# 15th European Union Contest for Young Scientists

Budapest, Hungary

20-26 September 2003


European Commission
Research Directorate-General

*The Gresham Palace*

*The Royal Palace in Buda, as seen from Pest*

*The Matthias Church*

*The Vajdahunyad Castle*

*The Elisabeth Bridge*

*Fountain on the Margaret Island*

# INDEX

# EU CONTEST PROGRAMME

## SATURDAY 20.09.2003

| | | |
|---|---|---|
| 8:00-12:00 | Arrival of the participants (contestants, national organisers and escorts) | Airport/ train station |
| 12:00-13:00 | Lunch | Hotel |
| 13:00-17:15 | Set-up of the stands | Millenary Park |
| 17:15-17:45 | Departure to castle district | Millenary Park |
| 17:45-18:45 | Guided tour in castle district | Castle district |
| 18:45-19:30 | Walk to the building of the Hungarian Academy of Sciences with guided tour | HAS |
| 19:30-22:00 | Reception at the Hungarian Academy of Sciences | HAS |
| 22:00-23:00 | Return to the hotel | |

## SUNDAY 21.09.2003

| | | |
|---|---|---|
| 8:00-12:00 | Set-up of the stands | Millenary Park |
| 12:00-13:00 | Lunch | Millenary Park |
| 13:00-15:00 | Departure to Paks | |
| 15:00-16:00 | Lecture about the Nuclear Power Plant of Paks | Paks |
| 16:00-16:15 | Departure to the plant | Paks |
| 16:00-18:00 | Guided tour in the plant | Paks |
| 18:00-18:30 | Trip to the city of Paks, visit the Holy Ghost church | Paks |
| 18:30-22:00 | Dinner at "Topáz" restaurant, folklore programme | Paks |
| 22:00-24:00 | Return to Budapest | |

## MONDAY 22.09.2003

| | | |
|---|---|---|
| 9:00-12:00 | Start of Jury interviews | Millenary Park |
| 12:00-14:00 | Opening Ceremony and Reception | Millenary Park |
| 14:00-17:00 | Jury interviews | Millenary Park |
| 17:00-18:00 | Scientific lecture (prof. Vonderviszt) | Millenary Park |
| 18:00-18:30 | Departure to Pálvölgyi cave | Millenary Park |
| 18:30-20:30 | Tour in the Pálvölgyi cave, concert (Cotton Club Singers) | Pálvölgyi Cave |
| 20:30-22:00 | Reception | Pálvölgyi Cave |
| 22:00 | Return to the hotel | Pálvölgyi Cave |

## TUESDAY 23.09.2003

| | | |
|---|---|---|
| 9:00-12:00 | Jury interviews | Millenary Park |
| 12:00-14:00 | sightseeing tour on a ship with lunch | |
| 14:00-17:00 | Jury interviews | Millenary Park |
| 17:00-18:30 | Departure to Visegrád | |
| 18:30-19:30 | Visit the Solomon Tower | |
| 19:30-20:30 | Knights' tournament | Solomon Tower |
| 20:30-22:30 | Dinner at "Nagy Villám" restaurant | Visegrád |
| 22:30 | Return to Budapest | |

## WEDNESDAY 24.09.2003

| | | |
|---|---|---|
| 9:00-12:00 | Jury interviews – group I.<br>Free programme – group II. | Millenary Park |
| 10:00-12:00 | National Organisers' Meeting | Hotel Budapest |
| 12:00-13:00 | Lunch | Millenary Park |
| 13:00-17:00 | Jury interviews – group I.<br>Free programme – group II. | Millenary Park |
| 17:00-18:00 | European Patent Office lecture | Millenary Park |
| 18:00-18:30 | Departure to the Parliament | |
| 18:45-19:30 | Guided tour in the Parliament | Parliament |
| 19:30-20:30 | Rehearsal for the Awards Ceremony | Parliament |
| 20:30-22:30 | Ship tour on the Danube | |
| 22:30 | Return to the hotel | |

## THURSDAY 25.09.2003

| | | |
|---|---|---|
| 9:00-10:30 | Nobel Minds Meeting | Millenary Park |
| 12:00-14:00 | Prize Giving Ceremony | Parliament |
| 15:00-19:00 | Dismantling of the stands | Millenary Park |
| 20:00-23:00 | Farwell Dinner at "Ladik Csárda" | Danube band |

## FRIDAY 26.09.2003

| | | |
|---|---|---|
| 7:00- | Transfer to the airport and departure | |

# WELCOME by the PRESIDENT of the HUNGARIAN REPUBLIC

## Ferenc MÁDL

The Nobel Prize-winning scientist Albert Szent-Györgyi was once asked what the grandest experience in the world of research was. He replied, "To see what anyone can see, and to conclude from that something which no one else has ever thought of."

This frank thought also reinforces in us how closely, and with conscious and grateful curiosity, we must pay attention to the work and results of the ingenuity of scientific minds. For they are the ones who strike upon the workings, who describe the innovations, who discover the processes that, owing to the wonderful individuality of the human mind, only they and no one else could see.

The European Union Contest for Young Scientists, now for the 15th time, serves to make this type of "individuality" and oftentimes "lonely" science into a real community celebration. Europe's young researchers can learn from presentations, get to know each other's work through conversations, and see new faces of the ever-changing world. They can introduce their findings in noble competition. Hungary is proud and delighted to accommodate this year's meeting, and is pleased to serve as host to the youngest generation of innovation, development and renewal.

Youth and science: the two mighty treasures of Europe's future. The two together honestly: the source of hope. A value that is not concealed deep within secret compartments – yet that always has to be rediscovered and put into the focus of our attention again and again. We hope that the appraisal in Budapest also proves that the inventiveness of young scientists – just like Europe of the 21st century – knows no boundaries!

***Dr. Ferenc Mádl***
President of the Hungarian Republic

## Bálint MAGYAR

Dear Young Scientists, Participants,

I am happy to welcome the European Union Contest for Young Scientists in Budapest in September 2003, including all contestants, organizers, guests and indeed everybody who has contributed to the success of this event.

In the past, Hungary has paid host to many interesting scientific and historical events. I believe it is quite a fitting succession that in the beginning of the new millennium, just before our joining the European Union the young scientists of Europe visit Hungary in order to make acquaintances, build contacts and compare their scientific skills. I hope that the local atmosphere, the "genius loci", the involvement of many eminent scientists and public leaders, and the rich program will result in great achievements by the numerous contestants dedicated to science, and altogether, will make this a memorable and spirited event. In the name of the leaders, scientists, and citizens of Hungary I wish you great results in this competition and also a long, successful scientific carrier.

I hope you will return home with great memories, experiences, new friendships and contacts, as well as kind feelings towards the host country. May you remember this event with fond memories for a long time.

***Dr. Bálint Magyar***
Minister of Education, Hungary

# INTRODUCTION by the EUROPEAN UNION COMMISSIONER for RESEARCH

## Philippe BUSQUIN

This year marks a very special year for both the Contest and for Hungary. This is the first time that the Contest has taken place in an "accession" country .

Hungary and nine other candidate countries will join the Union in May 2004, and the months ahead will be an exciting time as Europe prepares for a major new step in its future development. It is fitting, therefore, that the 15th European Contest for Young Scientists takes place in Hungary because the Contest is also about the future. Young people are key to the development of our societies, and it is essential that they each have the best opportunities for their own personal development and the acquisition of useful skills and experiences.

Today, the use of scientific knowledge and its exploitation through technology is shaping the world in which we live, and leading to advances in almost all fields of human endeavour that were unimaginable even just a few decades ago. More so than ever before, Europe needs its scientists, and the Contest plays an important role in stimulating the imagination of young people of whom many go on to become world-class researchers.

However, the way of doing science is also changing. Scientists are learning that what they do carries with it a very high level of social responsibility: the need to communicate with the non-specialist public; to respect ethical considerations; to maintain the highest levels of conduct and accountability; and to proceed with the utmost precaution in exploring the potentials of new technologies.

This opens exciting opportunities - but also presents new challenges that can only be met if science and society grow together. This is the essence of the Science and Society Action Plan that the Commission adopted in 2001 as one of the pillars towards establishing a truly European Research Area. In its implementation, the Plan seeks to reach out and involve the citizens in Europe in the processes that determine how science shapes their future. I have no doubt that all the young people competing at the Contest will go on to play a role in these processes; and some will go on to play leading roles!

***Philippe Busquin***
Commissioner for Research -
European Commission

## József HÁMORI

## János PAKUCS

Dear Young Scientists,

On behalf of the host organiser, the Hungarian Association for Innovation, it is a pleasure for us to welcome you to the 15th European Union Contest for Young Scientists, in Budapest. Our association has always stressed the scientific development of young talents: this is the 12th time that we have organised our national contest, and the 11th time that Hungary has had the honour of participating in the EU Contest for Young Scientists. Our country was the first among the associated states to join the EU Contest.

Since the decision of the European Commission in 2001, when Hungary obtained the right to organise the EU Contest, we have been preparing tirelessly for this special week, and hopefully not in vain: you will have unforgettable experiences in Hungary!

We wish the 15th EU Contest for Young Scientists to be an important milestone in your scientific career, an experience that is a pleasant one, but also rich in challenges which will continue to inspire you, even many years from now.

***Prof. Dr. József HÁMORI***
Vice-president of the Hungarian Academy of Sciences, President of the Host Steering Committee

***Dr. János PAKUCS***
President of the Hungarian Association for Innovation, Head of the Organising Committee

# The EUROPEAN UNION CONTEST for YOUNG SCIENTISTS in BUDAPEST

**The European Union (EU) Contest for Young Scientists is an initiative supported by the European Commission to promote co-operation and interchange between young people interested in science.**

The EU Contest gives science students the opportunity to compete at European level with other prize winners from national competitions from across Europe and beyond. But it is more than just a competition: "the young scientists" meet others with similar abilities and interests, as well as 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 at a national young scientist competition can participate in the EU Contest. Thus, the Contest represents a real scientific challenge for many thousands of "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, Zurich, Seville, Berlin, Luxembourg, Newcastle upon Tyne, Helsinki, Milan, Porto, Thessaloniki, Amsterdam, Bergen, and Vienna.

This year, the EU Contest is taking place in Budapest, Hungary, in the reception Hall of Millenary Park. **76 projects** involving **113 contestants** from **38 countries** will be competing in this years Contest. For the first time teams form the Peoples' Republic of China will be participating as guest participants.

Next year, the Contest will take place in Dublin, Republic of Ireland.

The Contest is one of the activities managed by the Directorate-General for Research of the European Commission and is the responsibility of the Science and Society Directorate and aims to widely build a more harmonious relationship between scientific endeavour and the European society at large.

For more information on the EU Contest please visit our web site:
http://europa.eu.int/comm/research/youngscientists

***Achilleas Mitsos***
Director General at the European Commission responsible for Research and the Sixth framework programme under which the Contest is funded.

*The view of Budapest from the Gellért Hill*

## The CONTESTANTS

All the contestants who take part in the EU Contest have been selected to represent their own countries having succeeded at their national young scientist competitions. They compete either as individuals or as part of a team. There are strict rules on the age of the contestants (15-20 years), the size of the teams (maximum 3 contestants per project) and the number of projects that each participating country can send. A copy of the contest rules is available on request from the Contest Secretariat.

The size of the project demonstration stands is also clearly defined in the application brochure and it is the contestants' responsibility to respect strict limitations on the space available to them.

The EU Contest accepts project entries in all fields of scientific endeavour.

*The Contestants in Bergen, 2001*

## The PRIZES

The contestants compete on the basis of their work and interviews with the Contest Jury for a number of 'core' prizes. In addition to this, a limited number of honorary and special prizes are also offered to some contestants where, in the judgement of the Jury, they would benefit from the specific experiences that these prizes offer. At the discretion of the Jury, a prize winner can receive both a core prize and either an honorary or a special prize.

The **core prizes** are:

- **Three first prizes worth € 5000.**
- **Three second prizes worth € 3000.**
- **Three third prizes worth € 1500.**

The **honorary prizes** are for covering the costs for:

- Participation in the London International Youth Science Forum (London 2004)
- Participation in the Stockholm International Youth Science Seminar (2003)

The **special prizes** are for covering the costs for:

- Participation in the student programme of the International Astronautical Federation Conference (Vancouver 2004).
- Study visits hosted by the European Patent Office, Munich, Germany.
- Study visits hosted by the Norwegian Polar institute, Svalbard, Norway.

## The JURY

The Jury is composed of a President and 11 other scientists of international reputation who carry out their duties as individuals and not as representatives of an institution or country. The members of the Jury are selected to represent their scientific discipline and on the basis of scientific criteria. They are drawn from both academia and industry.

The Commission appoints the Jury annually. A number of members of the Jury are replaced each year in accordance with normal Commission procedures.

# The SELECTION and EVALUATION PROCESS

**The EU Contest takes place in four stages following national competitions, which are held across Europe from October 2002 to May 2003:**

### 1. Selection

Winners of the national competitions are selected to represent their country at the EU Contest.

### 2. Preview

During summer the EU Contest Jury have reviewed the written descriptions of the projects that they will assess during the exhibition.

### 3. Contest

Contestants display their projects on stands in the exhibition hall and are interviewed by members of the Jury. The Jury use the following criteria in arriving at their judgement:

- 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;
- follow-through of the study from conception to conclusion;
- reasoning and clarity in the interpretation of the results;
- quality of written report;
- 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, the quality of the resources available to the contestants and their linguistic ability if required to speak a non-maternal language.

### 4. Award ceremony

The Award Ceremony is the highlight of the EU Contest for Young Scientists. 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; HRH Crown Prince Haakon of Norway, the Hereditary Grand Duke of Luxembourg; Government Ministers, Ambassadors, and European Commissioners.

