



**European
Union
Contest for
Young
Scientists**

*15 – 22 September 2001
Grieghallen, Bergen, Norway*



EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL



AIMS AND OBJECTIVES

The European Union (EU) Contest for Young Scientists, an initiative of the European Commission, was set up to promote the ideals of co-operation and interchange between young scientists. The Contest is the annual showcase of the best of European student scientific achievement and as such attracts widespread media interest.

The EU Contest gives students the opportunity to compete with the best of their contemporaries at European level. The young scientists also have the chance to

meet others with similar abilities and interests and to be guided by some of the most prominent scientists in Europe. In this way, the Commission seeks to strengthen the efforts made in each participating country to attract young people to careers in science and technology. Only projects that have won a top prize a national young scientist competition, can participate in the EU Contest. Thus, it represents the ultimate goal for more than 30,000 young scientists who compete annually in their national contests.

The first EU Contest took place in Brussels in 1989. Since then, the event has been

hosted in Copenhagen, Zürich, Seville, Berlin, Luxembourg, Newcastle upon Tyne, Helsinki, Milan, Porto, Thessaloniki and Amsterdam.

This year from 15-22 September 2001, the 13th EU Contest will take place in Bergen, Norway. Next year Austria will host the 14th EU Contest.

The Contest is part of the EU's Improving Human Potential (IHP) programme (1998-2002). Within the European Commission, the IHP programme is managed by the Research Directorate-General.

CONTACT

For more information, please contact:

GRAHAM BLYTHE
EU Contest for Young Scientists
DG Research – Directorate C
SDME 3/52
European Commission
200 rue de la Loi/Wetstraat 200
B-1049 Brussels
BELGIUM
Tel: +32 2 295 58 22
Fax: +32 2 296 32 70
E-mail: graham.blythe@cec.eu.int

Narrow Bergen alley
(Photo: Bergen Tourist Board)



THE 13TH EU CONTEST FOR YOUNG SCIENTISTS

Following the National Contests, which are held across Europe from October 2000 to May 2001, the EU Contest takes place in four stages:

1 Winners of the National Contests are selected to represent their country at the EU Contest. (Only National Organizers can submit proposals - see below). Currently, 32 European countries and the *European Schools* take part;

2 The EU Contest Jury receive copies of the written projects and preliminary assessments are made. For those projects that lie outside their scientific domain, members of the Jury consult other experts in the relevant field;

3 The 13th EU Contest takes place in Bergen, Norway.
18-21 September 2001
All contestants display their projects on stands in Grieghallen, where members of the Jury con-

duct discussions and interviews with the contestants.

21 September 2001
Award Ceremony, Press Conference, and official Reception.

4 Selected Contest Winners represent the European Union at other international science events in Sweden, the United Kingdom, and are chosen to work with leading scientists and engineers on projects organized by distinguished scientific bodies.

VISITORS

This is a European Union event and visitors are welcome to see the Exhibition at Grieghallen. Visitors are especially welcome to visit the EU Contest on Wednesday 19 September on the Contest's official "Open Day". The other times when the Exhibition is open to the public can be obtained from the Norwegian Foundation for Youth and Science.

However those parties who may be intending to travel to visit the Exhibition from afar and who are not contestants, escorts,

National Organizers or the specially invited guests of the European Commission or the Norwegian Foundation for Youth and Science, must meet all their own costs. For all such visitors intending to travel to Bergen, a list detailing suitable places to stay can be supplied by the Norwegian Foundation for Youth and Science on request.

The Norwegian Foundation for Youth and Science though cannot be expected to make special arrangements for visitors and is under no obligation to do so whatsoever. However, if in the view of the Norwegian Foundation for Youth and Science some

simple request can be readily accommodated, this may be arranged, if payment is received in advance. In the event of payment not being received prior to the Contest then any such arrangement will be cancelled.

Visitors intending to travel to see the Exhibition are also strongly advised to check the arrangements with the National Organizer of their own country's young scientist competition prior to making any travel plans.

(Please refer also to the Award Ceremony and Cultural Programme sections).

CONTESTANTS

Only young scientists who have been designated by their respective national jury can participate in the EU Contest. In each country, the National Organizer is responsible for nominating the projects, and therefore the contestants, which are entered for the EU Contest.

The 13th EU Contest for Young Scientists involves the 15 Member States of the European Union, Bulgaria, the Czech Republic, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Malta, Norway, Poland, Slovenia, Slovakia, Switzerland and, under special arrangements Georgia, Russia, and the Ukraine. In addition, the winners of America's INTEL International Science and Engineering Fair, Japan's Yomiuri Shimbun Young Scientist Contest, the Republic of Korea's Young Scientist Contest and the South American

Young Scientist Contest attend as special guest scientists.

Entries can only be considered from candidates who meet all of the following strict age and education requirements:

- Be born between 01.01.1981 and 17.09.1986
- Have not completed more than one year of higher education studies at the time of the EU Contest.
- Have not previously participated in the EU Contest, even if the project intended for presentation is different.

Projects may have been worked upon by individual participants or by teams of not more than three people. The rules concerning age and education requirements are applicable to all members of a project team. Where a team is involved all members of the team must be represented at

the Contest so the Jury can conduct a thorough evaluation of their combined efforts. If one or more members of the team are absent, other than on the grounds of ill health, the Commission will decide on a case by case basis whether the remaining team members can be admitted to present their project. However in all such cases the substitution of the project, by another project will not be tolerated.

At the Contest contestants be available for interviews at the times stated by the Jury and be prepared to explain their projects to visitors and join in all the events that are organized.

Contestants shall disclose to interviewing Jury members all material and information sources that they have used in carrying out their projects and must identify individuals or organisations that have supported or guided their work.

Where a project has led to publications, patents, trademarks or similar, the relevant documents must be made available to the Jury. (Please refer to the patent information kindly supplied by the *Europe Patent Office* on pages 10-11).



During their time in Norway, the participants will have time to see Bergen city and perhaps even climb one of the mountains surrounding the city. (Photo: Paul Smit, IMAGO/Fjord Norway)

NATIONAL ORGANIZERS

The list of National Organizers is given at the end of this brochure. The National Organizers are responsible for selecting projects, submitting applications, and for all communication with the European Commission.

All contestants will be accompanied to the EU Contest in Bergen, Norway by their National Organizer, or by an adult escort appointed by the National Organizer. The National Organizer, as the principal contact in all participating countries, will assure liaison between the contestants and the EU Contest in all matters concerning the Contest. Contestants should contact their own National Organizer about travel arrangements. Tickets will be booked, in the name of the individual contestants, for escorts and/or National Organizer, by the

Norwegian Foundation for Youth and Science. Travel tickets will be sent by registered mail to each National Organizer in August 2001. Contestants travel with their National Organizer or appointed escort and will depart and return to the international Contest venue. The cost of travel i.e. transfers to and from the point of international departure are the responsibility of each country's National Organizer. National Organizers advise their contestants about all travel documentation that may be required. Where Visas are required, at the time of the deadline for applications, National Organizers can request the assistance of the European Commission to help ensure their party can travel with the necessary travel documents.

