.

Science and research: In the foreground there is the teacher training on different institutions. Teachers have a number of opportunities to improve their abilities.

Now I would like to turn your attention on a specific Austrian school, the Sir-Karl-Popper-School in Vienna. This is our one and only institution of this kind. It´s a part of a regular academic secondary school. The SKP-school lasts 4 years, from 15 to 18. Every candidate has to pass two different tests and a personal dialog. One of the special qualities of the SKP-school is the coaching system. One member of the team of teachers coaches a group of four to fife pupils individually. This person is not allowed to teach the pupils in any subject. The aim of the weekly coaching lesson is that the members of the group find out their special talents. They get support from the teacher and especially from the other members of the group by learning to reflect.

Let me now talk about my work.

As I said before my special interest and experience lies in physics. Our school has a long tradition in offering special courses for highly interested pupils in chemistry and physics.

I started in the year 1988. I was a young teacher and I did not know if I could stand the challenge. The only help I got was a 3 day seminar. In those days I spent a lot of time to get specific knowledge of all fields dealing with physics. I worked hard to be prepared for the questions of my pupils.

Usually about 9 to 13 pupils attend a physics Olympiacs course. They are 13 to 18 years old and have very different pre-knowledge. They work together in groups according to their level. Thus it may happen that a highly gifted 14 year old girl or boy is in a group with students of the final grade. The main stress of my preparation courses is on experiments. My students enjoy working practically. They are required to create experiments by themselves to get wanted conclusions. That ´s not so easy, but in the course of time they gain more and more experience.

How do I find out about talented pupils? I generally recognize a pupil by the way he or she puts a question. That's independent from the age and you can recognize it after a short time working with the pupil.

Every year the young physicists have to absolve a number of contests: at first the course competition, the next step is the contest among participants of all Upper Austria, then there is the national contest. About 15 students get a very hard preparation in the 2 weeks before the national contest. The contest itself lasts for 2 days, 5 hours for theoretical problems and 5 hours for practical experiments. The top 5 students of the participating countries are allowed to go to the international contest of the physics Olympics, which for example took place in Isfahan, Iran this year. About 350 highly motivated young people work hard to solve a lot of very difficult problems, honestly most of them are too difficult for me.

As a conclusion of my presentation I´d like to quote Albert Einstein who said:

"Ich bin nicht besonders begabt, aber ich bin sehr neugierig."

"I am not exceptionally talented but I am very curious."

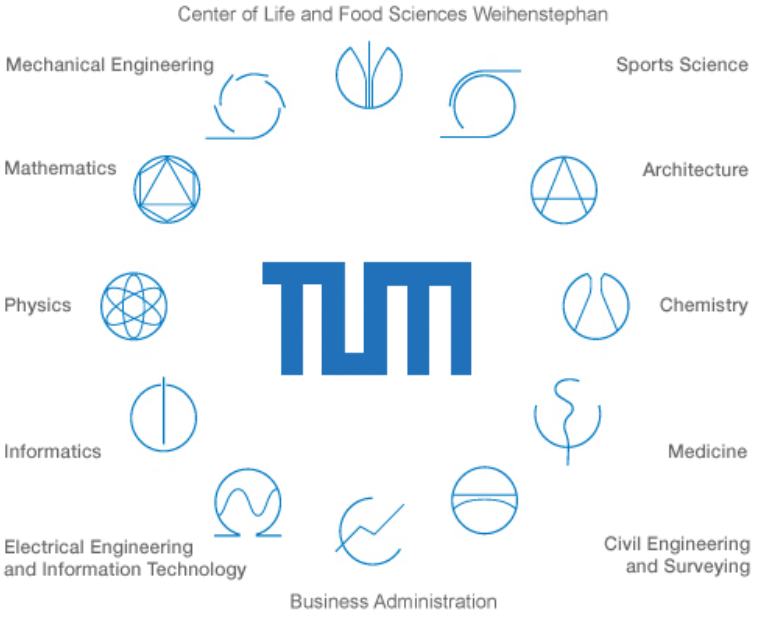
Thank you very much for your attention!