The award ceremony will be held in the House of the Parliament on 25th September. This year, it is our special honour to welcome the President of Hungarian Parliament, the Minister of Education, the Minister of Economy and Transport, the President and Vice-President of the Hungarian Academy of Sciences, **Achilleas Mitsos, Director General of Research Directorate General at the European Commission** and the Nobel laureates: **Prof. Ben Mottelson, Prof. Ivar Giaever and Sir Harry Kroto**.

The Ceremony will be followed by an official reception in the famous "Hunter" Room. The national and international press will cover the event.

## The PARTICIPATING COUNTRIES

The following countries participate in the Contest on a competitive basis:

Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Malta, The Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.
European Schools also participate.

In addition, special guest status has been conferred to prize winning teams[1] from the following countries:

- Japan
- Republic of Korea
- United States of America
- China

## Contact person:

For more information on the EU Contest for Young Scientists please contact the Contest Secretariat:

**Justina Martínez-Alarcón**

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Directorate C – Unit C/4.1
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B-1049 Brussels, Belgium
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[1] These four international participants exhibit their projects as the winners of, respectively, the Japan's Yomiuri Shimbun Young Scientist Contest, the Republic of Korea's National Contest for Students' Scientific Invention, the USA's INTEL/ISEF International Science and Engineering Fair, and the China adolescents Science and Technology Invention Contest.


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# EXHIBITION in MILLENARY PARK

## Millenáris Exhibition and Event Centre

39. Lövőház street, Budapest H-1024
Tel.: (36-1) 458- 5300,
Fax: (36-1) 438-5320
E-mail: millenaris@millenaris.hu

The Millenáris Exhibition and Event Centre was created on the site of the former Ganz factory in Budapest, built between 1844 and 1912.

The foundry produced railway wheels on the basis of the patented chilled casting method of Ganz, appraised and acknowledged all over the word, and later, under the supervision of András Mechwart, mills, developed on the basis of the same technology. Mechwart also played a decisive role in the foundation of the electric factory bordered by Lövőház street- Margaret ring - Kis Rókus street - Marcibányi square, where such renowned scientists were working, as Károly Zipernowsky, Titus Ottó Bláthy, Miksa Déri or György Jendrassik.

The basic principle of the concept of construction was to create an adequate environment for the exhibition highlighting the intellectual achievements of Hungarians and for the event programs.

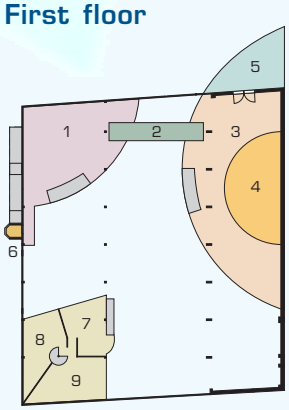
The architects approached the protected parts and forceful shapes of the buildings with outstanding civil engineering solutions, thus making it possible to preserve their individual character which are harmonically, however characteristically joined by the newly added parts.

The „B" building, a national monument was preserved, also the „D" building, which due to environmental pollution only a partly could be preserved, the new „C" building, which link the two, and the park a lake between them and a garage underneath create the settings for the one of the Hungary's biggest exhibition hall, the Millenáris Exhibition Hall.

The converted mantling hall named „E" is now the Millenáris Theatre housing musical, theatrical and dance programs.

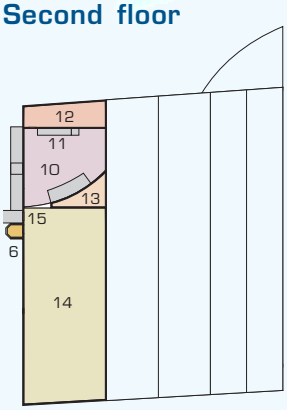
The „G" building, the Inn to the Milleneum, houses professional meetings and other events that are associated with the exhibition and event programs. The main entrance is emphasised by the Tower, symbolising the Heller-Forgó type cooling tower that is used in areas of the world where cooling problems must be solved economically trough minimal use of water as a coollant.

## First floor

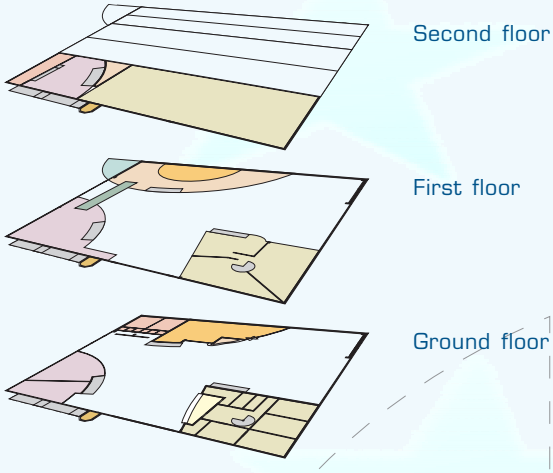



1. Internet corner
2. Bridge
3. Caféteria
4. Kitchen
5. Terrace
6. Elevator
7. Host
8. Press
9. EU

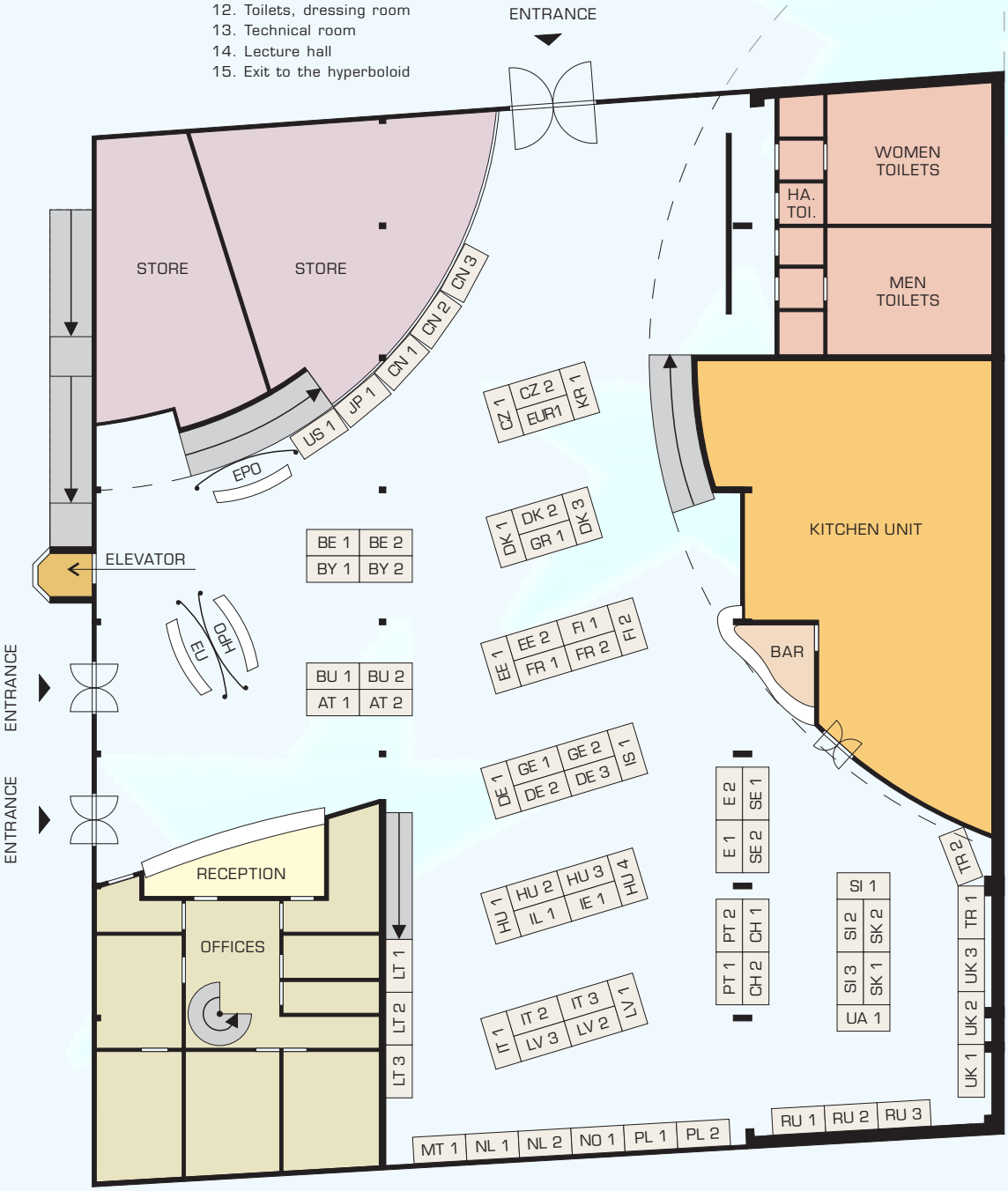
## Second floor




10. Foreground
11. Stair to jury
12. Toilets, dressing room
13. Technical room
14. Lecture hall
15. Exit to the hyperboloid




## Ground floor - Exhibition area



# INDEX of CONTESTANTS

| Country | Name | Ref. | Age | M/F | Domain | Title |
|---|---|---|---|---|---|---|
| **Austria** | Rupert FRIEMBICHLER | AT1a | 19 | M | Engineering | Intelligent accident warning system |
| | Franz SEIRINGER | AT1b | 17 | M | | |
| | Thomas KOFLER | AT2a | 20 | M | Engineering | Online measurement of the oil content of emulsions used in rolling mills |
| | David MAHLER | AT2b | 20 | M | | |
| **Belarus** | Mikita LESNIKAU | BY1 | 15 | M | Computer | Combining adaptive contextual modeling and entropy coding in compression software |
| | Konstantin MULYARCHIK | BY2a | 17 | M | Physics | Dirty drops or how to walk neatly |
| | Dmitriy ZUSIN | BY2b | 17 | M | | |
| **Belgium** | Nina VAN ROSSOM | BE1 | 18 | F | Social | Are astrology and numerology Sciences? |
| | Nienke BOONE | BE2a | 18 | F | Biology | Shampoos and the strength of hair |
| | Sylvie ACKAERT | BE2b | 18 | F | | |
| **Bulgaria** | Konstantin DELCHEV | BU1 | 18 | M | Mathematics | On two problems connected with the rectification of polyominoes |
| | Ana ALEXIEVA | BU2 | 18 | F | Mathematics | Original results on the sequences of Fibonacci & Lucas |
| **China** | Wei CHEN | CN1 | 17 | M | Biology | Effect of folic acid on the growth of flammulina velutipes |
| | Shaoxuan LI | CN2 | 17 | M | Engineering | The associated toxicity between Cu and Cd in green algue |
| | Jiayi XU | CN3 | 17 | M | Engineering | Intelligent surface garbage hunting and collecting device |
| **Czech Republic** | David SEHNAL | CZ1 | 18 | M | Computer | Math studio - a computer algebra system |
| | Barbora KUNZOVA | CZ2a | 18 | F | Physics | Globalisation versus catering |
| | Ondrej KOUDELA | CZ2b | 20 | M | | |
| **Denmark** | Thomas RASMUSSEN | DK1 | 20 | M | Biology | The Diacetyl concentration in beer depending on temperature and yeast strain |
| | Andreas PETERSEN | DK2 | 20 | M | Biology | Creatine supplementation, nutritional supplement or doping? |
| | Sean PAULSEN | DK3 | 20 | M | Physics | Determining the speed of light from the movement of the Jupiter Moon Io |
| **Estonia** | Mihkel KREE | EE1a | 19 | M | Physics | Lens as an optical parallel processor performing Fourier transform |
| | Aigar VAIGUR | EE1b | 19 | M | | |
| | Taavi TILLMANN | EE2 | 18 | M | Biology | The relationship between diurnal variation in height and physical activity |
| **European schools** | Frits VAN CLEEMPUT | EUR1 | 17 | M | Biology | Production of Sauerkraut, "classic versus biodynamic" |

| Country | Name | Ref. | Age | M/F | Domain | Title |
|---|---|---|---|---|---|---|
| **Finland** | Juhani KOIVISTO | FI1 | 20 | M | Chemistry | Determination of vibrational parameters B and X of iodine molecule |
| | Petri VALKAMA | FI2 | 19 | M | Chemistry | Analysis of the mass distribution of paper coatings |
| **France** | Manelle AJJAJ | FR1a | 18 | F | Environment | Chemical and microbiological analysis of air in Paris |
| | Dalila AGRED | FR1b | 18 | F | | |
| | Guillaume SHIRLEY | FR1c | 17 | M | | |
| | Ouardane JOUANNOT | FR2a | 18 | M | Physics | Study of a very strange oscillator |
| | Timothée LELEU | FR2b | 18 | M | | |
| | Jean-François SCHAFF | FR2c | 17 | M | | |
| **Georgia** | Aleksi VACHADZE | GE1 | 17 | M | Biology | Some aspects of goitered gazelle conservation in Georgian-Azerbaijan trans-boundary zone |
| | Nino LOMIDZE | GE2a | 18 | M | Medical | Helping kids gazing to the right |
| | Natia NAZGHAIDZE | GE2b | 19 | F | | |
| **Germany** | Uwe TRESKE | GE1 | 18 | M | Physics | Low cost scanning Tunneling microscope |
| | Andreas HOTKER | GE2 | 20 | M | Computer | Alcatraz - Dynamic high security system |
| | Jana IVANIDZE | GE3 | 19 | F | Biology | pH sensitive GFP mutant |
| **Greece** | Maria HAHAVIA | GR1a | 17 | F | Computer | Electronic secure key lock in cooperation with a central information system |
| | Konstantinos VERVERIS | GR1b | 17 | M | | |
| **Hungary** | Gabor NEMETH | HU1 | 19 | M | Physics | Efficiency enhancement of plasma loudspeakers |
| | Laszlo NAGY | HU2 | 18 | M | Biology | Phytocenology and environment protection of the Central Great Hungarian plain through a mycologist's eye |
| | Akos VERMES | HU3 | 19 | M | Biology | What happens with the stressed stress proteins |
| | Manuela LUKACS | HU4 | 19 | F | Engineering | Buildings assembled from skeleton elements and transportable in stock |
| **Iceland** | Anna KRISTJANSDOTTIR | IS1a | 18 | F | Environment | The Icelandic hydrogen house |
| | Boovar STURLUSON | IS1b | 20 | M | | |
| | Bryndis GUOMUNDSDOTTIR | IS1c | 20 | F | | |
| **Ireland** | Adnan OSMANI | IE1 | 17 | M | Computer | Advancement of the internet browser: Xwebs |
| **Israel** | Maxim AIZENSHTAD | IL1a | 18 | M | Computer | Advanced graphical 3D system for hardware accelerated environments |
| | Ofer KAPOTA | IL1b | 18 | M | | |
| | Shlomi FRUCHTER | IL1c | 17 | M | | |