National Organizers and/or escort(s) constitute together with their contestants their respective country's official delegation and

are the only ones that can enjoy access to all public and private events associated with the Contest.

National Organizers assume responsibility for the well being and behaviour of their party.

They:

- ensure that their party travels with adequate health, accident and travel insurance that covers them for both the travel and duration of the Contest.
- handle the linguistic or other problems that may arise during the Contest or in relation to associated activities.
- ensure that they have their own measures in place to assure their party's behaviour remains beyond reproach.

DEVELOPMENT OF THE EUROPEAN UNION YOUNG SCIENTIST CONTEST

Thirteen years ago Royal Philips Electronics of the Netherlands asked the European Commission to take over the running of the European Contest, after it had celebrated its 20th year of operations. Now the whole venture is in its 33rd year.



THE EU CONTEST ANNUAL LECTURE AND CULTURAL PROGRAMME

A varied and interesting cultural programme, including visits to sites of scientific interest in and around Bergen, has been arranged for the contestants. This provides contestants with an opportunity to meet one another, to exchange ideas, and to make new friends from across Europe.

One of the highlights of the cultural programme is the annual EU Contest Annual Lecture. Each year the country where the EU Contest for Young Scientists is being held nominates a distinguished scientist to deliver the lecture. This year the European Commission is delighted that Research Leader Helge Drange of the Nansen Environmental and Remote Sensing Centre has kindly agreed to present the lecture on climate and climate changes:

Greenhouse Warming - or Cooling?

Based on observed and reconstructed climate parameters, the Intergovernmental Panel on Climate Change (IPCC) has concluded that there has been a demonstrable change in the global climate as a result of anthropogenic (human-induced) emission of so-called greenhouse gases and aerosol particles. These global changes are manifested by an increase in the Earth's surface temperature, changes in precipitation patterns, reduced snow cover on land and reduced ice extent on land and the oceans, a global increase in sea level, indications of changes in the large-scale atmospheric and ocean circulation patterns, and indications of greater variability in the climate system.

With sea-surface and air temperatures 5-10 degrees Celsius above the mean temperature for comparable latitudes, the climate of north-western Europe and the adjacent ocean areas is special in a global

context. The main reason for the mild climate is the supply of warm and humid air from the North Atlantic, together with a supply of warm water masses in the extension of the Gulf Stream System. The majority of the global atmosphere-ocean climate models show a 30-40% decrease in the intensity of the circulation of the Gulf Stream and North Atlantic Drift systems over the next 100 years. This implies a reduction in the northward transport of heat in the Atlantic Ocean, and has led to speculations whether this may lead to a local cooling in north-western Europe as the greenhouse warming continues.

In the presentation, the status of the observed and modelled climate state of the Atlantic-European sector will be given for the representative day as well as possible future climate scenarios. In addition, the role of the Arctic Ocean in the global climate system will be addressed.



Trolldaugen; the home of Norwegian composer Edvard Grieg. (Photo: Per Nybø/Bergen Tourist Board)



Spectacular view of mountains and fjords in Sogndal. (Photo: Fjord Norway)

PROJECTS

The EU Contest for Young Scientists accepts project entries from all fields of scientific endeavour. Only projects that have been nominated by the National Organizer in each participating country are admissible. Contestants shall provide (a) a written project, and (b) a project suitable for display in a public exhibition.

a Written Project

The written project has five parts:

- 1 A typewritten presentation (or essay). Hand written presentations are **not** admissible. The presentation should describe the project. It may be accompanied by original illustrations (graphs, drawings and photographs). It may consist of up to a maximum of 10 pages of written text (A4 format; single sided; double spaced and unbound in a minimum character size of 10 point). It may be accompanied by up to a further 10 pages of illustrations (A4 format; single sided and unbound). No extra materials such as video tapes and diskettes can be accepted as part of the typewritten presentation. The presentation can be written in any of the official Community languages.

Contestants are reminded, however, that the working language of the Jury is English.

- 2 A one page scientific summary in English containing the most important points of the project (aim of project, materials and methods, observations and conclusions). – see *Contestant Registration form*.
- 3 A clear concise project title in English for the Contest Catalogue. This may be accompanied, if required, by the full scientific title – see *Contestant Registration form*.
- 4 The full original scientific title, in the original language.
- 5 A straightforward description of the project of not more than ten lines in simple English for publication in the Contest Catalogue. Contestants through their National Organizer must ensure that this brief project description should be readily understandable to the reporting print and broadcast and to interested members of the wider public. (See *both the Contestant Registration form and examples of both a Engineering and Environmental Science project drawn from the 12th EU Contest catalogue (pages 13-15)*).

(NB. In judging a project the Jury will consider how effectively the contestant(s) has managed to explain their project within the limits of the defined project length.)

b Project Display for Public Exhibition

At the EU Contest in Norway, contestants will set up their project for display. The project must both conform to the strictest safety requirements and be suitable for public display. A project that in any way can be construed to be a threat to either animal or human health will be withdrawn from the Contest.

In particular experiments that involve radioactive substances, dangerous equipment, toxic and carcinogenic materials are all excluded from public display.

Projects that involve experiments with living animals shall only be accepted on:

- a Non human vertebrate animals when non intrusive and non invasive experimentation has been conducted
- b Invertebrate animals

Such animal experimentation may only be conducted after all possible alternatives have been explored. If animal experimentation is seen to be the only option, every conceivable measure must be taken to lessen the pain and distress to the animal concerned.

Any project that is seen to violate the EU Contest's policy on animal experimentation will be excluded.

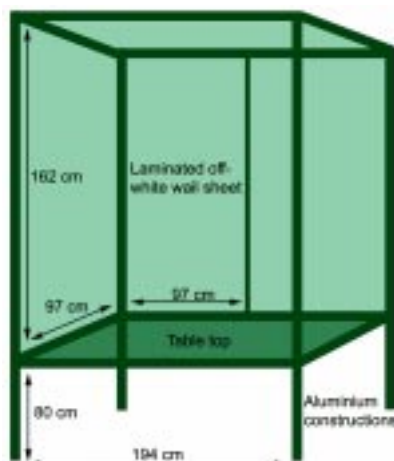
A good display is essential so that the Jury can appreciate the quality of the project. The projects are presented on a stand with side walls and must not exceed the dimensions that are given in the diagram below. The display is part of the contestant's project and is used to exhibit the essential parts of the work. The display may include, for example, working models, a video, and other demonstration material.

Project displays that exceed the stand dimensions will be disqualified from taking part in EU Contest. For larger exhibits, it is, however, possible to provide slightly more space by having the fixed shelf removed. If a project can best be displayed in this way, a request for a display stand without the shelf should be made before the deadline for the receipt of applications (5 June 2001). Failure to make it clear to the Commission by this date that an exhibit requires the shelf to be removed will mean that the project will have to be displayed within the standard dimensions of the display stand. Please note that where the shelf is removed, no table or other surface will be provided.