Dr. Karl Glöggler, Managing Director, ZLL

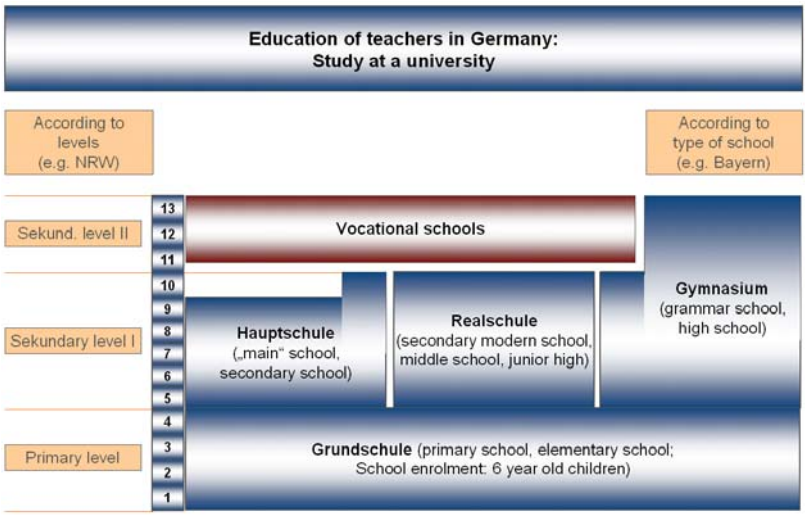
Teachers' Activities

On Thursday morning the teachers where welcomed to the "Zentralinstitut für Lehrerbildung und Lehrerfortbildung (ZLL)" (Central Institute for Teacher Education and In-service Training) of the Technische Universität München by Dr. Glöggler.

He gave a talk about the Technische Universität München (TUM), its ZLL and the teacher education in Germany. Finally he explained what the student were about to learn and do on that day – how to plan and execute a telescope session, in this case with a remotely controlled telescope.



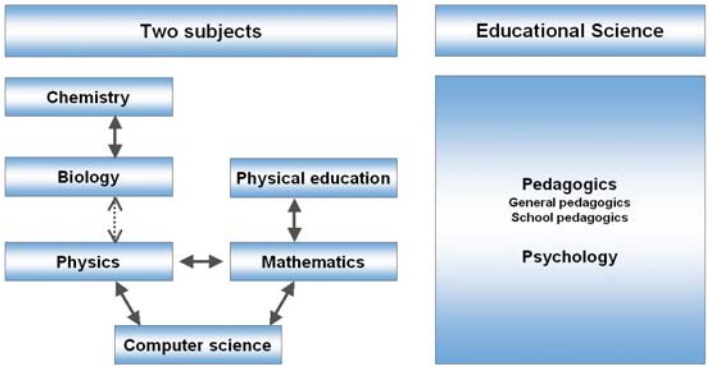
The Technische Universität München (TUM) is composed of 12 faculties, which are all more or less concerned with teacher education, although the TUM is not a typical representative herein: Only 5% of the students at the TUM are enrolled in study courses for teaching.