| Country | Name | Ref. | Age | M/F | Domain | Title |
|---|---|---|---|---|---|---|
| **Italy** | Elia RIGO | IT1a | 20 | M | Enviroment | Opale, On-time photosynthesis activity level examiner |
| | Alberto TONERO | IT1b | 20 | M | | |
| | Michele VIDONI | IT1c | 20 | M | | |
| | Giacomo PULINA | IT2 | 20 | M | Computer | A low complexity sorting algorithm. Developing and testing |
| | Elisabetta CHIODAROLI | IT3a | 18 | F | Mathematics | Following the anchovies to the discovery of Ligurian Sea |
| | Davide SOLENGHI | IT3b | 18 | M | | |
| **Japan** | Shigeaki MIKI | JP1a | 19 | M | Computer | Chime system: chime management using personal computers |
| | Keita ODA | JP1b | 19 | M | | |
| | Haruhiko EHERA | JP1c | 18 | M | | |
| **Korea** | Eunkyu AU | KR1 | 17 | F | Chemistry | Dying hair with natural materials |
| **Latvia** | Margarita LUKJANSKA | LV1 | 18 | F | Mathematics | Compatibility of tetraiamonds, pentiamonds and hexiamonds |
| | Kristaps MEKSS | LV2 | 17 | M | Chemistry | Dihydropyridines nowadays |
| | Kaspars DAMBIS | LV3 | 19 | M | Engineering | Performance of a vehicle determined using hand made pendulum |
| **Lithuania** | Andrius JASILIONIS | LT1 | 18 | M | Enviroment | The common Juniper employment possibilities to improve cities ecological conditions |
| | Evaldas TRAINAVICIUS | LT2 | 18 | M | Enviroment | The influence of works performed on islands for breeding waterfowls |
| | Ervinas GAIDAMAUSKAS | LT3 | 18 | M | Chemistry | Catalytic properties of lipase |
| **Malta** | Roberta GALEA | MT1a | 17 | F | Mathematics | The calculation of Pi: a teaching aid |
| | Stephen MICALLEF | MT1b | 17 | M | | |
| | Francesca STIVALA | MT1c | 17 | F | | |
| **The Netherlands** | Wim COOLS | NL1 | 19 | M | Computer | A new compact operating system |
| | Vincent RUIGROK | NL2a | 18 | M | Biology | Fast beer brewing with a new technology |
| | Geert DE VREEDE | NL2b | 20 | M | | |
| **Norway** | Katrine LILLERUD | NO1 | 19 | F | Chemistry | A metallographic and chemical analysis of a Viking sword from Telemark in Norway |
| **Poland** | Lukasz JAREMKO | PL1a | 19 | M | Chemistry | Design and synthesis of two new immunosuppressants |
| | Mariusz JAREMKO | PL1b | 19 | M | | |
| | Radoslaw POLESKI | PL2 | 18 | M | Physics | Can life exist outside the Solar system |
| **Portugal** | Ana Gomes BARATA | PT1a | 16 | M | Biology | Germination of the *Asphodelus bentorainhae* under different conditions Contribution to its preservation |
| | David ASCENSAO FILIPE | PT1b | 17 | F | | |
| | Bruno MAGALHAES | PT2a | 17 | F | Enviroment | An environment's friendly fuel |
| | Lorina VENTURA | PT2b | 17 | M | | |

| Country | Name | Ref. | Age | M/F | Domain | Title |
|---|---|---|---|---|---|---|
| **Russia** | Ksenia ROGOVA | RU1 | 16 | F | Mathematics | The key to the mystery of the stone book |
| | Maxim KONSTANTINOV | RU2 | 17 | M | Engineering | New method for cold welding of parts by plastic deformation |
| | Anton ERMAK | RU3 | 17 | M | Environment | Sludge as a gift of nature - original method of the bio-utilisation |
| **Slovakia** | Marek SEBESTA | Sk1 | 19 | M | Biology | Induction of nuclear and mitochondrial mutants in yeast williopsis suaveolens |
| | Martin POPIK | SK2a | 17 | M | Engineering | Thermal conductivity of liquids |
| | Michal HOLUB | SK2b | 18 | M | | |
| **Slovenia** | Matija KASTELIC | SL1 | 19 | M | Physics | Star spectrometry |
| | Nina FOKTER | SL2 | 18 | F | Medical | Cytological analysis of cervical smears in teenagers |
| | Luka GALE | SL3 | 19 | M | Earth Science | Dinosaur traces & remains in Slovenia and Croatia |
| **Spain** | Victor GUTIERREZ HERNANDO | E1a | 18 | M | Biology | Field guide of the orchids in Sierra de Mijas (Benalmadena) Spain |
| | Teresa JIMENEZ HELIN | E1b | 18 | F | | |
| | Milagros GARCIA VILLAMOR | E1c | 18 | F | | |
| | Marcial CLOTET ALTARRIBA | E2 | 19 | M | Environment | The public lighting of Igualada. Light pollution |
| **Sweden** | Magnus LINDEROTH | SE1 | 19 | M | Computer | TI Print |
| | Erik FRÖJDH | SE2b | 19 | M | | |
| | Björn MAGNUSSON | SE2c | 19 | M | | |
| | Jasper JACOBSSON | SE2a | 19 | M | Chemistry | Plastic - a brilliant material! |
| **Switzerland** | Johannes KELLER | CH1 | 19 | M | Physics | The influence of the quill-shape on the harpsichord sound |
| | Tobias BRUDERER | CH2a | 19 | M | Biology | Effects of electric and magnetic fields |
| | Wito TRAUB | CH2b | 19 | M | | |
| **Turkey** | Fatma SISMAN | TR1a | 18 | F | Chemistry | The extraction of chromium from leather wastes and protein recovery using enzymes |
| | Muammer CELIK | TR1b | 18 | M | | |
| | Hüseyin TULUK | TR2 | 17 | M | Earth Science | An investigation to improve the productivity of agricultural products using Pumice |
| **Ukraine** | Mykola RUDENKO | UA1a | 17 | M | Environment | Oil products and bacteria-oil destroyers in the Dnipro river |
| | Volodimyr SKALKA | UA1b | 17 | M | | |
| **United Kingdom** | Alex MORRIS | UK1 | 19 | F | Physics | A study of magnetic thin films |
| | Elizabeth NEWTON | UK2 | 19 | M | Zoology | Introduction of gum Arabic into the diets of callitrichids |
| | Emily PAYNE | UK3 | 18 | M | Environment | Classification of compression wood in Sitka Spruce |
| **USA** | David BENETT | US1a | 18 | M | Computer | Beacon: analytical instrumentation software for identifying fluorescent oligonucleotides used in encoded microbeads |
| | Aaron SCHULMAN | US1b | 18 | M | | |
| | Andrew ASCIONE | US1c | 18 | M | | |

## AUSTRIA

### Rupert FRIEMBICHLER (19)

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**Career:** Engineer
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### Franz SEIRINGER (17)

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**School:** HTBLA Braunau / Inn

## Intelligent accident warning system

The intelligent accident-warning system warning at traffic accidents or other dangers on the road. In each car there is a transmitter, which is coupled with the airbag and the hazard-warning flasher. On the road, radio controlled guidance pegs are installed. This warning system is triggered by this car transmitter and produces a blinking signal, depending on the type of warning. In an accident with release of the airbags a coded radio signal is sent. All receivers in a distance of approx. 300 m receive the code and produce an optical signal, warning the following road users. During release of the hazard-warning flasher an other code is sent and the receivers activate a different warning pattern. In case of activation over the airbag, the receiver activates the blinking signal a fixed time, in case of activation with the hazard-warning flasher, the system blinks as long as the code is received. We tried to appreciate the cost and could show, that the costs of the accidents, which could reduced with our system are much higher than the costs of the installation this alarm system in Austria.

### Thomas KOFLER (20)

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### David MAHLER (20)

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**Career:** Rock star
**School:** HTBLA Braunau / Inn

## Online measurement of the oil content of emulsions used in rolling mills

Rolling emulsions are typically milky white products, the measurement of the oil content using light absorption is not possible. The typical oil content varies between 3 and 10%. We diluted the emulsion with a dilution factor of about 1:50 and got a nearly transparent solution. This solution we used for measuring of the light absorbency. We found that there is a nearly linear correlation between the oil content and the light absorption. We used two hose squeezing pumps for the dilution of the pure emulsion. The diluted emulsion was pumped through a flow cuvette with a distance of 10 mm. The optical arrangement was made with a combination of a LED and a photo diode to measure the light absorption. A similar arrangement was used to test the method directly at the rolling plant. We found that our method gave good results. For the self developed system and the measuring equipment used at the plant we developed a labview program to control the measurement and to calculate the oil content.

## BELARUS

### Mikita LESNIKAU (15)

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**Hobbies:** Programming, Mathematics
**Career:** System Programming, Telecommunications
**School:** Gymnasium No. 1, Komsomolskaya, 1

## Combining adaptive contextual modeling and entropy coding in compression software

Nowadays data compression is a very important research field. It is used in many applications of communications and computing. But most of the modern industrial standards are based upon computationally very simple, but not very effective schemes. In this work a very effective, but still computationally not very hard approach to lossless compression is shown. Additionally an archive that uses such an approach is developed.

### Konstantin MULYARCHIK (17)

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### Dmitriy ZUSIN (17)

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## Dirty drops or how to walk neatly

The problem of "neatly-walking" is rather actual especially taking into account that yet we can't avoid pools and mud on the roads. In report the investigation of this topic is shown. The reason why the dirty drop falls on the leg has been found. The coefficient of the power of dirtying of the clothes has been experimentally defined. On the basis of our investigation we have given some pieces of advice on the so-called "neatly-walking".

## BELGIUM

### Nina VAN ROSSOM (18)

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**Hobbies:** Playing the saxophone, Reading, Listening to music
**Career:** Architect
**School:** Athénée Charles Janssens

## Are astrology and numerology Sciences ?

While, for many people, the question shall not be raised, Nina has decided to address this topic but in avoiding to repeat well-known arguments. After identifying the characteristics, which define a field as a science, she sets up experiments to test astrology and numerology against these characteristics. The experiments are based on newspaper daily publications, student interviews and blind tests. At the end, both astrology and numerology are investigated experimentally.


Nienke BOONE (18)

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Sylvie ACKAERT (18)

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**Career:** Medical sector
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## Shampoos and the strength of hair

Nienke and Sylvie want to assert how strong hairs are and to understand why. First, they realize experiments from students of their school, testing hairs from blonde, red, brown and black girls and boys. They discover that hairs are extremely strong: one head of hairs would be able to withstand 12,000 kg. Afterwards, they wonder if all the shampoos we use are really needed. Starting from a pharmacist's recipe, they design their own shampoo. As a result of their investigation, they gain more respect in this simple part of our body, which is not just something dead but well a complex thing that we can't underestimate

# BULGARIA


Konstantin DELCHEV (18)

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**Career:** Mathematician
**School:** Sofia Mathematic High School 'Paisij Hilendarski'


## On two problems connected with the rectification of polyominoes

Since polyominoes were introduced in mathematics by Solomon Golomb in 1951 the problem for their rectification /tiling a rectangle with them/ is one of the most discussed problems in the field. The project concerns two of the main generalizations of this problem which were studied in the last three decades. These problems are finding of sets of polyominoes or their n-dimentional equivalents which have similar tiling properties and finding the explicit form the function fx(a,b), which gives the number of tilings of an axb rectangle with the polyomino X. In the project we collect some of the already known results in this field and prove new facts concering the L-polyominoes, the boot polyominoes the stepwise $n^2$-ominoes and a group of n-dimensional equivalents of the stepwise hexomino.


Ana Ivanova ALEXIEVA (18)

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**Hobbies:** Reading fiction, Writing poetry, Training Folk-dances, Volleyball, Table Tennis, Mountaineering, Listening to music
**Career:** Mathematician
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## Original results on the sequences of Fibonacci & Lucas

The project is devoted to the sequences of Fibonacci and Lucas and consist of: Item one, which contains formulations and proofs of several entirely new theorems, considering divisibility in each sequence and between them both Item two, including original analyses of the prpperies of polygons in the plane and in the space, which coordinates are members of the sequences of Fibonacci and Lucas.

Appendix1, Appendix2 and Appendix3 contain propositions, which were used by the proofs of the theorems of the project. All of them were taken from another author's work and most of them are also original. Appendix4 proposes 13 entirely new problems, which is illustrate the theory explored in the project and in Appendix1, Appendix2 and Appendix3. Appendix5 includes the bibliography used.