The stand and electrical connections will be provided by the Norwegian Foundation for Youth and Science. Contestants who may be anxious to know the precise details of the power supply are advised to inform themselves via their National Organizer of the situation in advance of the Contest.

A VHS video recorder and TV monitor can be provided on request. **(Though contestants are reminded that should they wish to present a video that the Members of the Jury will only have time to see the briefest video footage. Such material thus should be designed to help inform visitors about their projects and to provide, if possible, the Commission with useful publicity material).** All other equipment (computers, printers, etc.) must be brought by the contestants themselves or rented locally at their own cost.

Contestants are strongly advised to insure all their equipment, or in the case of hired equipment, to check that insurance cover is included. The European Commission cannot accept any responsibility for loss or damage and the Norwegian Foundation for Youth and Science will not rent equipment unless it is pre-paid in advance of the Contest.



DEADLINES

The Written Project with a completed Registration Form must be received by the European Commission (in the EU Contest for Young Scientists office) before: 5 June 2001 at the latest. The Jury has made it clear that under no circumstances will it conduct a preliminary review of any late project. A late project entry thus would suffer from not being the subject of a full examination.

(Projects received in Brussels on or after 19 June 2001 will be returned to the contestant(s) and will be excluded from entering the Contest).

Through the office of their National Organizer, contestants must ensure that the necessary arrangements are made so that their Project Displays for Public Exhibition arrive in time for the 13th EU Contest in Norway.

THE STAND

The back wall is 162 cm high and 194 cm wide, made of two plates each 97 cm wide. The sidewalls are 162 cm high and 97 cm wide. The Shelf is 194 cm long, 97 cm deep and 80 cm above the floor. The stand is made of laminated off-white plates with aluminium framing. Please take into account that there will be a sign on the top front of the stand indicating the name, project and country of the participant.

PATENTING, THE EU CONTEST AND YOUNG SCIENTIST COMPETITIONS

Most people know that when they write something, whether it is a piece of music, a poem, or a text for an article or a book, their work is protected by copyright. Protection is more or less automatic and free from the date the work was created. However, the protection of ideas of a technical nature (such as the vast majority of projects entered into young scientist competitions) is dealt with under patent law, which is very different to and rather more complex than copyrighting.

Few participants in young scientist competitions seem to give such thought to the commercial potential of their project. They are too busy concentrating on scientific and technical details. This may be a fatal oversight, however, as patents cannot be applied for retrospectively.

This paper is intended to give very general advice in order for young scientists to start thinking about the subject of patent protection before rights are lost by accident rather than by consent. It is not meant as a substitute for the specialist advice available from patent attorneys and organisations such as inventor associations and national patent offices.

Contestants in young scientist competitions should be aware that their projects are their own property. The legal term for

this is “intellectual property”. It can be protected by various means such as patents, copyright, and registration of designs or trademarks.

Of these, patenting is perhaps the most relevant means for protecting young scientists’ projects. Many projects are of commercial interest. By legally protecting their intellectual property, exclusive rights are secured which may eventually lead to financial gain.

The granting of exclusive rights is not in itself a guarantee of commercial success, the invention must either be used profitably itself or sold or licensed to someone else. Intellectual property rights may also serve to attract the attention of potential investors and confer prestige on individuals or an organization.

Normally participation in a young scientist competition leads to ideas “being made available to the public.” Legally this doesn’t mean that a product or service has actually to be offered. In fact it is enough if an idea is demonstrated or exhibited, as is usually the case at a competition. The exact legal effect of this may vary from country to country, so it needs to be carefully looked into on a national basis. However, contestants should be aware that, in most cases **a project which has been “made available to the public” before filing a patent application, can no longer be patented.**

It is therefore critical that contestants either apply for patent protection of their intellectual property **before entering a young scientist competition**, or make a conscious decision not to, in the knowledge that they will then lose their intellectual property. Before this decision has been taken and acted upon it is important to avoid the pitfall of making details of the project “available to the public” by other means, such as by press releases etc. Even just discussing a project with someone can count as making it available to the public - so keep it secret!

All too often young scientists are deterred from patenting by misconceptions about cost or how complicated the procedure is. The cost of patenting is meaningful only when compared to the potential financial gain to be made from the patent. Contestants interested in patenting should therefore investigate the market and develop an idea of the commercial worth of their invention. Enquiries should then be made into national and international patenting costs, starting at the information department of the national patent office.

Generally costs break down into three areas: those of the patent office(s), legal representation and translations. Some national offices offer special advice and reduced fees to participants in young scientist competitions. It is particularly important for young scientists to appreciate that, generally speaking, patent costs are low to start

with but increase with time. This means that it is relatively inexpensive to “get a foot in the door”, buying time in which to fully assess the potential market for the project and consider the commercial viability of a patent.

Whilst not usually obligatory, it is recommended that contestants make use of a patent attorney. Lists of these are normally available from national patent offices. Patent attorneys are highly qualified specialists with a technical or scientific background. They assume much of the responsibility for processing the patent application, hence the young scientist does

not have to worry about the complexities of patent law.

Finally, as well as looking into the financial value of a patent, contestants should try to establish whether their idea, or something similar, has already been patented. Many national patent offices and patent libraries offer assistance in this area. It is also possible to use the Internet to conduct simple searches for patent literature in the databases of national and regional patent offices. The esp@cenet service of the members of the European Patent Organisation and the online patent databases of the US Patent and Trademark Office

(USPTO) are good starting points. Further details may be found on the websites of the relevant patent offices.

N.B. The European Commission thanks the European Patent Office in Munich for having kindly supplied this information. Copies of the advice sheet have been translated by the European Commission’s services into the 11 official languages of European Union and have been sent to all National Organizers in the most appropriate language available. Additional copies in English, French and German are readily obtainable on request from the EU Contest office in Brussels.



The European Patent Office lecture during the 12th European Union Contest for Young Scientists, Amsterdam 2000

(Photo: Alexander Refsum Jensenius / Norwegian Foundation for Youth and Science).

PROJECT EVALUATION

Judging takes place in five phases: (1) preliminary assessment; (2) drawing up of the preliminary assessment list; (3) interviews and discussions at the Science Exhibition; (4) final decision; (5) announcement of the list of winners at the Award Ceremony.

1 Following the deadline for receipt of applications (5 June 2001), to enable the Members of the Jury to carry out the preliminary assessment the Commission transmits to them all eligible Written Projects. Members of the Jury assess each project against the criteria specified below. Members of the Jury do not consult other Jury Members during the preliminary assessment stage. Where a project lies outside the field of the Jury member's scientific expertise he or she may consult and seek advice from appropriate experts of their choice.

The criteria used to assess projects shall be the following:

- originality and creativity in the identification of and the approach to the basic problem;
- skill, care and thoroughness in designing and carrying out the study;
- following through of the study from conception to conclusion;
- reasoning and clarity in the interpretation of the results;

- quality of written report (within the confines of the specified limits);
- presentation and ability to discuss the project with the Member of the Jury.