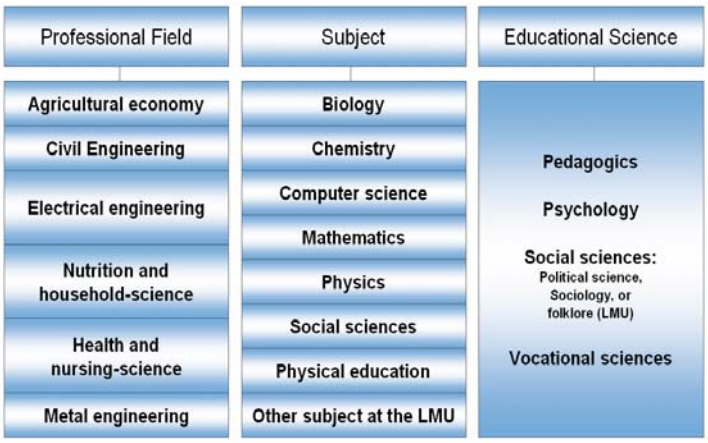


In Germany teacher education is not a matter at federal level but of the "Länder", as the individual states are called in Germany. Therefore teacher education differs a bit from state to state. Summarizing what Mrs. Martin said at the "Bayerisches Staatsministerium für Unterricht und Kultus" (the Bavarian State Ministry for Education) at the beginning of the week, the figure below gives a simplified overview of the Bavarian school system, which is of course similar to the school systems of the other Länder and on this note typical for Germany. The Gymnasium usually leads to university. Haupt- and Realschule mainly lead to a vocational education in the so called "Duales System", where the students learn the more theoretical contents at a vocational school and parallel to this the more practical skills in a company. But this is not a dead-end street: There are some vocational schools (like technical colleges), that confer a university-entrance diploma, and some, that provide further vocational training leading to, for example, an advanced technician degree.

Some states (Länder) educate their teachers according to the level they are to teach at, like for example teachers for secondary level I. In other Länder, e.g. Bavaria, teachers are educated according to the type of school, for example teachers for highschools.

The TUM provides two appropriate courses to become a teacher: One for highschool teachers in six different combinations of subjects and one for teachers at vocational schools in more than 60 possible combinations.





Teachers for highschools have to study two subjects (each comprising about 44% of the entire volume) and educational sciences (approx. 12%), teachers for vocational schools a professional field (approx. 50%), a subject (approx. 30%) and also educational sciences (approx. 20%). The studies are supplemented by internships at schools and industry. The two figures show the total supply at the TUM.

After graduation the teachers-to-be have to attend two years of teacher training at school, before they are qualified for appointment as a teacher in public (council) schools.

In order to internationalize the studies for teachers, the courses are currently being converted to a Bachelor-Master structure.

More about the Central Institute for Teacher Education and In-service Training see below. To the topic how to plan and execute a telescope session see scientific programme.

In the afternoon the teachers visited the Laboratory for High Voltage Technology and Power Transmission. Located in the large high voltage hall they could see a cascaded transformer for AC-Voltage up to 1.2 Million Volts, one for DC-Voltage up to 1.4 Million Volts and an impulse generator, that can supply a voltage up to 3 Million Volts. The photograph below gives an impression of this very large hall and its equipment. In smaller laboratories there were much more electrical gadgets to marvel at.

All this equipment is used to do research on properties of insulating materials, improving gas insulated systems, nano filled materials for high voltage technology and lightning protection of wind turbines. These topics were explained to the teachers very competently by the researchers who are very committed to their projects.

In the early evening there was a bit of time to visit the castle Nymphenburg for both, students and teachers.

Laboratory for High Voltage Technology and Power Transmission

Lecture on Telescopes and Observation of the Night Sky

On Monday evening Martin Dietzel of Astrocom, gave a short summary of the history, the state of the art and the future of telescopes as well as the technology involved. He talked about the different kinds from the first simple telescopes, medium-sized observatories and Radio-arrays to the modern high-end telescopes such as the Very Large Telescope in Chile. The logistic difficulties incurred when working with large telescopes, when for example, the extremely sensitive 8.4 metre mirror is transported to its place of installation, was also talked about.

During the observation which followed the lecture it was possible, in spite of the somewhat dense clouds, to have a look at many of the beautiful objects in the night sky. From the large globular cluster in the northern hemisphere M13 and the remains of former suns, the planetary nebulae M27 and M57 (Ring Nebula), to the smaller objects such as M92 (globular cluster) and M 56 (open cluster), all these objects were sighted. The superb and colourful binary star Albireo was also on the agenda. Binoculars were available for wide-range viewing as well, which allowed impressive sightings of the two open clusters h and chi in Perseus as well as a less known but striking asterism, Brocchi's Cluster, (also known as the Coathanger or Collinder 399).