## CHINA


### Wei CHEN (17)

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**Career:** Biochemist
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### Effect of folic acid on the growth of *flammulina velutipes*

*Flammulina velutipes*, a delicious mushroom is in rich of peroxidase, superoxide dismutase, and others. Thus it can prevent people from some severe diseases like cancer and coronary heart disease, and it would be benefit for physical and intelligence of children. In the present study the effect of folic acid on the growth and enzymatic activities of fresh *Flammulina velutipes* was investigated. The result showed as following:

1. Folic acid in proper concentration improved the growth of *Flammulina velutipes* obviously.

2. The soluble protein content and the activities of peroxidase and superoxide dismutase of *Flammulina velutipes* could be increased by spraying folic acid, thus nutrition and medical value would be increased too.

In conclusion, during the culture of *Flammulina velutipes*, spraying folic acid in proper concentration is an economical and effective way to increase its yield, quality and medical values.


### Jiayi XU (18)

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### Intelligent surface garbage hunting and collecting device

There is often a considerable amount of garbage floating on the surface of rivers and lakes. This waste is generally removed manually. However, in scenic areas, the manual collection of garbage may spoil the region's natural beauty. The focus of my project is an un-piloted intelligent surface garbage hunting and collecting device controlled by a Single Chip Microcomputer (SCM). Manual monitoring and control are performed through a wireless photograph transmission system. The device's automatic search system resembles radar scanning, i.e. active infrared detecting devices are used to scan for surface waste. A model of the device is also available for verification. This project offers the prospect of a simple, efficient and cost-effective method for the removal of unsightly waterborne waste.


### Shaoxuan LI (18)

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### The associated toxicity between Cu and Cd in green algue

The main pollutants existing in the open water include organic materials and metal salts. Nowadays, research related to the toxicity of heavy metals is one of the focuses of public attention.

Green algae, which are the main producers in rivers, play a very important role in the aquatic ecosystem in polluted water. Therefore, algae that are easy to be observed and counted are chosen as our research objects.

I tried to explore the associated effect of two heavy metals Cu and Cd, with the following two aims. One is to evaluate

the quality of water and the other is to supply some theoretic basis for measuring metals' toxicity exactly and bringing the application of environmental monitoring closer to the factuality.

Photo density and cell number scale were chosen as the two parameters according to OECD's standard method of experiments in the hindering of the growth of algae. *Chlorella Pyrenoidosa Chick* and *Scenesesmus Obliguus* were selected as the objects in my research. The results show: (1) The EC50 values of Cu and Cd with *Chlorella Pyrenoidosa Chick* are 0.05 mg/L and 0.024 mg/L respectively; (2) The EC50 values of Cu and Cd with *Scenedesmus Obliguus* are 36 mg/L and 3.68 mg/L respectively; (3) When the proportion of Cu to Cd is 1 to 1 and 3 to 1, the associated toxicity is both Antagonistic action. I think that Cu reduces Cd's toxicity and the cause may be the reaction of heavy metals with metallothionein-like (LMT), the capability of Cu2+ conjugate to LMT is more than that of Cd. When the proportion is 1 to 3, it is Cooperative action. Whether *Chlorella Pyrenoidosa Chick* or *Scenedesmus Obliguus*, the results are the same.

## CZECH REPUBLIC

### David SEHNAL (18)

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**Career:** Computer Programmer
**School:** Reálné gymnázium a základni skola mesta Prostejova

## Math studio - a computer algebra system

**Math Studio – Project description**

Math Studio is a computer algebra system (CAS) I'm developing. It is intended to be an easily available CAS. It is a scripting language for mathematics. Mathematica – the world leading CAS, has inspired it. It will allow the user to solve equations, differentiate, integrate, simplify and evaluate the expression in arbitrary precision and much more. Math Studio is also going to provide a powerful visualization kernel, which will allow the user to display almost what ever he/she wants. Everything will be easily accessible via a user-friendly GUI (graphical user interface). There is already on distribution of Math Studio available at http://math.pomerac.cz. It is more a visualization tool. However, it provides several symbolical routines such as simplification or equation solving.

### Barbora KUNZOVA (18)

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### Ondrej KOUDELA (20)

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**Career:** Journalist
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## Globalisation versus catering

This project is concentrated at McDonald's company in Czech Republic and at "McDonaldization" process. The aim of this work is to find out statistically how many people and why visit McDonald's and find out the connection between the results and the "McDonaldization" theory. We are also posing a question if it is possible to avoid "McDonaldization" or decrease its influences. Our another goal is to gather the information regarding meals served at McDonald's and conditions prevailing at McDonald's restaurants. The next goal is to summarize information gathered and send it to the interested respondents. We can use obtained results and experience as a basis to continue our work. We established a basis of a project which, hopefully, will help to start public debate on McDonald's and "McDonaldization" subject, will supply the information on this subject and will offer more detailed insight into this problem in the Czech Republic. Our future goal is to se up a web site presenting and gathering increasing amount of information regarding McDonald's and connected topics.

## DENMARK


### Thomas RASMUSSEN (20)

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**Hobbies:** Handball, Editing the local magazine
**Career:** Biotechnologist
**School:** Svendborg Gymnasium


## The Diacetyl concentration in beer depending on temperature and yeast strain

Imagine sitting down on a hot summer's day with a glass of cold beer – and then discovering an aftertaste of butter! This is a real problem faced by the brewing industry. Because wort, which is used to brew beer along with yeast and a wide range of other ingredients, produces diacetyl during the fermentation process – and diacetyl tastes like butter. I became aware of this when carrying out a project for a Danish brewery with a grant from the Confederation of Danish Industries. So I decided to tackle the subject in my final-year biology dissertation. I carried out fermentation experiments using both baker's yeast and brewer's yeast to gain an insight into how temperature and yeast strain impact on the concentration of diacetyl in the beer. I have used this insight to come up with possible solutions for optimizing the removal of diacetyl from beer.


### Andreas Overbeck PETERSEN (20)

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**School:** Morso Gymnasium


## Creatine supplementation, nutritional supplement or doping ?

Doping is an issue that attracts much media attention. It is illegal, it is cheating and it is not fair play. Athletes, who use shortcuts to enhance physical performance by drugging themselves with EPO, anabolic steroids and the like, run risks, however, of being found out by official doping tests. The doping list is an official catalogue of drugs known to improve physical performance. Many studies indicate that creatine also enhances some physical performances. This study is a survey of several of these former studies. On the basis of conclusions drawn from these studies and on personal tests, a sprint test and a vertical jump test, carried out by upper-secondary students, it is concluded that creatine supplementation does improve some sprint activities and that creatine should rightly be added to the doping list when a method – perhaps the one indicated in this study – of measuring unnaturally high levels of creatine has been found. Creatine is not only a nutritional supplement. It is doping.


### Sean PAULSEN (20)

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**Career:** Astrophysics
**School:** Amtsgymnasiet i Sonderborg


## Determining the speed of light from the movement of the Jupiter Moon Io

I have tried to determine the speed of light based on observations made by the famous Danish astronomer Ole Romer, who as the first scientist showed that light has a velocity, which he determined. The result was surprisingly close to today's exact value, considering the methods and equipment he used. It is important to determine this value because of its usage in physics as well as in the everyday life. We have today more precise methods of doing so, but I think it is important to know of this alternative, yet original way.

## ESTONIA

### Mihkel KREE (19)

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### Aigar VAIGU (19)

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**School:** Hugo Treffner Gymnasium

### Lens as an optical parallel processor performing Fourier transform

The aim of current study is to compare two methods of performing Fourier transform. It can be performed either digitally by a computer or by making use of some wave optical processes which result in the Fourier' transform. The work shows that it is possible to carry out the two-dimensional Fourier transform in parallel by the optical Fourier processor. This processor might potentially have very many applications in signal analysis. There is no doubt that optical information processing will play an important role in the information technology in the future. To increase the security level in the airports new techniques are being used to identify people, which base on the optical analyse of the iris of eye. A way to identify people using Fourier transforms of their fingerprints, which will be carried out optically, might be invented in the nearest future. Nowadays fingerprints are being identified by algorithms that base on finding correlation and matching between different fingerprint patterns, therefore optical solution should me much faster and more precise.

### Taavi TILLMANN (18)

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**Career:** Medical career
**School:** St. Clare's College, Oxford

### The relationship between diurnal variation in height and physical activity

By the evening people can be up to 2 cm shorter than in the morning. During the evening and night they regain this loss. Nobody has ever looked at the factors which determine the amount of height loss. The author thought physical activity could be the key factor, which could cause greater compression of the spine, and hence a greater height loss. Four people were measured every 3-hrs, from 0900hr to 2100hr, for ten days. The results show that the average height loss was 1,8cm. Simultaneously, they wore small portable activity monitors to estimate their physical activity levels. Each change in height was correlated to the respective activity level. The results show that height loss during the day occurred independent of physical activity. However, during the evening height gain, more height was gained during inactive evenings. Thus should anyone wish to be "taller", they should ask to be measured in the early morning or as late in the evening as possible, but only after a good inactive nap!

## EUROPEAN SCHOOLS

### Frits VAN CLEEMPUT (17)

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**Hobbies:** Judo, Listening to music and going out
**Career:** Scientific area
**School:** European School II

### Production of Sauerkraut, "classic versus biodynamic"

In this project the differences in the fermentation between classic and bio-dinamic (organic) cultivated cabbages are examined. Much has been of the advantages to helth by eating bio-dinamic foods. This idea stimulated me to investigate if there were measurable differences between

cabbages grown in a biodynamic way and those „mass producted" using pesticides. The procedure involves monitoring the fermentation of the two kinds of cabbages: dry mass, ash mass, temperature, pH, lactic acid production, population count, vitamin C contrencation and viscosity. The bio-dynamical cabbage had more dry mass and ash mass. The bio-dinamical fermentation had a higher temperature, a faster decline an pH, a higher yield of lactic acid, a fester production of vitamin C and a lower viscosity. The viscosity is probably lower because there are fewer waste products formed because the undresired bacteria die faster decline in pH. All of the results point in the same direction: thefermentation from the bio-dinamical cabbage is faster and better of qality. This results in bio-dinamical sauerkraut with a better flavour. The results also suggest that this protocol could be used to investigate the quality of various other foods suitable for fermentation.

## FINLAND


### Juhani KOIVISTO (20)

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**Hobbies:** Judo, Piano, Role-playing, Cycling
**Career:** Researcher in Physics
**School:** Mattlidens Gymnasium


## Determination of vibrational parameters B and X of iodine molecule

Through experimental modelling the spectroscopic fine structure of iodine has been estimated based on its absorption spectrum in the 480-650 nm region at 298 K. This information includes data for the molecules vibrational frequency, anharmonicity, dissociation energies, force constant, bond lengths, and population, among other parameters describing the molecular potential energy diagram. Moreover the experiment introduces techniques widely used in engineering and medical studies.


### Petri VALKAMA (19)

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**Career:** Engineer
**School:** Jyväskylän Lyseon lukio


## Analysis of the mass distribution of paper coatings

A method for analyzing the grammage and mass distribution of paper coatings with laser spectroscopy was developed. The coating was bored through with laser and its grammage was calculated from the number of pulses needed to pierce it. The mass distribution was analyzed by measuring the grammage in nearby points. A spectrum of the radiation emitted when the laser hit the coating was used to analyze its composition. The method identified the interface of the coating and the paper using their different composition. The error of the method was calculated. The method was found to be suitable for analysis of paper coatings with errors of 7,5%, reducible easily to 5,5% and even further. The method is best suited for measuring single coatings, although it can be used to measure double coatings as well. It can be used for both online and offline measurements.

## FRANCE

### Manelle AJJAJ (18)

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**Career:** Doctor
**School:** Lycée Galilée

### Dalila AGRED (18)

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### Guillaume SHIRLEY (17)

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**Hobbies:** Rugby, Informatics, Internet, Music
**Career:** Chemist or Physicist
**School:** High School Galilée

## Chemical and microbiological analysis of air in Paris

Chemical and microbiological analysis of air in Paris was studied. It was shown that air in a bedroom can contain more germs than in the subway (!), and that air in a car can be far more contaminated than in a high traffic street. It was also shown that biocontamination decreases rapidly with altitude, whereas NO2 concenration decreases much slower.

### Ouardane JOUANNOT (18)

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**Career:** Biologist
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### Timothée LELEU (18)

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### Jean-François SCHAFF (17)

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**Hobbies:** Music, Computer modelling
**Career:** Researcher in Physics
**School:** Lycée Chaptal

## Study of a very strange oscillator

A small can with a hole in its bottom, containing sweet water was placed in a water vessel. Laser measurements, showed that while sweet water dropped into the water vessel, water from the vessel raised into the can. Surprisingly, in some conditions, an oscillation of water appeared at the level of the hole. Experiments were done to better understand the reasons of this water oscillation.

## GEORGIA


### Aleksi VACHADZE (17)

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**Hobbies:** Basketball, Reading, Getting knowledge, Painting, Walking in nature
**Career:** Cardio surgeon
**School:** AIETY Natural Sciences Gymnasium


## Some aspects of goitered gazelle conservation in Georgian-Azerbaijan trans-boundary zone

Goitered Gazelle is extinct in Georgia, this species has not been sighted in our arid and semiarid country ecosystems since 70s of the last century. Goitered Gazelle extinction was caused mainly by anthropogenic factors, such as:

1) reduction of living space, because of urbanization processes;

2) degradation of food sources (grasslands and pastures) due to erosion processes, which in turn are caused by overgrazing;

3) poaching.

In spite of problems mentioned above, there are still another places, which can serve as a playground for beginning of recovery processes. For the first time in the world we have investigated Goitered Gazelle in nature, studied the condition of historical range in Georgia, also the places inhabited by the healthy population (Shirvan reserve, Azerbaijan), determined the minimal size of viable groups, gazelle's role in predator diet, their behavioural specificities and based on this information worked out the necessary recommendations needed for successful recovery and further conservation of Goitered Gazelle population in Georgian-Azerbaijan trans-boundary zone.