In applying all these criteria allowance shall be made for the age and educational level of the contestants. Each Jury member awards each project a preliminary mark in the following categories:

- excellent project
- very good project - which could be improved in certain minor respects
- generally good project - which could be improved in certain areas
- average or poor project - which contains definite weaknesses

2 At the beginning of the EU Contest, the President will contact each of the other Members of the Jury, who notify the President of the preliminary marks they have awarded to each project. The President draws up a preliminary assessment list.

3 At the EU Contest, the Members of the Jury have a first meeting to review the preliminary assessment list marks. After discussion, the President of the Jury decides which Members of the Jury should visit which projects at the Science exhibition. The Jury ensures that each project exhibit is visited by at least 3 members of the Jury for interviews. Detailed discussions with all the contestants involved takes place during Tuesday,

Wednesday and Thursday. If necessary, the President shall arrange a timetable.

4 Based on the results of these interviews the Jury may amend the preliminary assessment list. The Jury shall award the Project Prizes and decide whether any of the EU Young Scientists Honorary and Special Awards and should be made. The Jury reaches its decisions based on consensus.

5 The list of prize winners, recipients of the Honorary Awards and Special Awards (if any) is drawn up and signed by the President on behalf of the Jury. The Jury secretary makes arrangements for the official announcement and for the Award Ceremony to take place. The President of the Jury gives an overview of the Contest at the Award Ceremony.

The President of the Jury may at any time inform the Commission where, in the opinion of the Jury, any of the following is apparent: (i) contestants are estimated to have received undue assistance from experts; (ii) contestants have had undue privileged access to resources; or (iii) the contestants have clearly plagiarized ideas from others. In such a case, the Commission will withdraw the project from the competition. And even after the event demand if necessary, the return of any prize monies.

The decision of the Jury is final.

THE AWARD CEREMONY

The Award Ceremony is the culmination of the EU Contest for Young Scientists. In the tradition of the Contest, leading dignitaries and high profile personalities from the world of science will be invited to the Ceremony.

In the past the Award Ceremony has been honoured by the presence of the President of the Federal Republic of Germany; the President of Finland; the Hereditary Grand Duke of Luxembourg; Government Ministers; Ambassadors and European Commissioners.

It is an enjoyable, but formal, occasion and contestants are asked to dress appropriately. In the past, some contestants have worn national costume and this is both welcomed and encouraged. The Award Ceremony is followed by an official reception.

The 13th EU Contest Award Ceremony will take place in King Haakon's Hall. This grand banquet hall was erected by King Haakon IV Haakonson (1217-1263) for the coronation of his son at the peak of Norwegian power in the middle ages.

For reasons of security and pressure on space, the Norwegian Foundation for

Youth and Science has informed the European Commission that entry to this year's Award Ceremony has to be restricted. Thus there will only be space for the EU Contest's contestants, escorts, National Organizers and invited VIPs.

Parents, guardians or friends who may be visiting the Contest, therefore, cannot be permitted to attend the Award Ceremony. However, ample opportunity exists for visitors to see and visit the Exhibition. The exact times when the Exhibition will be open to the public can be obtained from the office of the Norwegian Foundation for Youth and Science, who is hosting the Contest.



Left: Participant Tanja Brown being interviewed after the award ceremony during the 12th European Union Contest for Young Scientists, Amsterdam 2000. (Photo: Alexander Refsum Jensenius / Norwegian Foundation for Youth and Science).



Right: Excitement and discussions before the award ceremony during the 12th European Union Contest for Young Scientists, Amsterdam 2000. (Photo: Alexander Refsum Jensenius / Norwegian Foundation for Youth and Science).

THE PRIZES

Project Prizes

The following awards are available to projects entered from any European country. Up to nine monetary prizes will be given to the best projects:

- Three first prizes worth **5000 euros**
- Three second prizes worth **3000 euros**
- Three third prizes worth **1500 euros**

EU Young Scientist Honorary Awards

The Jury can designate deserving prize winners to represent the European Union at:

- The Stockholm International Youth Science Seminar:

where they will attend the 2001 Nobel Prize ceremonies, meet the Nobel Laureates and take part in a series of other scientific/cultural activities during the week. *(maximum two individual project contestants)*

- The London International Youth Science Forum:

where they will meet young scientists from around the world and take part in the annual two-week intensive summer science festival. *(maximum two individual project contestants)*

The prize winners of the 11th EU Contest for Young Scientists, Thessaloniki (Greece) - September 1999 (Photo: The organizers)

EU Young Scientist Special Awards

Additionally the Jury can select deserving prize winners to join distinguished research scientists and engineers to work on projects organized by:

- The European Northern Observatories, IAC in the Canary Islands, Spain
- The European Patent Office in Munich, Germany
- The European Space Research and Technology Centre in Noordwijk, the Netherlands

The Alumni Prize

Is awarded not by the Members of the Jury but by three former EU Contest prize winners. The three former prize winners in the course of the Contest tour the stands and discuss with Contestants the merits of their project. They have 1200 euros to provide for either up to three prizes of 400 euros or one prize of 600 euros and two of 300 euros; this they award to the projects that in their opinion is best in terms of:

- visual display
- oral explanation



12TH EU CONTEST PROJECT ENTRY EXAMPLES

Joanne DANIEL (18)
Gemma DAWSON (18)
Alex WILKIE (18)
(United Kingdom)

Designing a disposable sample device

We designed a disposable sample device for the extraction of cells from fermenters for use in the pharmaceutical industry.

Our instruction was to replace the stainless steel and glass device GlaxoWellcome currently use with an improved model. The disadvantages of the existing design include the safety hazard caused by glass against steel and the substantial length of time required to clean and sterilise the device.

We did extensive research into plastics and came up with numerous designs. Our final design is disposable and made solely from silicone. Our design resulted in the manufacture of a silicon bag which is novel to the industry. It is fully sterilisable in place thus significantly reducing the required preparation time. The plastic manufacturers have taken out five patents on our design and Glaxowellcome hope to have the device in use by the end of the year .

1st Prize Winners and Special Award Prize Winners, 12th EU Contest for Young Scientists, Amsterdam - September 2000.

Nickoloz TCHANKOSHVILI (18)
(Georgia)

The monitoring and protection of bats in Georgia

Bats have never been the object of special study in Georgia. So I started my research on the biological and ecological characteristics and the migration of bats, there was no information. I started studying myself and found out that an alarming situation of bats in different parts of Georgia and throughout Europe exists and that's how I became convinced of the necessity of bat protection. Thirty bat species are known in Europe today, but local extinction has already occurred, and all but tree species are considered to be endangered, rare, or vulnerable. One of the main reasons is the disappearance of roosts. The forests are unsafely cut down due to circumstances relating to the energy crisis in Georgia. However, by cutting trees down, the bats are left without any shelter. The cheapest and most effective solution to the problem is to create artificial hollows, by which we can not only save bats, but increase their number, too. Compared with the natural hollows, the artificial ones contain fewer parasites and humidity is lower. Therefore the conditions are better than in natural hollows, especially for newborn bats.

1st Prize Winners and Special Award Prize Winner, 12th EU Contest for Young Scientists, Amsterdam - September 2000.