Martin Dietzel managed the telescope

We thank Astrocom for their support and for allowing us the use of a MEADE telescope

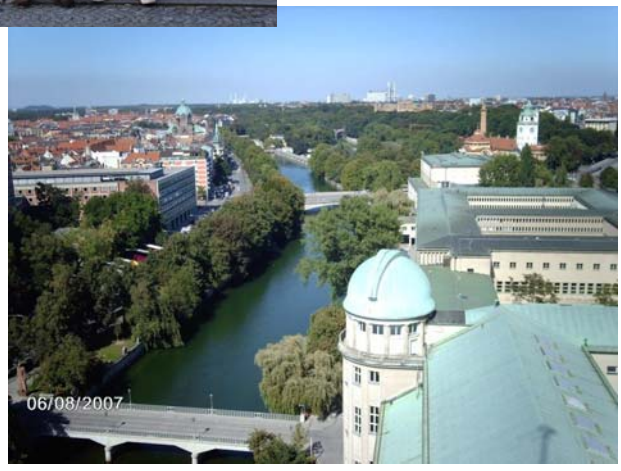
State Minister Schneider in the TUMLab

Student lecture at the youth hostel in Possenhofen

At work in the TUMLab

Lecture in Possenhofen

Sightseeing in Munich and vicinity




06/08/2007

The Team of Scientists

Dr. Andreas Kratzer studied physics at the Technische Universität in Munich. His diploma thesis dealt with the investigation of magnetic materials under high pressure. For his PhD thesis Andreas set-up experiments for the investigation of rare earth and actinide compounds using the μSR-method. He did his research in Canada, England and Switzerland. Now Andreas is working in didactics of physics at the Technische Universität in Munich. Among his many activities in the science, he is the contact person in the German-speaking part of the world for the project 'Hands-on Universe'. Andreas was responsible for the creation and supervision of the scientific programme as well as the subsequent work on the project.
When Andreas is not busy teaching physics he likes to spend time investigating the scientific aspects of the restoration of old textiles like tapestries and clothing dating centuries back.

Dipl.-Ing. (FH) Mike Kramler began his career in radio electronics. He then studied at the University of Applied Sciences in Munich and received his diploma in electronics. His working experience has been diverse including 2 years of teaching at trade school. Since 2003 he has been working with the Technische Universität (TU) in Munich and was involved in putting the concept of a student-teacher laboratory into practice in the form of the TUMLab in the Deutsches Museum. Not only does he teach courses in the TUMLab he designs and develops them as well. He has helped organise the Robotics competitions which take place at the TU each year. As a member of the team organising the International Summer Academy he will be assisting with the scientific program through the week.
When Mike is not working with computers and making sure that everything in the TUMLab is running smoothly he likes to spend time doing photography, exploring by bicycle or sometimes putting funny pieces of furniture together in his carpentry shop.

Dr. Karl Göggler studied engineering and mathematics at the Technische Universität (TU) in Munich. His diploma thesis dealt with an e-learning platform for university students regarding the contents of telecommunication. After doing his diploma, Karl did his PhD thesis on "action orientated education" in the professional field of electrical engineering. This lead to his career at the ZLL (Central Institute for Teacher Education and In-service Training). As well as being Managing Director of the ZLL he participates in the Global Hands-on Universe programme attending conferences all over the world. During the week of the Summer Academy he accompanied the teachers.
When Karl is not managing the ZLL he is travelling to conferences world-wide or setting up a telescope to observe the night sky.

The Organisation Team

Cornelia Gottswinter is Project Manager of ‚Jugend und Wissenschaft e.V.' She has been working with gifted young people for many years and has designed and created several special science projects for the extracurricular enrichment of talented young learners. Planning and organising courses and academies for these young people is among the many things she does for 'Jugend und Wissenschaft e.V.' One of her special areas of focus is the promotion of girls' participation in science programs. As well as having planned and organised the International Summer Academy she will be in charge of organisation during the week.