### Nino LOMIDZE (18)

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### Natia NAZGHAIDZE (19)

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## Helping kids gazing to the right

Neglect of left side of visual space in healthy right-handed children (about 30% of an experimental population of 1091 subjects) aged 6 to 10 are revealed. Left sided neglect is suggested due to delay of development of the right brain hemisphere spatial functions. As is shown, that children with neglect experience problems in acquiring reading skills. Application of methods used rehabilitation of patients with unilateral neglect, promoted reading skills in children under examination. Profile Drawing Test is recommended as an efficient method to detect or neglect of the left side of visual space in children aged 6 to 10.

## GERMANY


### Uwe TRESKE (18)

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**Career:** Physicist or Nanotechnologist
**School:** Paul Gerhardt Gymnasium


## Low cost scanning Tunneling microscope

Scanning Tunnelling Microscope feels the surface of the test with the help of an extremely fine tip. It belongs to the most important tools in nanotechnology because it can make even partial atoms of a material surface visible. Such devices usually cost several thousands of Euros. My microscope can be copied at a materials price of 40 Euros. Filaments serve as a microscope tip and a pile of towels damps undesirable vibrations. I reached the biggest reduction in costs by the usage of a standard PC sound card for the digitization of the measuring signal. My device offers a unique relation between price and resolution.


### Andreas HOTKER (20)

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## Alcatraz - Dynamic high security system

Main component of the Alcatraz Security System is a special "low- level" network driver, that is not only able to filter the whole network traffic and to search for hack attempts (integrated firewall and IDS (= Intrusion Detection System)), but also to protect the protocol drivers and the system itself. Additionally, Alcatraz is able to fool attackers by simulating the operating system on the victim's host and therefore confuses any hacker that tries to scan the system. Any rules that are added or any options that are changed take effect immediately – there's no need to reboot the whole system.

The Alcatraz Security System supports an easy configuration even by remote access, which minimizes the expenditure for the administrator.


### Jana IVANIDZE (19)

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**Career:** Medical Researcher
**School:** Städtisches St. Anna Gymnasium


## pH sensitive GFP mutant

The intracellular pH plays a decisive role in the life of cells. In my project, I have tried to measure the internal pH of the Endoplasmic Reticulum (ER), a cell organelle involved in protein synthesis and the response of cells to external signals. For this project I used the more simple slime mould Dictyostelium discoideum, as complex processes can best be understood using simple organisms.

Using the methods of genetic engineering, I constructed a gene, which codes for a fusion protein of pHluorin and calreticulin. pHluorin is a pH sensitive mutant of the green fluorescent protein GFP. The pHluorin spectra give us information about the pH of the protein's environment. Calreticulin is a resisdent protein of the ER and thus cannot be found anywhere else inside the cell. When the two proteins are fused with each other we get a pH indicator, which can be found in the ER only – we can thus measure the specific internal pH of the ER. I found that the ER is acid compared to the cytosol.

At this point we do not know whether the acid pH has more to do with the role of the ER in protein synthesis or intracellular signalling. This must be established through studies of the ER pH under various conditions – something that is made possible by my work. These results will hopefully help understand the reactions, which form the basis of life.

## GREECE

### Maria Anastasia HAHAVIA (17)

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### Konstantinos VERVERIS (17)

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## Electronic secure key lock in cooperation with a central information system

System of checking the secure distribution of personnel. It is a hardware system which collaborating with the corresponding software, checks and allows or not the passage of personnel inworking or domestic places. There are three solutions given for same problem. The key for the certification is the information that is contained on a simple telephone card. A group of data constitutes the 104 bits of the ROM. An another group of data is the picture that exists on the card. We can check the luminous energy that goes through the holes punched in the body of the card or read the photograph that exists on it. Both sides of the card are scanned each one in a different way. One with a dot-to-dot scanning and one with a lens and a high-resolution optic reader. All this system can function in a network, or stand alone in the case where we simply want to make a lock for our house. Using only the card to unlock the system is useless, because in order to have someone access it needs keying the secure password.

## HUNGARY

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**Career:** Electric Engineer
**School:** Pálfy János Technical School of Precision-, Chemical Engineering

## Efficiency enhancement of plasma loudspeakers

The dynamic sound radiators have become an important part of human life considering both listening to music and entertainment. Due to their structure, however, they can only be improved to a certain level of fidelity. In order to receive the more perfect sound of acoustic instruments, or the singing voice, we have to use a transmitting channel, in which the scale of distortion is negligible. One way of eliminating this harmful effect is to establish some kind of plasma in the air. The plasma is an ionized gas in the fourth aggregate, which, in this case is generated as corona-discharge. From the survey results it has turned out that the instrument transmits clearer sound, and has greater performance, than the previous plasma sound radiators. Its further advantage is that it expressively demonstrates such applications of theoretical plasma-physics. If the volume is increased, the transmission band is further widened, the clearness of the sound is refined, and the effectiveness is improved, an even more perfect instrument can be constructed.

### László NAGY (18)

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**Career:** Biologist, Mycologist
**School:** Katona József High School

## Phytocenology and environment protection of the Central Great Hungarian Plain through a mycologist's eye

I've collected over 510 fungi species from over 1100 localities in the surrounding of Kecskemét (Hungary, middle region of the Great Hungarian Plain). 21 out of these species are published as new for Hungary (there was no occurrence data from Hungary) and 2 as new for science: *Tricholoma populinum Lge. var. lutea var. nov.* and *Inocybe atrofibrosobasis spec. nov.* With full knowledge of the fungal flora of the investigated area I made proposals to the Red List of Macrofungi in Hungary, especially in case of some underinvestigated genera and species. With the comparison of the fungal flora in the beginning of the XX. century and the present rarefying and spreading species was selected. With knowledge of fungi of each association the fungi flora of a special association can figured out (of course with comparison of other publications concerning the same habitat). The research has not only theoretic value but also opens perspectives in the agrarian sector and in the environmental protection as well.


Ákos VERMES (19)

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**Career:** Biochemist
**School:** Fazekas Mihály High School


## What happens with the stressed stress proteins

Environmental stress leads to proteotoxic damage, when many of our proteins loose their native structure, neces sary to any enzyme action. Stress proteins help the recovery of the native conformation of the other proteins. However, stress proteins are proteins themselves, and they also suffer a significant damage. Unfortunately stress protein function is not easily measured, therefore stress protein damage was not investigated before. I have used a novel tool developed in our lab, affinity nucleotide cleavage, to monitor stress protein denaturation. Moreover, I was able to address the question for the first time: what happens, if the damage control itself gets damaged? My studies revealed that the repair of stress proteins needs a rather complex, active mechanism of our cells. My results may open novel ways to preserve stress protein function, which would be a new strategy to cure aging diseases such as diabetes, Parkinson's disease, Alzheimer's disease, etc.


Manuéla LUKÁCS (19)

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**Hobbies:** History, Collecting antique things
**Career:** Technical manager or dealing with invention patents


## Buildings assembled from skeleton elements and transportable in stock

Special stocks can be made from the skeleton elements of the building structure system containing multifunctional structural elements, which are suitable to include the other building elements into uniform packages and to protect them against the adverse effects occur during transportation. These elements amalgamate the advantages of the light construction and the space-unit building structures with a new facility that the buildings can be transported by means of packaging them into their own elements, which results in a significant saving in utilising the packaging materials. The construction can be used advantageously for the purpose of warehouses, work-shops, accommodation buildings, schools, offices, sport facilities, as well as temporary facilities requiring quick location and relocation.

## ICELAND

### Anna KRISTJANSDOTTIR (18)

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## The Icelandic hydrogen house

For the past five years, Iceland has been aiming for creating a hydrogen economy converting its sustainable electric energy into hydrogen (1). A group of three students from the junior college in Ármúli, Reykjavík, is working on a project which involves the definition of the design parameters for a hydrogen house. Solar, hydroelectric wind and geothermal energies have been selected as the main sources of clean and sustainable energy for this project. A hydrogen system is also part of the project. On site hydrogen generation and storage possibilities will be discussed. The use of a fuel cell to assist the power consumption of the house is also discussed. The Icelandic Hydrogen House is 30% more expensive than a regular grid-only connected house but in this project the house has been designed to be a laboratory for future analysis of the technologies used.

## IRELAND

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**Career:** Computer Engineer
**School:** St. Finians College

## Advancement of the internet browser: Xwebs

Adnan's project XWEBS™ is a breakthrough in the development of Internet Browsers. It encompasses not only more features than any other program of it's type, but also showcases the next generation of Web Browsing tools. The browser features enhanced graphical displays, in-depth searching facilities (more than 1500 searh engines are built in), a speaking animated character that can, among other things, reag out web pages, a built in FTP client sidebar, every single type of media player available from the comfort of a sidebar, video and audio encoders, multiple browsing facilities, a built in Zip sidebar, Web page preview and translation facilities, advanced real-time saving features, a built in Internet phone as well as several hundred other user-tools. The project also removes many of the errors associated with internet browsing. XWEBS™ has two core features, however, that clearly put it ahead of the browsers developed by the large commercial companies. Firstly, it has a new 1500-bit security algorithm (the first of its kind in the World) which allows users to encrypt messages and files using the program; or their own „key" definitions. This effectively means that it would be nearly impossible to decrypt any piece of data without the original key. Secondly, XWEBS™ showcases a new method of increasing the speed of the Internet, whereby users can increase the apparent physical speed of the modem line by up to 500%. Adnan has also invented a new method of internet compression, which when used at the server-point and in XWEBS™, also users to access the Internet at a far higher speed than is possible wih any of the modems currently available. These breakthroughs, coupled with the vast array of tools included in the program, make XWEBS™ the most sophisticated Web Browser on Earth.

## ISRAEL

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### Shlomi FRUCHTER (17)

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## Advanced graphical 3D system for hardware accelerated environments

The issue of 3D simulations and virtual reality fascinates the imagination of many around the globe. Knowing that one day, in the near future, we will be able to navigate through virtual photo-realistic worlds drives many developers to invest their time and resources in order to stay on the front line of technology. Such graphics technologies have infinite applications, including medical systems, military simulations, architectural design tools and entertainment. By using advanced graphic techniques, we can create new worlds. We can build virtual machines, look at them from any direction and even make them work and move, all that without making any noise or getting our hands dirty. The Claw 3D-Graphics Engine is another step towards perfect graphic simulation of reality. It uses the most recent developments in the fields of hardware and software, in order to create the most realistic 3D environment the user has ever experienced.

## ITALY

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**School:** Università degli studi di Udine

## Opale, On-time photosynthesis activity level examiner

This project concerns the realisation of a technical instrument for the quantitative determination of the photosynthetic activity of the plants. The clorophyllian photosynthesis is correlated to various factors, amongst them the more important ones appear to be temperature, brightness and carbon dioxide presence. Thus, this technical device was set up to determine the interrelations that connect the process of photosynthesis of a plant to the quantitative relieves of the three aforesaid factors. OPALE is born, therefore, as a prototype for the monitoring of the processes of photosynthesis in controlled conditions; it is able to collect data through a IRGA system, to transmit them to a datalogger, which collects them, and send to a PC for process the opportune simulations. With this instrument characterised by great versatility it is possible, thus, to reproduce particular stress conditions of the environment and to measure the influences that these operate on the metabolism of the observed plant.

## ITALY


### Giacomo PULINA (20)

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**Career:** Engineer
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## A low complexity sorting algorithm. Developing and testing

The aim of this study is to realize a simpler algorithm in respect of the most diffuse ones (bubble sort, quick sort, merge sort). In order to measure the simplicity of his algorithm, the student has lead different series of sorting experiments. He calculated the time needed for every process and counted the number of operations carried out during the experiment. The purpose of the project is to realize an algorithm that is able to "see" all the relations of a considered numerical set. If the calculation considers a number not only for its relative value to an other number, but regarding all the other numbers, a more efficient algorithm would be obtained. This hypothesis has been verified through a wide series of operations and has turned out that a linear dependency between everyone of the parameters exists which the experimental algorithm depends upon. The conclusions regard the possibility to realize an algorithm effectively faster and simpler.


### Elisabetta CHIODAROLI (18)

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**School:** The "Lorenzo Respighi" Scientific High School



### Davide SOLENGHI (18)

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**Career:** Civil Engineer
**School:** The "Lorenzo Respighi" Scientific High School


## Following the anchovies to the discovery of Ligurian Sea

This project is an attempt of creating a mathematical model for describing population dynamics of anchovies in the Ligurian Sea. The numerical analysis of the relative data of the population of *Engraulis Encrasicholus* reported in 1999 has been centralized on the application of a time-space dynamics connected to the atmospheric conditions in order to simulate the movement of the considered biomass. Moreover, the model of Beverton-Holt has been applied to the sampling data and the numerical calculation has been lead with the Matlab software that represents a language of programming finalized to the formal setting of matrices and to the visualization of complex analyses through diagrams to two and three dimensions. It emerges that the biomass of anchovies in the study area shows cyclical dynamics that could reflect the combination between the development explained by the Beverton-Holt model and the fishery policy simulated in the course of the survey. This study places itself borderline between mathematical sciences and natural sciences and reflects the meaningful words of Galilei: "the great book of the nature is written in mathematical language"

## JAPAN

### Shigeaki MIKI (19)

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### Haruhiko EHARA (18)

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**School:** The University of Tokyo

## Chime system: chime management using personal computer

CHIME SYSTEM is a new and innovative set of computer programs that controls school chimes. In the past, teachers were struggling with an outdated machine, which was difficult to use. You had to fill in a mark-sending card and insert it. It often misread the sheet and you had to set a whole week's setting at the same time. However, with this CHIME SYSTEM, teachers are now free from the unbearable work. CHIME SYSTEM has a lot of advantages. First, it is flexible and easy to use. You can set the schedule with clicks and drags at any time, very easily. Second, since CHIME SYSTEM has a nice-looking window that shows current settings, it is easy to spot errors, while the previous system never told us when chimes would be played until they were played. Third, it is inexpensive because what you need is only an old personal computer and some relays, and because we worked for free. Thus, CHIME SYSTEM is an ideal replacement for old-fashioned chime systems all over Japan.