THE SECRET TO PROJECT SUCCESS

We originally took part in the (EES) Engineering Education Scheme. To take part in the scheme, a group of up to four pupils attempt to solve a real life problem set by a sponsoring company found by the school.

Our first instinct was that we didn't need another load of work adding to the pile already building up. After some discussion, it did seem like a good idea, providing another interest to add to our University applications. The project was, in fact, much more work than we had imagined, but far more rewarding too, with many trips to a number of countries.

The brief for our project was to design a disposable sample device for the extraction of cells from industrial fermenters at

the pharmaceutical company GlaxoSmithKline. This was to replace the existing reusable device made of stainless steel and glass, which was heavy and a safety hazard. After initial ideas and designs, we spent a few days at Bournemouth University to give us a chance to focus on our project. It was in Bournemouth that most of the design work took place and by the time we left, we had designed our final prototype and made a mock-up of it the best we could.

Over the next few weeks we began writing up our report and meeting up with a Plastic Manufactures company to investigate the possibility of producing our design. We already had a prototype of our model, but we wanted to look into a way of producing the device as a whole, rather than using tubing and connections to join

them together, to reduce the chance of contamination. It was quite an experience working with people in the industry and we found it difficult to get our ideas across as we felt we were treated like kids and that the manufacturers would have preferred to meet just with workers at GlaxoSmithKline.

Our teachers and contact at GlaxoSmithKline were very supportive, helping in any way they could. We presented our project to a couple of people from GlaxoSmithKline, our Head teacher and many teachers in order to gain feedback.

We found that the majority of time spent on our project was taken up writing the report to go with the project and meeting with manufacturers. The actual design work only took up a fraction of the time.

The project had its fair share of problems, the first being the exit of one of the team members. The next was finding out that the manufacturing company that were producing our design took weeks longer than they said because they had secretly taken out four patents on the manufacturing processes of our design. This meant that



Hours of hard work is part of getting interesting, scientific results.

(Photo: Anders Grønli / Norwegian Association of Young Scientists).

we did not have a prototype of our design to show at the EES presentation day.

We felt really annoyed with the Plastic Manufactures, as they had told us the delay in producing a prototype was due to staff problems. This simply was not the case and it was as if they had stolen our design. However since the patents were taken out on the manufacturing process, it wasn't as if the patents should have been in our name. After feeling rather disillusioned with the Plastic Manufactures, we received a letter from them saying that they wanted to pay for us to go to America to see the factory where the device would be made. It was a great trip, where we got to visit New York, saw a baseball match and went white water rafting. While talking to the manufacturers, they told us that they were planning to build a whole new factory to produce part of the design that could have uses in other fields.

We were chosen to present our project at the regional CREST (CREativity in Science and Technology – an award scheme, where the best projects in each category go through to higher level final. We then qualified for the National CREST finals

Alex Wilkie, Joanne Daniel and Gemma Dawson with HRH The Princess Royal at the British Youth Science Fair 2000.

(Photo: British Association for the Advancement of Science).

and entered the British Youth Science Fair. By this stage we were used to talking and answering questions on our project, so we did feeling more confident.

At both the British Youth Science Fair and European Union Contest of Young Scientists, we all thought we had no chance of winning. So we approached both with a relaxed attitude, with no expectations of winning. This helped, as none of us got particularly nervous. It was a great experience, which has helped us all to be more confident when speaking and answering questions.

The most important thing to do when entering a competition like the European Union Contest of Young Scientists is to practice the kinds of questions the judges will ask and answer confidently, even if

you are not quite sure what you are saying is right. The more you practice, the easier it will get. It is also important to display all the work clearly and make it look as interesting as possible, so it is easy to understand by the judges.

Also, make the most of the experience and enjoy yourselves. Good luck! We wish you every success.

Joanne DANIEL
Gemma DAWSON
Alex WILKIE

*The United Kingdom
Designing a Disposable Sample Device
1st Prize Winners
12th European Union Contest for Young
Scientists, Amsterdam 2000*



FINALLY... WHAT CONSTITUTES A WINNING PROJECT?

During a long period scientific work followed two different directions: describing and explaining the nature of phenomena which had been observed; and searching for new ways and means to improve the quality of life, possibly generating a little profit in the process. Early scientists were scientist-philosophers who could boast that they understood everything known in the realms of philosophy, science and technology during the period in which they lived.

As time has gone on, the sum total of human knowledge has increased to such an extent that nobody can now claim to know everything there is to know. At the present time, scientific disciplines are divided into a number of different specialised areas and fields of research are extremely diverse and sharply focused.

The 20th Century saw outstanding progress in our understanding of the universe around us, including what are considered to be its more mundane aspects, and in the development of new technologies. The 21st Century may also lead to a host of ground-breaking discoveries, as a result of which certain individuals may play a decisive part in shaping scientific progress. The present time, however, is one of progress in tiny steps forward, with thousands of scientists working together

rather like ants, not one in which any single genius will come up with revolutionary new ideas.

Even if this means that scientists today have to exercise a little more modesty, there is no reason for despondency because each passing day reveals things hitherto unknown and opens up new questions. In particular, ever since they have known about the problems, scientists have spoken out and said that work must also focus on finding ways of counteracting the adverse effects of human activity and population growth.

Today, we are called upon, as a matter of urgency, to find ways to manage the dramatic, uncontrollable consequences of what, until only recently, we proudly called technological advances: global warming (which is probably due to human pollution), the ethical and economic problems related to rapid population growth, public health issues in the food industry, problems of jobs due to the use of robots in industry... These are the new challenges we must rise to: they are just as exciting as past challenges and are vital for humanity. More than ever, it is therefore necessary to stimulate and promote the resources of our imagination and creative spirit.

What is the secret of a successful project?
Who would not like to know the recipe?
What scientist has not dreamt of develop-

ing the procedure for an experiment which would radically alter the scientific landscape or call into question concepts which have been accepted as “true” for generations? If only we had a list of apparently ordinary substances which, on reacting together, would cause something new, something earth-shattering, to appear. Imagine the prospects if we had a technology bank from which you just had to make a careful choice of technologies which, when combined in the right order, would lead to something never seen before. Or what about a breathtaking computerised database which, when intelligently consulted and used, would cast a completely new light on a particular problem?

Of course, the world is not like that. An idea is often born of an intuition and it may take root when you are thinking about something completely different. The first idea leads to another and, gradually, the project takes shape. Highly productive episodes are followed by periods of profound gloom. Sometimes, a course of action that seemed to be promising turns out to lead nowhere. Sometimes, an idea that seemed to be unrealistic or without any rational foundation nevertheless leads on to exciting and unexpected developments.

So what is the recipe? Here is one: choose a subject that interests and inspires you (the idea must of course be an original one). Add a little curiosity and know-how, a touch of perseverance and obstinacy,

some advice from specialists, a good pinch of ingenuity, a large measure of a critical mind, enthusiasm and an enterprising spirit and, above all, the best part of your imagination.