When Cornelia is not busy planning and organising enrichment activities for talented young people she spends her free time travelling and sightseeing.

Penny Reich is the chairperson of 'Jugend und Wissenschaft e. V`. After studying German as a foreign language at the Ludwig-Maximilians-Universität in Munich she taught German to foreigners for several years. In the last 5 years, however, her focus has been on gifted young people. Among other things she plans and organises enrichment programs for these youths. Together with Cornelia Gottswinter she has planned and organised the International Summer Academy. During the week she will also be in charge of organisation.

When she is not sitting with Cornelia discussing and arranging enrichment activities for young people she is sitting on a horse enjoying the ride.

TECHNISCHE UNIVERSITÄT MÜNCHEN

'At home in Bavaria, successful in the world'. That is our motto, linking provenance and posterity. Our graduates are active throughout the globe, our professors at home on an international platform. The secret of our success comprises numerous components: competence in one's field of special interest; communicativity with associate departments; cross-curricular, transdisciplinary team spirit, alliances with professional practice. Unafraid of taking risks, we are breaking new scientific ground. Ingenuity and normality, ivory tower and workbench, lecture room and laboratory, traditional beer brewing and 'virtual reality' – the Technische Universität München nurtures all these features under its collective roof.

True to our origins, ever since the Technische Universität München was founded as a 'polytechnic school' at the heart of Europe in 1868, we have played an active role in transforming Bavaria from an agricultural state to a high-tech location. Rooted in this tradition we created a powerful international network. We are now an international university. One in every four undergraduates within a total student body of approximately 20,000 comes from abroad. The four-leaf clover symbolises our scientific spectrum: natural sciences, engineering sciences, medicine, life sciences.

In our capacity as an up-to-date entrepreneurial university, we pin our hopes on the vast range of human skills, identifying and sponsoring talent. We create teams by pooling new strengths. This leads to top performance and supports Corporate Identity.

Creative licence in the multifaceted world of science ranks high at the TU München. This particularly applies in the case of the TUM Institute for Advanced Study currently under development. It is based on the conviction that an atmosphere of creativity and inspiration, freedom and unbureaucratic support is the most productive source of progress for outstanding scientists.

One of our visions is the goal of becoming the most attractive technical university for women in Germany. With the help of unconventional measures, we want to create a seat of learning and a workplace that complies with the special needs of women and young families.

contact: presse@tum.de

Zentralinstitut für Lehrerbildung und Lehrerfortbildung

The Central Institute for Teacher Education and In-service Training (ZLL)

Every faculty at the TUM is in some way involved in teacher education and in-service training, but each faculty supplies only parts of the courses. Moreover, depending on the combination of the two mandatory subjects a student chooses, different groups of faculties have to be co-ordinated within the same study course – with regard to lectures and examinations. As a consequence the TUM founded a central institute, the ZLL, to attend to interest in the field of teacher education and in-service training all across the diverse faculties.

As well as co-ordination tasks the ZLL offers support to all teacher students especially concerning course guidance. It supplies places of extra-curricular activities for school students and therefore operate the “TUMlab im Deutschen Museum” and “TUMScienceLabs” in Garching and Freising/Weihenstephan.

Moreover the ZLL evaluates the study courses for teachers and works on their enhancements, especially on the improvement of the relationship between the courses and the practical application at school. Therefore the ZLL conducts a network of “Referenzschulen” (co-operation schools) and is responsible for the distribution of the resources, dedicated to teacher education at the TUM. Last but not least, the ZLL supplements these activities with related research on teacher education.

TUMLab im Deutschen Museum

Tell me and I will forget – show me and I will remember – let me do it and I will understand.