## KOREA

### Eunkyu AU (17)

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**Career:** Veterinarian
**School:** Bosung Girls' High School

## Dying hair with natural materials

Because the commercial and artificial hair-dye damages the hair, we began to think of the possibility of dying hair with natural materials. We tried to find out whether we could dye the hair using the natural dyes exracted fom the natural materials.

Then using varius natural materials and mordents, we tested various colors avaliable. In addition we compare the color and a pollution level of these natural dyes with the artificial ones.

## LATVIA

### Margarita LUKJANSKA (18)

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**Career:** Computer scientist or Mathematician
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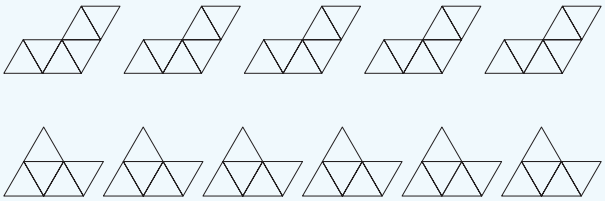
## Compatibility of tetraiamonds, pentiamonds and hexiamonds

Margarita Lukjanska dedicated her research to a new, challenging and in general unsolved problem of combinatorial geometry, namely to determining the common multiples of afore-mentioned shapes. These shapes consist of 4, 5 and 6 equilateral triangles respectively joined edge to edge. A common multiple of two shapes is defined in the same way as that one for the whole numbers. No effective method is known; there are very few publications on compatibility problem. She was able to construct common multiples (or to prove compatibility) in 158 cases out of 171 considered. Moreover, she

suggested few methods to prove incompatibility. In fact the findings of Margarita Lukjanska lie in the research foreground of this subject. Some of common multiples can be immediately used in creating new mechanical puzzles of a top quality. For example, assemble two equal shapes using all 11 pieces shown below. For example, assemble two equal shapes using all 11 pieces shown below.




Kristaps MEKSS (17)

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**School:** Riga Centre Language School


## Dihydropyridines nowadays

Gene engineering has been considered to be the most perspective method for different illness treatment for more than 15 years. The principle of the gene therapy sounds very simple: the damaged genes of the cells of an organism are replaced with "corrected" ones, but actually this action is more complicated. In order to transport DNA to the right place i.e. in cell's nucleus, it is necessary to use an aid of a specific substance that acts as a transport for the appropriate genes.

More and more scientists are looking for non-toxic, safe gene transports. The aim of the project was to synthesize such a substance. So in the framework of the project a novel substance (cationic amphiphilic 1,4-dihydropyridine derivative) was created which has been recently tested and belongs to an effective gene delivery substance class in vitro (in the culture of the cells).


Kaspars DAMBIS (19)

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**Career:** Mechanical Engineer
**School:** Riga State Gymnasium No. 1


## Performance of a vehicle determined using hand made pendulum

Have you ever wondered why Markus Gronholm wins the World Rally Championship? How can the drivers know what type of tires lead to win the best results? Physical measurements of a car's performance had to be made to find the answer, but – "what and how to measure?" Kaspars Dambis has designed an apparatus that accompanied by a computer data logging system determines the acceleration, velocity and power of a vehicle also helps to make the decisions about what tires to use, how to configure the vehicle's engine, how to enhance the car's suspension, etc. The correct decisions on all of these factors lead to affective use of the vehicle's power resources and the best results. It is a unique solution for car racing drivers because of the construction of the apparatus and the data logging software designed by the author.

# LITHUANIA


Andrius JASILIONIS (18)

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## The common Juniper employment possibilities to improve cities ecological conditions

Often getting worse the ecological condition in cities forces us to make the maximum use of sprouts. Therefore, sprout plants have to purify the air at the maximum degree. Without direct purification while extricating the oxygen, the purification degree is determined by the degree of phytoncyde extrication. In the analysis of sprouts in Lithuanian cities, a paradox revealed – the common juniper

(*Juniperus communis L.*) – one of the leaders of phytoncyde extrication in Europe – is not employed. The assertion that it almost never establishes and striving to introduce the common juniper into sprouts encouraged the idea to develop a universal methodology of location estimation according to the suitability and also, to improve the protection of natural juniper places of growth. The following aims were accomplished: Arlaviskes, Vilkoksnis, and Sekioniai juniper areas were explored. The analysis of the ecological state was prepared in order to improve the protection of the explored juniper areas. A universal methodology of locality estimation with regard to the common juniper was developed. On its basis the possibilities of the common juniper introduction into Kaunas' zones of sprouts in Santaka Park, Karmelitai Island, and Sajunga Square were estimated. While analysing the ecological situation in juniper areas, 13 surveys were carried out in order to sample the most important ecological indices. The following phenomena were explored: iconographic material, the botanical variety of plants, mechanical composition, permeability, the speed of respiration, acidity, the speed of cellulose decomposition, the intensity of albumen decomposition, air condition on the basis of bio-indicative characteristics of lichen, the amount of wax of pine needles, the speed of metal corrosion. While generalising the ecological condition, one may claim that Arlaviskes and Vilkoksnis.


Evaldas TRAINAVICIUS (18)

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**Career:** Zoologist
**School:** Gymnasium


## The influence of works performed on islands for breeding waterfowls

The task of this work is to estimate this works influence on the variety of the breeding waterfowl on the islands of Bagrenas which belongs to the Regional park in the River Nemunas Loop. In section „The geographical situation" is described location and size of islands. In section „Results of research" is described which species of waterfowl breed there. We talk about the number of breeding birds on the first, second and third Bagrenas islands and about the conditions for the birds there during 2001 – 2002 years. The diversity and the number of breeding birds pairs is compared to the facts made in 1999 – 2000. We explain what conditions ensure the success for birds breeding. The section „The comparison of quantity of the breeding waterfowl on the islands in 2001 – 2002 " describes us the fact that there was the best diversity of the birds and the greatest number of them on the third island of Bagrenas in 2002, because this island was cleaned regularly. We watched such species of birds as Black – headed Gulls (Larus ridibundus), Little Terns (Sterna albifrons), the Mallard (Anas platyrhynchos) there. The number of the Black – headed Gulls (Larus ridibundus) increased from 300 to 1000 pairs, Common Terns (Sterna hirundo) - from 60 to 80 pairs, Mallard (Anas platyrhynchos) from 2 to 10 pairs. There were no Little Terns (Sterna albifrons) at the beginning of the birds population and in 2002 there were 10 pairs of Little Terns (Sterna albifrons).


Ervinas GAIDAMAUSKAS (18)

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## Catalytic properties of lipase

An enzyme is a complex protein produced by living cells that promotes a specific biochemical reaction by acting as a catalyst. An enzyme simply increases the rate of the reaction it influences. Fats and oils can be split in the presence of an enzyme called a lipase. Moreover, subject to reaction conditions it may catalyze not only hydrolysis of lipids, but also synthesis of various fatty acid esters. The aim of this project was to investigate the enzymatic reactions of hydrolysis and alcoholysis. Lipase from filamentous fungus Thermomyces lanuginosus specificity towards various types of lipids, effect of experimental factors (emulsifier, metal ions, surfactant concentrations, pH) on hydrolytic enzyme activity were determined. T. lanuginosus lipase was immobilized on three supports. Immobilization is a suitable approach that allows biocatalyst reuse, makes product recovery easier. High immobilization yield was obtained using natural polysaccharide as a support. The method for enzymatic resolution of (±)-2-ethyl-1-hexanol was proposed. This compound whose arrangement of atoms is such that it cannot be superimposed on its mirror image is comprised of two optical isomers (+ and -). The results demonstrated that T. lanuginosus lipase is more specific to one of 2-ethyl-1-hexanol optical isomers. Therefore partial resolution of the isomers by carrying out the alcoholysis reaction is possible. (+) and (-) forms of drugs, or any other substrates, have very different effects on human body, so it is most important to isolate one isomer of such substances.

## MALTA

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### Francesca STIVALA (17)

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**School:** St. Aloysius' College

## The calculation of Pi: a teaching aid

A set of iterative equations have been derived using the concepts of geometry. Algebra and self-similarity to calculate an estimate of Pi to 3 decimal places. The model was simulated and validated. A value of pi 3.142 was obtained with a relative accuracy of 99,99% several ways of using the mathematical and computing concepts as a teaching tool have been suggested.

## THE NETHERLANDS

### Wim COOLS (19)

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**Career:** Software Engineer
**School:** Augustinianum

## A new compact operating system

Users often curse at their computers: they crash, another virus has been detected, the software is incomprehensible or is using too much memory. With these problems in mind, I wanted to find out how most Operating Systems work, and develop one myself. My goal was to create a prototype of an OS that is both user-friendly and stable, as well as compact and secure. I also wanted to implement some new ideas and combine the elements of a desktop- and server OS into one system. 150,000 lines of code later, my OS is able to boot from floppy, run applications, communicate with other computers, provides an interface that is easy to use, is protected by several security functions and can act as a server ( I am currently using it as a web-server on a floppy!). The features of this new OS should make using the computer easier and more pleasant and make the OS suitable for both desktop and server applications, even on smaller devices with less storage capacity.

## THE NETHERLANDS

### Vincent RUIGROK (18)

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### Geert DE VREEDE (20)

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**Career:** Computer Engineer
**School:** Westland College

## Fast beer brewing with a new technology

Students -and many others- all over Europe like to drink beer. We have been able to shorten the first fermentation process of beer brewing from 5 days to 5 hours! Such tremendous increase in productivity of beer brewing might cause an important reduction in production costs and hence, in the cost price of a glass of cool, refreshing beer.

How did we achieve this interesting result? We have used immobilised yeast in a continuous brewing process. The immobilization of the yeast means that the yeast cells are locked up in balls of calcium alginate. We have found that this immobilization protects the yeast cells from various external effects and moreover, increases the yeast's activity needed for an efficient fermentation process. The beads with immobilized yeast are easily prepared, and easy to handle and recycle, which presents a further advantage of the use of immobilized yeast in beer brewing processes.

## NORWAY

### Katrine LILLERUD (19)

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**Career:** Medicine
**School:** Berg Videregående School

## A metallographic and chemical analysis of a Viking sword from Telemark in Norway

This research project deals with chemical and metallurgic analyses of a Viking Age sword fragment collected in Norway. The quality and the foundry technology of the sword are investigated by means of microchemical and physical analyses including scanning electron microscopy and microhardness measurements. The applied methods are adequately desribed, so are the descriptions of the corroded sword remnants. Based on analyses of the slag inclusions, she concludes on age and history (origin) of the sword. The sword has been forged in a technologically advanced slashing weapon culture of the late Viking Age.

## POLAND

### Lukasz JAREMKO (19)

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## Design and synthesis of two new immunosuppressants

Since ages people have been suffering from different immune system disorders. Oversensitivity of the immune system can lead to allergies and in peculiar cases to autoimmune diseases, like multiple sclerosis, juvenile diabetes and rheumatoid joint inflammation. In modern times when organ transplantations may save human life appeared new problem connected with immune response against transplants, rejection. Efficient way of curing such symptoms is therapy based on immunosuppressive drugs, but drugs used currently cause a lot of side effects. It creates needs for new immunosuppressants. Previous studies proved that some fragments of the proteins essential for immune system can modulate immunity. Lukasz and Mariusz Jaremko on the basis of the knowledge about the shortest biological active fragment of ubiquitin protein designed two new peptides. These compounds can be used to explain why partial sequences of ubiquitin are able to lover the activity of the immune system. This knowledge could be applied in diagnostics of some immune diseases and design of more efficient drugs giving hope to people who suffer from some immune disorders. Brothers synthesized and purificated designed peptides, which will be tested for the biological properties.

### Radoslaw POLESKI (18)

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**Career:** Astronomer
**School:** Nicolaus Copernicus High School

## Can life exist outside the Solar system

More than 100 planets have been discovered outside the Solar System since 1992. Radek investigated 104 of them to find out on which the temperature and surface illumination make the life possible. His calculations based on the data from Internet show that all these planets have the surface illumination sufficient for photosynthesis and 50 planets are neither too cold nor too hot for life to develop. According to Radek the best conditions for life are on the planets HD 23079b and HD 28185b.

To verify his calculations Radek estimated the temperature of the Solar System planets using the same method and received values near the real ones.

## PORTUGAL

### Ana Gomes BARATA (16)

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### David José ASCENSAO FILIPE (17)

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**Career:** Biology teacher
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## Germination of the *Asphodelus bento-rainhae* under different conditions Contribution to its preservation

*Asphodelus bento-rainhae* is an exclusive andematic of Serra da Gardunha being first described by A. R. Pinto da Silva in 1956. In what concerns its status of conservation it is considered to follow the criterion of UINC (1994) which classifies it as an area of an occurrence inferior to 5000 $Km^2$ and an area of occupation inferior to 500 $Km^2$, in a unique place. It is not surprising then it is mentioned as a priority in the II supplement of Habitats Directive.

For this investigation the seeds of the plant have been subjected to different conditions where the controlled variable was the temperature. The germination has been carried out in Petri dishes and after they have been transplanted to plastic PET vases. With this research assignment we can contribute to the preservation of *Asphodelus bento-rainhae* and to a better knowledge of its germination conditions and life cycle.