If the recipe is a good one, it will contribute to scientific and technological progress, but will also give you intellectual pleasure and personal satisfaction. There is obviously the risk of failure and disappointment. This difficulty is quickly overcome if you take the trouble to ask what caused things to go wrong and then try to find ways of remedying the situation.

So what, then, is a winning project? Being selected by a jury - which is always subjective - is not the most important thing. The main thing comes at the end of the day: it is that feeling of a very legitimate personal sense of pride in having overcome untold difficulties to develop and see through an original idea and to have given the best of yourself to increase your own understanding and for the benefit of the community.

**Pauline
SLOSSE**

*President of
the Jury
13th Euro-
pean Union*

*Contest for Young Scientists, September
2001, Bergen, Norway*



THE JURY

Projects are evaluated by a Jury. The Jury is composed of a President and other scientists of international reputation who carry out their duties as individuals and not as representatives of an institution or country.

Members of the Jury are selected to cover the following scientific disciplines:

- **Biological Sciences**
- **Chemistry**
- **Earth Science**
- **Engineering**
- **Information/Computer Science**
- **Mathematics**
- **Physics**

Two additional Guest Jury Members serve on the Jury. Presently these positions are filled by: Dr. Kevin Kahn, INTEL Fellow and Director of Communications at INTEL's Communication Architecture Laboratory in Hillsboro, Oregon and Mr. Pantelis Kyriakides, Vice President of the European Patent Office in Munich. The current President of the Jury is Professor Pauline Slosse of the Université Libre de Bruxelles.

Members of the Jury including the President, are chosen on the basis of scientific criteria. They are drawn from both academia and industry. They are appointed each year by the European Commission. Normally, up to one third of the Members of the Jury are replaced each year. A European Commission scientific officer serves as the secretary to the Jury and is responsible for the operation of the EU Contest.

IMPROVING HUMAN POTENTIAL

Improving Human Potential or to give it its full name “Improving Human Research Potential and the Socio-Economic Base” (IHP) recognises that the world is increasingly based on knowledge and that Europe’s prime asset is the quality of its researchers, engineers and technicians.

Therefore, IHP aims to preserve and help develop this knowledge potential through greater support for the training and mobility of researchers and by enhancing the access to research infrastructures. Operating within the Commission’s Fifth Framework programme, the IHP programme runs from 1998-2002, and aims to:

- to develop Europe’s human resources
- by training and mobility of researchers
- by innovation in education and training
- to make Europe attractive location for researchers and research investment
- to promote European research
- to develop the socio-economic knowledge base
- to understand better key aspects of developments in European society
- to aid science and technology policy, other Union policies

To help it achieve this ‘**Improving Human Potential**’ supports:

The Marie Curie Fellowships

For the individual researcher, the award of a Marie Curie Fellowship is a major opportunity to broaden ones research horizons.

Marie Curie Fellowships are highly prized research training grants. Grants that are designed to encourage young European researchers to conduct research training, particularly at post-doctoral level in a foreign laboratory. Marie Curie Fellowships enable senior researchers to undertake short-term research assignments in Europe’s less favoured regions.

This contribution to the strengthening of the science base in these regions is further supplemented by the award of additional one year research training grants to existing postdoctoral Marie Curie Fellowship award holders who originate from Europe’s less favoured regions.

These are granted to counter the effects of the so-called “Brain Drain” and thus enable Fellows to return home to continue their research. The Marie Curie Fellowships are further enhanced by a series of host fellowships: Industry Host Fellowships, PhD visits to Training Sites (Marie Curie Centres of Excellence) and Devel-

opment Host Fellowships. The latter initiative being especially designed to build up even further the expertise existing in Europe’s less favoured regions.

Research Training Networks

Enable high-powered European teams of scientists and engineers to come together and to be joined by young researchers to work on high quality transnational collaborative research projects.

The Research Training Networks encourage the interaction between different disciplines, the combination of different technologies, the transfer of techniques from one scientific domain to another, the dissemination of results, and co-operation between academia and industry.

All the young researchers are recruited to the project from countries that have no connection with the research teams concerned. Each network defines a training programme for its young researchers so that they can derive the maximum benefit from the international nature of the research.

Networks use the full capabilities and potential of modern telematics and Internet-based services. Results of the joint research are published and diffused by the timely publication of brochures and overview articles.

Access to Large Scale Facilities

Europe possesses some of the most valuable research facilities in the world. Telescopes, airborne spectrometers, synchrotrons, cyclotrons, ocean going research vessels, wave basins, lasers, high field magnets, supercomputers-all indispensable instruments in the carrying out of high quality, cutting edge research.

Often, however, a large part of this research infrastructure is owned by national or private organizations. Use of the facility is thus often restricted to nationals of

the country or to company staff. IHP through its specific action devoted to "Support for Research Infrastructures" enables Europe's major research facilities to open up its installations so that they can give wider access to Europe's research community. This allows researchers to come together readily so that they may better pool their expertise and knowledge.

Euroconferences, Summer Schools and Practical Training Courses

The Euroconference programme supports the most comprehensive programme of

scientific meetings in the world today.

The scheme allows senior scientists the opportunity to link up with their junior counterparts to discuss and mull over the topical scientific issues of the day.

To ensure that the emerging generation of researchers is fully represented at these fora, the Commission provides funds to enable each 'Scientific Meeting' organizer to pay for their attendance costs. To obtain this support all that the young researcher has to do is to contact the event organizer of the activity concerned.

SCIENCE EXHIBITION

The Science Exhibition, which is organized in order to exhibit the participating projects, will take place from 18-21 September 2001. During the Exhibition, Members of the Jury will pay at least three visits to each project display to discuss the projects and interview the contestants. This means that contestants have to be available in the exhibition hall at all the appointed times.

The Science Exhibition will be open to the public, and contestants should be prepared to explain their projects to visitors. Students, science teachers, members of the general public are especially welcome to visit the Contest on Wednesday 19 September on the Contest's official Open Day.

The exhibition at the 11th European Union Contest for Young Scientists, Thessaloniki 1999. (Photo: The organizers).



The ways to manage change

Underpinning the work of both the programme and indeed most of the Commission's research activities is IHP's key socio-economic action. This is targeted at improving our understanding of the structural changes that are taking place in the European society.

It is both about identifying the ways to manage change as well as enabling European citizens to become more actively involved in shaping of their own futures.

This Key Action is mainly going to be implemented through the organization of



Research Projects and Thematic Networks. It will more specifically involve the analysis of the main trends giving rise to these changes and thus will examine: the relationships between technology, employment and society.

It will also re-appraise the various existing mechanisms for collective action at all levels of governance and will elaborate and develop new strategies to foster growth employment and economic and social cohesion.

Finally

To identify the very best efforts of European co-operative scientific endeavour, IHP supports the "Prix Descartes". And last but not least the EU Contest for Young Scientists.

In sum IHP's EU Contest for Young Scientists could be said to provide the first possibility for the emerging generation of some of Europe's brightest and best scientists to display their research accomplishments at an early age on the international stage.