(Confucius)

The goal of the TUMLab in the Deutsches Museum is to intertwine the work done in the laboratory with the exhibits in the museum. The displays supplement the content of the courses offered in the laboratory which also provide background information concerning certain parts of the exhibits. In this way we want to incite the visitors to take a voyage of discovery as well as demonstrating the unique quality of information that the museum offers. Compared to modern electronic sources of information, it would be hard to find anything that surpasses the museum.

In the lab we bet on the visitor's curiosity and willingness to tinker. The competence of the TU and its partners are at the disposal of the participants. The learning goals, which we have set for ourselves, can be reached in different ways.

The range of courses we offer are divided into various subject areas (modules). All courses of each module are offered to different age groups. The requirements for participation are included in the course discription. Visitors can also take part in courses of increasing difficulty consecutively.

The lab has the capacity for a maximum of 16 participants. School classes can be divided into 2 groups. While one group works in the lab the other one can look at the exhibits in the museum. In some cases the researcher questionaires of the museum can be used.

As is the case in all laboratories we keep protocols: the TUMLab logbook. Here all information is recorded. It also serves as a guide through the course and can later be used as a reference book for the participant.

www.tumlab.de

Jugend und Wissenschaft e. V.

Children are not casks to be filled,

but fires to be ignited. (Rabelais)

With the words of the humanist Rabelais in mind the idea to found the association 'Jugend und Wissenschaft e.V.' was born. In the spirit of this metaphor our goal is to ignite these fires with exciting extra-curricular programmes dealing with various scientific topics. With the project 'Youth Forum' a constellation of diverse projects and activities offers a long-term enrichment programme to keenly motivated and gifted youths. As a proud partner of the Technische Universität in Munich we are able to offer the finest instruction under excellent working conditions. Our instructors are scientists and experts from one of Germany's elite universities and our activities take place in the TUMLab in the Deutsches Museum or in research facilities on the university campus. In this way our participants are not only working with real scientists and researchers; they also have access to demonstrations and lectures given by experts on the premises of other world-renowned research centres like the Max-Planck-Institutes.

The wide range of projects we make available to gifted young people not only serve the purpose of satisfying the quest for knowledge; they also help these young people to find their own major areas of interest. Our goal is to offer long-term enrichment for students at secondary level. We at Jugend und Wissenschaft e.V., however, are not only concerned with the development of the individual talent. The cultivation of interpersonal relationships and mutal support amongst the participants is also a focal point of the projects we create. As well as taking part in workshops, academies and courses the participants, who show the aptitude, are given the opportunity to train to become JuniorExperts or mentors of pupils. Younger or newer participants benefit from the support of more experienced youths who themselves have profitted from their own participation in our projects. In this way, those participating can also become directly involved in the creation and organisation of further projects. Ideas for new projects and courses have been developed by avid young people who are members of Jugend und Wissenschaft e.V. We welcome their enthusiasm and do everything possible to implement and support their ideas.

After several years of working in the field of gifted education 'Jugend und Wissenschaft e.V.' has acquired a wide range of experience regarding the creation of enrichment programmes for gifted and talented young people. For this reason we were most happy to accept the appointment from the Bavarian State Ministry of Education to organize an international summer academy for gifted students from the partner regions of Bavaria.

'Jugend und Wissenschaft e.V.' has been very pleased to organize and host this unique project which, as the first academy of its kind, is a pilot project that we hope will give the impulse for further meetings of the talented young people of the partner regions.

Working with and promoting gifted and talented young people is not only a matter of great importance to us, it is a most pleasurable challenge.

www.jugendundwissenschaft.de

Deutsches Museum

Founded in 1903 by the engineer Oskar von Miller, the Deutsches Museum in Munich is now one of the most important museums of science and technology worldwide. With 70,000 square metres of exhibition space - 50.000 of them located in the parent house on the museum island - and an extensive stock of valuable original technical and scientific exhibits, it is not only one of the largest museums in the world, but also one of the most successful, attracting almost 1.4 million visitors a year. For more than 100 years it presents the technical and scientific achievements in an exciting and accessible way, whilst also reflecting the related process of social change.