### Bruno Joel Farto MAGALHAES (17)

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**Career:** Doctor
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## An environment's friendly fuel

We decided to study the production of an environment's friendly fuel for diesel engines made from waste vegetable oil. The main purpose was to give a good destination to the waste vegetable oil. To produce the environment's friendly fuel we went to the Chemistry Lab and made a transesterification reaction using vegetable oil, methanol and sodium hydroxide as a catalyst. To determine the quality of the biodiesel produce we run a series of analyses and compared the results with the specifications given by the standard EN14214. We were able to determine the water content, by the Karl-Fischer method (coulometric method), the refraction index using the Abbé Refractometer, the viscosity using a calibrated viscometer and the density using the pyknometer. With this work we learn how to turn a waste into an environmentally friendly fuel, as well as the precaution needed for the production of this fuel. We also learned the importance of the quality control of the biodiesel.

## RUSSIA

### Ksenia ROGOVA (16)

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**School:** University Lyceum

### The key to the mystery of the stone book

In datum research with the help of mathematical methods as heuristic cluster analysis, method of correlation galaxies and method of chi-squared for comparison nominal features was worked out the system of comparison the petroglyphs of elks and deer from Belomorye. The breaking the petroglyphs up according to the similarity between them with the revelation the groups of elks and deer was suggested. With the usage of achieved results the system "PIRS" was worked out. It is intended for specialists, who study the petroglyphs. In this system the search of similar depictions of the petroglyphs was organized on the basis on the neuron Hemming network.

### Maxim KONSTANTINOV (17)

**City/Region:** Tula
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**Career:** Engineer
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### New method for cold welding of parts by plastic deformation

Cold welding of parts with plastic deformation is used in cases when effects of high temperature, vibration and impulse loading are inadmissible. Researching the methods of presser welding it was established that not only the quality of the bridging but the thickness of the bridge in vulnerable cross-section has an influence on the strength of the weld. The method of increasing the strength of weld joint of work pieces made of aluminium alloys is proposed. Tests of a new method of welding electric tires and encapsulation of capsules are described. It was found out that the strength of joint increases twofold.

### Anton ERMAK (17)

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### Sludge as a gift of nature - original method of the bio-utilisation

The problem of domestic waste has been one of the most urgent problems for mankind for a long time. The sludge of municipal cleaning structures is one of the sorts of waste products. I developed the design of the engineering plant and the shop for the practical utilization of the red California worm in sludge handling in municipal cleaning processes. After utilization, biohumus is generated which can be used as fertilizer for planting of trees in towns, in agriculture and so on, and so forth. Profit can therefore be made from the "waste" of municipal cleaning processes.

## SLOVAKIA

### Marek SEBESTA (19)

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### Induction of nuclear and mitochondrial mutants in yeast williopsis suaveolens

Mitochondria are semiautonomous organelles which are essential for almost all strictly aerobic eukaryotic cells. Mitochondria contain their own genome. It can be

presented by a circular or a linear form. Expanded occurrence of the linear mitochondrial DNA asks for several questions about their evolution origin. Yeasts are suitable model organisms for the study of mitochondria and their genomes for sever reasons. Two strains of the same species, Williopsis suaveolens, carry linear (CBS 1670) and circular (CBS 255) mtDNA respectively. This fact allows studying the relationship and the communication between mitochondrial and nuclear genome (e.g. observation of the phenotypic changes after reciprocal replacement of mtDNA between the strains). This work is focused on the isolation of the collection of mutants with nuclear and mitochondrial markers. Auxotrofic and erythromycin-resistant were obtained using mutagenic agents MNNG and MnCl2. These mutant strains will be used for further experiments (e.g. genetically analysis).


Martin POPIK (17)

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Michal HOLUB (18)

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## Thermal conductivity of liquids

We have created new device that helps to didactically show and compare the thermal conductivity of liquids. Our device is able to compete with other systems that are currently used at Slovak Schools and Universities. The different system that was the source of our ideas is called IP-Coach and it was brought to Slovakia from Holland. The software program was translated into Slovak language. We also have our own software program for our device called PoPoLab. This program is compatible with all kinds of computers without any complicated installation needs. Probably the biggest advantages of our devices are that we are able to measure and to show graphs from experiments in real time from all 4 scanners. There are also statistics from experiment when the measuring is done. Our system is using 4 scanners with its own data channels. The user of our device has possibility to use saved data and analyze them from graph. Probably everyone knows Office programs as Microsoft Excel. That was the reason, why we prepared an interface from experiments for this or any other program. So the user is able to analyze the data and make other graphs or use the data anytime without problems. We have reached all the targets that we set for this project. We have successfully made new device with software program. To demonstrate its advantages and give examples of possible experiments we have also done some. We compared thermal conductivity of often used liquids. In our opinion, our device is able to compete with other systems that are currently used for didactically showing thermal conductivity of liquids.

# SLOVENIA


Matija KASTELIC (19)

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## Star spectrometry

Due to the development of some kinds of technologies, in the past few decades astronomy has made huge progress. In this development, spectrometry has played an important role as a large part of modern astronomy and discoveries would not be possible without it. Since the equipment at our school is good enough and due to spectometry popularity in astronomy, I have decided to write research work on this topic. Firstly, I recorded all main star types and measured them with emission spectrum of neon and helium for which I knew the wavelenghts of spectrum lines. In all measurements I used deviation net with hundred lines per millimetre, CCD camera st7 and 10 inch (''=2. 54 cm) Mead S-C telescope.

## SLOVENIA


Nina FOKTER (18)

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**Career:** Physician
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### Cytological analysis of cervical smears in teenagers

The data about all cervical smears taken from teenagers between 10 and 20 years of age and examined in Celje General Hospital in the year 2000 was statistically analyzed. In some cases this data was compared to the data for a group of women between 29 and 40 years of age.

I did not find any premalignant and/or malignant lesions in our teenagers during one year period, but that is eactly why I think it is reasonable to start educating young women about how to care for their health at this age.


Luka GALE (19)

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**Hobbies:** Collecting stones, Reading, Basketball
**Career:** Geologist
**School:** Zavod Sv. Franciska Saleskega


### Dinosaur traces & remains in Slovenia and Croatia

In my research I presented the locations of dinosaur tracks and bones in Slovenia and Istria. These locations are on Mali Levan, cape Marlera, Fenoliga, cape Verdela, the Archipelago Brioni and locations near Bale, Beram, the mouth Mirna, camp Solaris (Cervar), Kozina and hamlet Pesek. I focused especially on locations in Pesek and Solaris. My work included prints counting, measuring, sketching, trying to find links among them, photographing and gathering limestone samples. I concluded that the tracks in Solaris belong to mostly five different animal species and that those animals were relatively small. As to the location in Pesek I found out that the prints there belong to only one dinosaur species. The supposed prints, which are near the „main" tracks, are only hollows in the dolomite slab, filled with iron hydroxide. Similar, but empty hollows (as the locals said) also supposed to present the dinosaur's finger impressions, but in this case they are only hollows int he stoneware. I managed to photograph and measure also the plaster casts from the island of Fenoliga, which belong to the Slovenian Museum of Natural History.

## SPAIN


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### Field guide of the orchids in Sierra de Mijas (Benalmadena) Spain

In comparison with other European nations, in our country there are many divulgative books dealing with flora and fauna. Nevertheless there exist numerous studies that circulate exclusively along university departments and are not very known by the citizens. Since the 1970's, fields

guides dealing with the flora of the Iberian Peninsula began to be edited and, later, guides about orchids have been published in Granada, Almería and other zones of interest. In spite of these latest editions there is still a lot to investigate.

In our study we try, as far as possible, to fill in this gap and contribute to the knowledge of the flora at the Sierra de Mijas (Benalmádena, Málaga, Spain). With this purpose we have visited weekly, during the years between 2000, 2001 and 2002, eleven routes which cover all the hillsides of the mountain. 28 species grouped in five types were found. If we compare our catalogue with the only one which exists about the flora at the Sierra de Mijas, we can say that we have increased it in 9 species (*Ophrys picta, O.bilunnulata, O.lupercalis, Orchis langei, O.conica, Serapias lingua, S.strictiflora, Anacamptis pyramidalis*). Afterwards we carry out a dicotomic key to identify the species, using the most evident criteria. In the same way we describe the 28 species found in a more extended way, including the best photographs and maps of distribution we have obtained in these 3 periods of searching. We need to point out the description of a hypocromatic specimen of *Ophrys tenthredinifera* we have proposed as a variety of "*alba*".


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## The public lighting of Igualada. Light pollution

Objectives: The main purpose of this investigation was to establish the level of light pollution that produces the public lighting of Igualada. Detect the causes and the factors that take part in the production of light pollution and present in a logical, easy way collected data. Recommendations will be proposed if it is necessary. Both general and particular suggestions, addressed to improve the lighting system.

Theory: Light pollution: Brightness or shire of the night sky produced by diffusion of artificial light that escapes to the sky. Is what we usually call urban sky glow.

Causes of light pollution: There are three major causes, public lighting, special lightings, and lamp types.

Effects of light pollution: Light pollution directly effects consumption, but also has ecological and economic effects.

Conclusions: The actual state of the public lighting in Igualada is not acceptable. However if the improvement policies continue, and no new polluting fixtures are installed, we could get an efficient and sustainable lighting. From the analysis of the collected data we detect that a 67% of the public lights produces light pollution. A 22% are extremely polluting. In certain recently constructed areas we have noticed a massive installation of mercury vapour lamps.

Future expectations: Make people become aware of this problem is the best expectation that we could imagine. The city council has been interested in this study. In the future it would be interesting to establish a close collaboration in order to improve public lighting system.

# SWEDEN


Magnus LINDEROTH (19)

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**Career:** Civil Engineer
**School:** Sundsgymnasiet


## TI Print

The purpose of the project TI-PRINT was to develop a printer for the graphing calculator TI 83 plus. The mechanical parts of the printer were built in LEGO. Two motors work together to move a felt pen to the coordinate for a dot and a third motor dips and lifts the pen in order to mark the dot on the paper. To handle communication between the printer and the calculator a circuit was developed.

In order to control the printer, a program had to been written. The program was developed in assembler with a development tool for Z80, the processor used bythe calculator. The printer lets you print graphs, pictures, data lists etc. By printing one part/colour of the image at a time and changing pen in-between it is possible to build up a picture of as many colours needed. In the process of developing the printer I had to face many problems, but finally I could solve them and I actually succeeded in making the printer work, a truly satisfying feeling.

## SWEDEN

### Erik FRÖJDH (19)

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## Plastic - a brilliant material!

For more than hundred years, we have known that metals conduct current and that plastics are good insulators, but almost 25 years ago it was descovered, more or less by accident, that even plastics can, under certain circumstances, conduct current. That was a discovery that led to the Nobel Prize in chemistry year 2000, and that opened our eyes for tis new and exciting scientific field in the borderland between chemistry and physics. It gave us inspiration to carry trough a project in this field that le tus combine theoretic knowledge with experimental research.

In our school laboratory we have synthesised an elecrically conductive plastic, polypyrrol by polymerisation of pyrrol on a film of P-4-VP-Cu2+-complex. We measured the conductivity of different samples to a value between 300 and 3000 Siemens/metres. This is about one hundred thousand times less then copper but comparable to doped silicon, as used in microelectronic devices.
Measurements at different voltages in the range 0-30 V indicate that the current is always proportional to the voltage as expected for ohmic behaviour.

Conductive plastic will most likely replace metals in several business areas, because of the lower material costs and weight, better processability and flexibility. Scientsts have already found several applications, for example in digital electronics and nicrosurgery. But using electroluminicent polymers, which emit light in response to an applied voltage, it is possible to produce light emitting diodes and screens of plastics.

## SWITZERLAND

### Johannes KELLER (19)

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## The influence of the quill-shape on the harpsichord sound

There is an amazing variety of timbres in the diversity of harpsichords, a baroque keyboard instrument. This variety is mainly caused by the features of the soundboard and the proportions in general. This paper shows for the first time in a scientific way that also the shape of the quill influences the timbre of a harpsichord. The quill is the central element in the harpsichord mechanics because it plucks the string like an artificial fingernail. An important part of the paper is the development of a FFT-program (Fast Fourier Transformation) for the physical analysis, written in C++ / OpenGL. So, the analysis - software could be ideally adapted to the high requirements of the harpsichord sound. Over 20 different quill shapes were examined to make the results as detailed as possible. The results of the measurements help a harpsichord maker or a harpsichordist to make quills for a certain desired timbre (for example: peaked and rather long quills for a French tonality). In addition, the paper sums up the experience and opinions of several specialists in the field of harpsichord making and playing.

## SWITZERLAND

### Tobias BRUDERER (19)

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### Wito TRAUB (19)

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## Effects of electric and magnetic fields

The common use of electrical and electronic appliances and the increasing use of electromagnetic waves for data transmission generate electromagnetic fields. Opinions are divided on the possible effects of these weak fields on living beings. We have investigated the influence of such fields on two model organisms, Bacillus megaterium (a bacterium) and Drosophila melanogaster (fruit fly) by determining replication rates. In addition, the cell lengths of B. megaterium and the formation of intracellular storage polymers (as a stress indicator) were determined. The irradiation of the fruit flies by a low frequency alternating magnetic field (80 µT at 50 Hz) resulted in an increase in the reproduction rate. B. megaterium showed an enhanced replication rate as well. A slight increase in the average cell length was also observed. The content of intracellular storage polymers was not influenced. The exposure of B. megaterium to a low frequency electric field (620 V/m at 50 Hz) led to an increase in the formation of colonies. Increases in replication rates as well as a reduced storage polymer formation were observed upon exposure to a weak high frequency electromagnetic field (0.4 V/m at 960.8 MHz). In conclusion, several effects of electromagnetic fields on living beings have been demonstrated.

## TURKEY

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### Muammer CELIK (18)

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## The extraction of chromium from leather wastes and protein recovery using enzymes

Leather is one of the oldest commodities and an important industrial good in Turkey. About 90 percent of the world's output of leather materials are prepared by chrome process tanning. Both the tanning solution and the leather wastes after the production of leather goods are potential environmental wastes. In this study, chromium is recovered from leather's protein by using certain enzyme. The chromium and other salts were then precipitated selectively from tanning waste solution and solution of enzyme treated leather wastes. Most of the salt recovered could be recycled for tanning process. Protein was also hydrolyzed with enzyme treatment. The hydrolyzed products can be used as livestock feed or as fertilizer.