Then once first degrees have been completed, IHP is there to provide top achievers with the chance to pursue postgraduate and postdoctoral level research in another European country. While, afterwards with IHP support there is the potential to conduct top level research at the cutting edge of science in collaboration with Europe's other leading scientists and engineers.

Research that might equally lead to breaching the frontiers of science through to perhaps seeing a new revolutionary design enter the European market place. Research that for the very best could now result in the award of a "Prix Descartes"- the ultimate in European scientific recognition.

For Further IHP Information :

Researchers who may wish to know more about IHP's opportunities. Full IHP programme details, application forms, complete listings of all the 'Scientific Meetings' and vacant posts in Research Training Network can be obtained from : www.cordis.lu/improving

"Statsraad Lehmkuhl" at the German Wharf "Bryggen" in Bergen.

(Photo: Bergen Tourist Board).

NATIONAL ORGANIZERS

THE HOST

NORGE

Anders GRØNLI
The Norwegian Foundation for Youth
and Science
Oslo Research Park
Gaustadalléen 21
N-0349 Oslo
NORWAY
Tel: +47 22 95 86 76
Fax: +47 22 60 44 27
e-mail: anders@unge-forskere.no



Anders Grønli surrounded by members of the Norwegian Association of Young Scientists that will be student helpers during the 13th European Union Contest in Bergen 2001. (Photo: The Norwegian Foundation for Youth and Science).

EU MEMBER STATES

BELGIË/BELGIQUE/BELGIEN

Michel KRUGLANSKI
Jeunesses Scientifiques de Belgique
Avenue du Parc 90
1060 Bruxelles
BELGIUM
Tel. : +32 2 537 03 25
Fax : +32 2 537 08 02
e-mail: michelk@bira-iasb.oma.be

DANMARK

Ryan HOLM
Unge Forskere
Klintevej 35
DK-7500 Holstebro
DENMARK
Tel. : +45 97 42 52 06
Fax : +45 97 42 91 41
e-mail: ryanholm@post3.tele.dk

DEUTSCHLAND

Uta KRAUTKRÄMER-WAGNER
Stiftung Jugend Forscht e.V.

Baumwall 5
D-20459 Hamburg
GERMANY
Tel. : +49 40 374709
Fax : +49 40 374709-99
e-mail: wyre@wyre.org

ELLAS

Dina MARKOPOULOU
Ministry of National Education and
Religious Affairs
15 Mitropoleos Str.
GR-101 85 Athinaí
GREECE
Tel. : +30.1 32 28 060
Fax : +30.1.32 20 767
e-mail: europe@ypepth.gr

ESPAÑA

Luz PENACOPA QUINTANA
Certamen de Jovenes Investigadores
c/Serrano 150
E-28071 Madrid

SPAIN

Tel. : +349.1.561 69 81
Fax : +349.1.562 57 82
e-mail: mluz.penacoba@seui.mec.es

FINLAND/SUOMI

Pekka PELLINEN
The Finnish Association of Graduate
Engineers TEK
Ratavartijankatu 2
FIN-00520 Helsinki
FINLAND
Tel. : +358.9.22 91 22 59
Fax : +358.9.22 91 29 44
e-mail: Pekka.Pellinen@tek.fi

FRANCE

René TURLAY
Objectif Science
362, rue de Vaugirard
F-75015 Paris
FRANCE
Tel. : +33 1 69 08 84 18

Fax :+33.1.69 08 74 01
e-mail: objectif.science@in2p3.fr

ITALIA

Alberto PIERI
FAST
P. le Morandi 2
I-20121 Milano
ITALY
Tel. : +39.02.76 01 56 72
Fax :+39.02.78 24 85
e-mail: Fast@fast.mi.it

IRELAND

Andrina MOORE
Esat Telecom Young Scientist Exhibition
Malt House
Grand Canal Quay
Dublin 2
IRELAND
Tel. : +353.1.602 61 82
Fax :+353.1.602 61 90
e-mail: amoore@esat.ie

LUXEMBOURG

Jean-Paul GREISCH
Jeunes Scientifiques Luxembourg a.s.b.l.
B.P. 1387
L-1013 Luxembourg
LUXEMBOURG
Tel. : +352.52 52 71
Fax :+352.36 01 30
e-mail: jean-paul.greisch@ci.educ.lu

NEDERLAND

Jenny COENEN
Netherlands Young Scientists Foundation
De Vries van Heystplantsoen 2
NL-2628 RZ Delft
THE NETHERLANDS
Tel: +31.15.261 38 74
Fax: +31.15.261 38 74
e-mail : national.organizer@djo.nl

ÖSTERREICH

Thomas Blöch
Air Liquide GmbH „Jugend Innovativ“
Sendnergasse 30
2320 Schwechat
AUSTRIA
Tel. : +43.1. 701 09 287
Fax :+43.1.701 09 318
e-mail: thomas.bloech@airliquide.com

PORTUGAL

Maria GERALDES
Fundacao da Juventude
Casa de Campanhia
Rua das Flores 69
P-4050 Porto
PORTUGAL
Tel. : +351.22.339 35 30
Fax :+351.22.339 35 44
e-mail: fjuventude@caleida.pt

SVERIGE

Anders LINDSTROEM
Förbundet Unga Forskare
Drottninggatan 120
S-11360 Stockholm
SWEDEN
Tel. : +46.8.31 62 60
Fax :+46.8.31 69 23
e-mail: kansli@fuf.org

UNITED KINGDOM

Caroline CHIPPERFIELD
Visions for the Future/BAYS Officer
British Association for the Advancement
of Science
23 Savile Row
London W1X 2NB
UNITED KINGDOM
Tel. : +44 (0) 20 7973 3071
Fax : +44 (0) 20 7973 3051
e-mail :
Caroline.Chipperfield@britassoc.org.uk

ASSOCIATED AND OTHER STATES

BALGARIJA

Albena VOUTSOVA
Ministry of Education and Science
National Science Fund
2A Knjaz Dondukov Blvd.
BG-1000 Sofia
BULGARIA
Tel. : +359 2 980 89 88
Fax : +359 2 981 14 04
e-mail: a.voutsova@minedu.govrn.bg

CESKO

Miroslava FATKOVA
The Institute of Children and Youth
of Ministry of Education, Youth and
Sports of the Czech Republic
Sámova 3
101 00 Praha
The Czech Republic
Tel. : +420.2.7174 5934
Fax : +420.2.7174 6923
e-mail : idm@vc.anet.cz

ISLAND

Páll M. JÓNSSON
Haskoli Islands (Research Centre)
Vestmannaeyjar
ICELAND
Tel. : +354.48 12 696
Fax :+354.48 12 669
e-mail: palmar@eyjar.is

ISRAEL

Nava BEN-ZVI
Science Teaching Center
The Hebrew University of Jerusalem
Givat Ram Campus
Jerusalem 91904
ISRAEL
Tel : +972.2.6586492
Fax : +972.2.6585708

LATVIJA

Mudite KALNINA
National Youth Initiative Center
Ministry of Education and Science
Strugu street 4
Riga, LV- 1003
LATVIA
Tel / Fax : + 371 – 7228987
e-mail: strugu@vjic.apollo.lv