The "Kinderreich" opened in 2003 is for the youngest researchers, introducing in a playful and imaginative way some basic aspects of science and technology. From 2008 on a new "Center of New Technologies" will be devoted especially to current research and upcoming technologies.

The new Transport Museum, the "Verkehrszentrum" at the Theresienhöhe, displays the famous collections of the Deutsches Museum of automobiles, bicycles, coaches and railway vehicles.

The "Flugwerft Schleißheim", located at Germany's oldest maintained airfield north of Munich, presents exhibitions on aviation and space flight.

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ASTELCO has designed a series of alt-az telescopes from 0.6m to 1.4m aperture, as well as a series of 0.4 to 0.6m telescopes that can be operated on a universal mount in either alt-az, alt-alt or equatorial mode, reflecting the needs of special applications. All designs use industry-leading, state-of-the-art technology.

ASTELCO's genuine operating software was carefully developed over years, putting together own experiences of the past 15 years, as well as valuable input from scientists of observatories around the world. It guarantees flawless operation and permits user-defined access to allow researchers to add own functionality. Multi-layer software architecture permits optimum performance on all levels with easy, remote-access error handling.

ASTELCO Systems is engaged only in telescopes and related technology as the main business. The entire ASTELCO team consists of people that have been involved with astronomy for a very long time. ASTELCO's software engineers have decade-long experience in telescope control.

"We understand ourselves as one of the many arms of scientific research, listening to scientists and providing them with what they need to achieve their goals. Many of our projects are requests from the astronomical community, which we turn into ready-to-buy products."

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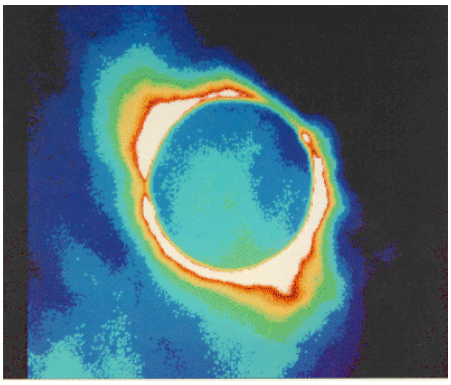

Hands-On Universe, Germany

In 1998 the newest results of the „Supernova Cosmology“ project (Lawrence Berkeley National Laboratory) were acclaimed by the American magazine „Science“ as the „Breakthrough of the Year“. Based on the calculation of the distance of type 1a supernovae and the observation of their red shift the rate of expansion of the universe can be calculated. From this newest data it can be deduced that the expansion of the universe is accelerating. In conjunction with the „Supernovae Cosmology“project, Hands-On Universe (HOU) came into being in 1992 in order to give students and teachers the opportunity to share in these fascinating scientific adventures.

Hands-On Universe concerns itself with astronomy. No other topic fascinates people in the same way or has the same relevance for the history of mankind or for the natural sciences. As a living field of research it offers access to the global network in the world of science. Today, due to modern forms of communication science is within reach of everyone. This close contact to current research would not have been imaginable a few years ago. The access to scientific resources can put forth a new quality in education which could go as far as involvement in scientific projects.

Since 1998 students in Germany have also had the opportunity to participate in Hands-On Universe. The Technische Universität München (TUM) has promoted its introduction here. Thanks to the establishment of the TUMLab HOU courses can be offered on a long-term basis and futhermore, the TUMLab is a central contact for the world wide activities of the project „Global HOU“.

In the meantime, Global HOU can be found on 5 continents. For this reason, not only scientific work but intercultural exchange is another one of the distinctive features of this project.

http://hou.ph.tum.de

http://www.ghou.org

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Dr. Andreas Kratzer, TU München

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Cornelia Gottswinter, Jugend und Wissenschaft e. V.
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