LIETUVA

Aušra Birietienė
Ministry of Education and Science
Development Division
A. Volano g. 2/7
Lt-2691 Vilnius
LITHUANIA
Tel : +370.2.622483
Fax : +370.2.612077

MAGYARORSZAG

Janus PAKUCS
Hungarian Association for Innovation
P.O. BOX 183
H-1518 Budapest
HUNGARY
Tel. : +36.1.386 96 15
Fax :+36.1.385 21 81
e-mail: h7716ant@ella.hu

MALTA

Ruth RAJADA
National Student Travel Foundation
220 St. Paul Street
Valletta VLT 07
MALTA
Tel : +356.244983
Fax : +356.230330
e-mail: nstf@nsts.org

POLSKA

Ryszard RAKOWSKI
Polish Children's Fund
Ul Chocimska 14
PL-00 791 Warszawa
POLAND
Tel. : +48.22.482 398
Fax :+48.22.8459142
e-mail : fundusz@gask.pl

ROSSIJA

Alexander KARPOV
Bauman Moscow State Technical
University
5, 2nd Baumanskaya St,
107005 Moskva
RUSSIA
Tel. : +7.095.263 62 82 - +7.095 267
55 52
Fax :+7.095 267 55 52
e-mail: apfn@online.ru

SAKARTVELO

Tamar KHULORDAVA
ISSEP
52 Rustaveli Ave.
Tbilisi
GEORGIA
Tel. : +995.32.922153
Fax : +995.32.999153
e-mail: issep@pop.kheta.ge

SCHWEIZ/SUISSE/SVIZZERA

Noëlle GMÜR BRIANZA
Stiftung Schweizer Jugend Forscht
Claramattweg 8
PO BOX
CH-4005 Basel
SWITZERLAND
Tel. : +41.61.690 92 00
Fax : +41.61.690 92 01
e-mail: info@sjf.ch

SLOVENSKO

Jan SIPOS
AMAVET
Moyzesova 2
SK-902 01 Pezinok
SLOVAKIA
Tel +421.704.6412377
Fax +421.704.6412516
e-mail : amavet@netlab.sk



National Organizers having dinner during the 12th European Union Contest in Amsterdam 2000 (Photo: Anders Grønli / Norwegian Foundation for Youth and Science).

SLOVENIJA

Primoz SKULJ
ZOTKS
Lepi pot 6
1000 Ljubljana
SLOVENIA
Tel. :+386.61.213 727
Fax. : +386.61.222 487
e-mail : primoz.skulj@uni-lj.si

UKRAÏNA

Olexander ROMANENKO
Ecological Academy of Sciences
Ukrainian State Medical University
Pobedy Ave 34
256 280 Kiev
UKRAINE
Fax :+380.44 418 22 32

EUROPEAN SCHOOLS

Nigel EVANS
EUROPEAN SCHOOL
Elise-Aulinger-Str. 21
D-81793 München
GERMANY
Tel. : +49.89.6302290
Fax :+49.89 630 229 68

INTERNATIONAL GUESTS

BRASIL

(Organizer : South American Youth
Science Fair)

Luis BROCHIER
Fundação Escola Técnica Libarato
Salzano Vieira da Cunha
Rua Inconfidentes 395
Caixa Postal 621
Bairro Primavera - Novo Hamburgo
Rio Grande do Sul – CEP 93.340-140
BRAZIL
Tel. : +55.51.595 8000
Fax : +55.51.595 8008
e-mail: executiva@liberato.com.br

KOREA

Jung-Hyun BAIK
National Science Museum
Seoul
REPUBLIC OF KOREA
Tel. : +82.42.861 2526
Fax : +82.42.861 2546
e-mail: jhbaik@nsm.go.kr

NIPPON

Yumi IGUCHI
Planning and Promotions Dept
The Yomiuri Shimbus
1-2-1 Kiyosumi

Koto-kuTokyo 135-8438
JAPAN
Tel.:81-3-5245-7093
Fax:81-3-5245-7690
e-mail : yumi8018@yominet.ne.jp

UNITED STATES OF AMERICA

Ann KORANDO
Science Service
1719 N Street, N.W.
Washington DC 20036
THE UNITED STATES OF AMERICA
Tel. : +1.202.872 51 52
Fax :+1.202.785 12 43
e-mail: ann-korando@scisvc.org

NEXT YEAR

The 14th European Union Contest
for Young Scientists will be held
in Austria in September 2002.

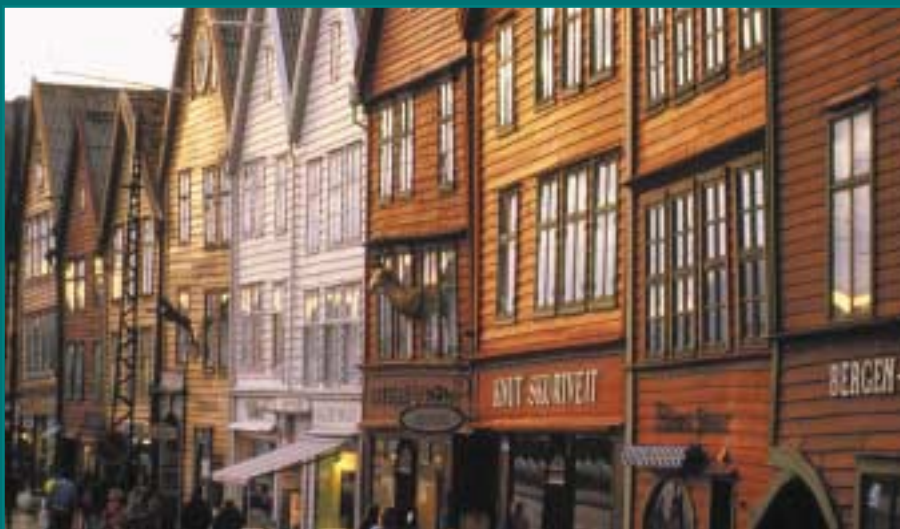
Contact:

Thomas Blöch
Air Liquide GmbH “Jugend Innovativ”
Sendnergasse 30
2320 Schwechat
AUSTRIA
Tel. : +43.1. 701 09 287
Fax :+43.1.701 09 318
e-mail: thomas.bloech@airliquide.com

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The German Wharf – Bryggen



www.eucontest.org

Contacts:

Graham Blythe

The European Commission
DG Research, SDME 3/52
200 rue de la Loi/Wetstraat 200
B-1049 Brussels, Belgium

Tel: +32 2 295 58 22

Fax: +32 2 296 32 70

E-mail: graham.blythe@cec.eu.int

Anders Groenli

The Norwegian Foundation for Youth
and Science

Oslo Research Park

Gaustadalléen 21

N-0349 Oslo, Norway

Tel: +47 22 95 86 76

Fax: +47 22 60 44 27

E-mail: anders@unge-forskere.no



Grieghallen



EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL



**Stiftelsen
Ungdom og Forskning**

The Norwegian Foundation for
Youth and Science