## TURKEY

### Hüseyin TULUK (17)

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**Career:** Industrial Engineer
**School:** Özel Ufuk Fen Lísesí

### An investigation to improve the productivity of agricultural products using Pumice

Pumice is a highly vesicular, volcanic glass consisting mainly of silica $SiO_2$. The high silica content (70 % per g/100g) positively affects the quality of pumice increasing the hardness of the material and its resistance to chemical attack. It is permeable and highly absorbent. It has excellent drainage characteristics similar to coarse sand. The use of Pumice in agriculture reduces the weight of clayey grounds, and due to the slow and uniform release of water previously absorbed by pumice particles, it enables to save on the cost of irrigation systems. It also enables a perfect rooting of plants and a very good drainage favoring a natural cultivation cycle. It is found that tomatoes planted in pumice granules are 60 percent more profitable than the tomatoes planted in natural soil. In addition, tomatoes in pumice granules yield five generations while the planted tomatoes in natural soil yield only three.

## UKRAINE

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### Volodimyr SKALKA (17)

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**School:** Secondary School No. 293

### Oil products and bacteria-oil destroyers in the Dnipro river

The goal of this work was to determine the amount of oil products in the river in the industrially developed region and to investigate bacteria – oil destroyers in the waters of the river. It was found that oil product and various bacteria – oil destroyers are present in the waters of Dnipro river in Kyiv region. They differ in their level of activity and morphology and cultural features. Among the most active bacteria – oil destroyers, are those witch have common features to those of the Pseudomonas class, and possibly belong to it. Artificially created associations from isolated selected cultures of bacteria – oil destroyers, selected from the waters of Dnipro river, effectively breakdown oil in laboratory conditions, and can be used to clean the environment from oil pollution.

## UNITED KINGDOM

### Alex MORRIS (19)

**City/Region:** Sheffield
**E-mail:** alex@osaris.freeserve.co.uk
**Hobbies:** Reading, Travelling, Music, Hiking, Bats
**Career:** Civil Engineer
**School:** Tapton School

## A study of magnetic thin films

Magnetoresistance is being investigated by a research group at the University of Sheffield. The aim of the work is to improve computer hard drives. An experiment to determine the resistance change of thin films in varying magnetic fields and under varying stresses was required. The report details how the experiment was designed through an iterative approach to problem solving. Its application, both socially and economically, is also detailed.

### Elizabeth NEWTON (19)

**City/Region:** Edenbridge
**E-mail:** Liz.newton@virgin.net
**Hobbies:** Photography, Swimming, Animals, Reading, Internet
**Career:** Zoologist
**School:** Tonbridge Grammar School

## Introduction of gum Arabic into the diets of callitrichids

The aims were to compare the nutritional value of the diet and the behaviour prior to and following the introduction of gum Arabic for each callitrichid, and to present the gum naturally. Behavioural observations and 'Intake Studies' were conducted before and after the introduction, and the results analysed. Two species showed little interest in the gum, however the elusive pygmy marmosets were frequently seen feeding on it, so use has been continued at the zoo.

### Emily PAYNE (18)

**City/Region:** Edinburgh
**E-mail:** emily.payne@blueyonder.co.uk
**Hobbies:** Scottish History, Scottish Medieval Martial Arts, Sport, Reading
**Career:** Actuary; Statistician
**School:** George Watson's College

## Classification of compression wood in Sitka Spruce

The aim of the project was to develop a laboratory method to detect severe and mild forms of compression wood in tree samples. This method was then used to assess the reliability of a new scanned image analysis process currently under development by Forest Research to enable the early detection of this defect at the sawmill. Initial results show that there was a high correlation between the two methods.

## USA


### David BENETT (18)

**City/Region:** Annapolis
**E-mail:** wynbennett@yahoo.com
**Hobbies:** Computer Programming
**Career:** Computer Programmer
**School:** Broadneck Senior High School



### Aaron SCHULMAN (18)

**City/Region:** Arnold
**E-mail:** phidrum@comcast.n
**Hobbies:** Computer Programming
**Career:** Computer Programmer
**School:** Broadneck Senior High School



### Andrew ASCIONE (18)

**City/Region:** Arnold
**E-mail:** andrew242@comcast.net
**Hobbies:** Running, Weight Training, Science fairs, Photography
**Career:** Orthopedic surgeon
**School:** Broadneck Senior High School


## Beacon: analytical instrumentation software for identifying fluorescent oligonucleotides used in encoded microbeads

Purpose: The purpose of the BEACON project is to develop software that can identify the exact combination of flourescent oligonucleotides (Molecular Beacons) in a solution. The software will be used to support the patent of a new progress that uses Molecular Beacons to spectrally encode Microbeads used in biological assays. The software will process data from a spectrofluormeter.

Approach and engineering experiment: Beacon was developed by a project team consisting of a Sciene and Mathematics Expert, a Software Designer, and a Software Coder. The BEACON team used a pop-down approach to create the software, utilising requirements analysis, design, coding, integration, testing, and validation. Result: Beacon is written in the Matlab scripting language and has a Graphical User Interface. BEACON uses smoothing algorithms, identification and analysis of key derivative points, and a reference table of melting temperatures and corresponding beacons. Processing is performed on real data arrays.

Conclusion: The team has successfully developed instrumentation software capable of taking data from a spectrofluorometer and analyzing it to obtain the specific melting point of a Molecular Beacon with a melting point of a Molecular Beacon with a specific fluorophor and the corresponding beacon name. This software, combined with the new process of utilising Molecular Beacons to encode Microbeads will dramatically advance the field of biological testing. Utilizing current testing techniques, it is only possible to test for a small number of genetic markers during a single test. With BEACON and the new process, simultaneous identification of hundreds of genetic markers during a single test will be possible.

**Since the European Commission took over the running of the European Contest for Young Scientists in 1989, the following have held the position of President of the Jury:**

- Sir Peter Swinnerton-Dyer, Trinity College, Cambridge. 1989-1991
- Professor Galo Ramirez, Universidad Autónoma de Madrid. 1992-1994
- Professor Gisela Anton, Universitat Nurnberg. 1995-1996
- Professor Sue Kingsman, Trinity College, Oxford. 1997
- Professor Pedro Guerreiro, Universidade Nova de Lisboa. 1998-1999
- Professor Pauline Slosse, Université Libre de Bruxelles. 2000-2002

Currently Dr. Ulf Merbold ESA/ESTEC, Noordwijk is the President of the Jury. The current guest jury member is from the European Patent Office, Munich.

## PRESIDENT of the JURY

Dr. Ulf MERBOLD
(Physics/Space)

European Space Agency/European Space Research and Technology Centre, Noordwijk

Born in Greiz, Germany, 20 June 1941, Dr Ulf Merbold graduated from Stuttgart University in 1968 with a diploma in physics. In 1976 he received a doctorate in Sciences (Dr.rer.nat.). He was the first ESA astronaut to fly in space and the first non-American to fly on the Space Shuttle. He became an ESA astronaut in 1978 and was assigned to fly on the first Spacelab mission STS-9 (FSLP) on board Columbia, from 28 November to 8 December 1983. During his second flight he flew as Payload Specialist on Space Shuttle Discovery, STS-42 (IML-1) between 22-31 January 1992. His third spaceflight, Euromir'94, took him on a 32-day mission to the Russian Space Station MIR from 3 October to 4 November 1994, making him the first ESA astronaut to fly to the MIR space station. Since the end of 1999, Ulf Merbold has been responsible for the Utilisation Promotion Management in the Microgravity Promotion Division of the ESA Directorate of Manned Spaceflight and Microgravity, at ESTEC, Noordwijk, the Netherlands.

## MEMBERS of the JURY

Dr. Elisabeth STILLER-ERDPRESSER
(Information/Computer Science)

Siemens Austria

Studied Physics at the University in Vienna and graduated with a Ph.D. Since then she has been with Siemens. Starting in the business unit for program and system development as a project leader for international automation systems she later became the head of a software development department. Currently she is responsible for the department of Interactive Media Systems within the business unit Audio and Video systems, her special interests there are connected with marketing and product planning. For several years this department has been working on leading edge technologies for media content management systems and this involves extensive work with an international development team that is distributed right across Austria and the USA. Dr. Stiller-Erdpresser is also one of the founding members of the University of Applied Sciences for Telecommunication and Media, St. Poelten.

Prof. Helena Maria DE OLIVEIRA FREITAS
(Biology/Ecology)

University of Coimbra

Born in 1962. Graduated in Biology Helena Freitas obtained her Ph.D. at the University of Coimbra, Portugal, in 1993. In 19945 she completed her post-doctoral work at Stanford University (USA). She is currently Associate Professor of Plant Ecology at the Department of Botany of the University of Coimbra since 1997 where she co-ordinates an interdisciplinary unit involved in several national and international projects on Mediterranean ecosystems, bio-diversity, plant-soil interactions, and nature conservation. The unit expertise

supports a significant capacity to interact with other units, through the participation in research programmes and post-graduate courses. Professor Freitas was president of the Portuguese NGO for the Conservation of Nature (LPN, IUCN member) from 1999 to 2002.

### Prof. Vagn LUNDSGAARD HANSEN
(Mathematics)

Technical University of Denmark

He earned a masters degree in mathematics and physics from the University of Aarhus, Denmark, 1966, and a Ph.D. in mathematics from the University of Warwick, England, 1972. He has held positions as assistant professor, University of Aarhus, 1966-69; research fellow, University of Warwick, 1969-72; associate professor, University of Copenhagen, Denmark, 1972-80. Visiting professor fall 1986 University of Maryland, College Park, US.

He has produced numerous research papers in topology, geometry, and global analysis. Author of several books including "Geometry in Nature" and "Shadows of the Circle".

President of the Danish Academy of Natural Sciences since 1984. Member of the Danish Natural Science Research Council 1992-98, four of the years as vice-chairman.

He is currently professor of mathematics at the Technical University of Denmark and is presently chairman of the Raising Public Awareness of Mathematics committee of the European Mathematical Society.

### Dr. Colin OSBORNE
(Chemistry)

Univesity of Sussex

Colin Osborne studied chemistry at the University of Sussex and then took a PhD in physical organic chemistry. He started work in patents and industrial property but after two years changed career to teaching in schools in London and Brighton. After 24 years he changed career again to manage the Royal Society of Chemistry's education programme for schools. This includes the production of books, videos, CD-ROMs, events for students and teachers and careers material. He still finds chemistry fascinating, especially the applications of chemistry in all walks of life.

### Prof. Jane GRIMSON
(Computer/Engineering)

Trinity College Dublin

Professor Jane Grimson obtained her batchelors degree in Engineering from Trinity College Dublin and her Masters and Doctorate in Computer Science form the Universities of Toronto and Edinburgh. She is currently Vice-Provost of Trinity College Dublin. She was previously President of the Institution of Engineers of Ireland and of the Irish Academy of Engineering and is currently President of the Irish Computer Society and of the Healthcare Informatics Society of Ireland. She is a member of the European Research Advisory Board and of the Executive Board of the European Science Foundation.

Her main research interest is concerned with the use of Information and Communications Technology (ICT) to improve healthcare. ICT has the potential to provide a more efficient and cost-effective healthcare system, reducing medical errors and improving quality, allowing doctors, nurses and other healthcare professionals to concentrate on providing the best care to their patients.

Professor Grimson has also been active in promoting engineering as a career among young women. Engineering is about providing innovative solutions to improving quality of life and women have a key role to play in shaping the future.

## Prof. Pál ORMOS (Biophysics)

Institute of Biophysics, Biological Research Centre of the Hungarian Academy of Sciences

Pál Ormos studied physics at the Szeged University during which time he became interested in biological problems. After graduating in 1975, he started to work in the Institute of Biophysics, Biological Research Centre of the Hungarian Academy of Sciences in Szeged. He has spent most of his career at this Institute where he is now the director. During his scientific career his field of interest has been the physical aspects of the function of proteins, the molecular mechanism of biological energy transduction.

Recently, he moved into the field of nanotechnology where he is engaged in building nanomachines that are generated and activated by light.

Since 1998 he is correcponding member of the Hungarian Academy of Sciences. He is president of the Hungarian Biophysical Society, vice president of the Inrternational Union of Pure and Applied Physics and chair of its Commission on Biological Physics.

## Dr. Elettra RONCHI-BLUM (Health/Biotechnology)

OECD-STI-Biotechnology Unit Paris, France

Elettra Ronchi, Ph.D.,-is Co-ordinator of Health and Biotechnology Activities at the OECD, Directorate for Science, Technology and Industry. Elettra Ronchi holds a Ph.D. in molecular genetics and neuroendocrinology from the Rockefeller University/Cornell Medical School in New York, (US). She has held research, teaching and assistant appointments at the Howard Hughes Medical Institute of the Rockefeller University in New York, the University La Sapienza of Rome and at the Ecole Normale Superieure, in Paris. She has lectured and published extensively on topics linked to new developments in molecular genetics and biotechnology and their impact on health care systems.

Dr. Ronchi has acted as consultant and science adviser on biotechnology, health system management and technology transfer for human health to the United Nations and the OECD since 1992. In 1995 Dr. Ronchi joined the OECD to lead a programme of work on new emerging technologies related to human health, particularly new biotechnologies. Dr. Ronchi sits as expert and as OECD representative on a number of committees and advisory boards, including the UN Interagency Committee on Bioethics and the Bioethics Committee of the Council of Europe.

## Dr. Dominique Robert Emiel FONTEYN (Chemistry)

Belgian Institute for Space Aeronomy

Dominique Fonteyn completed his doctoral studeis in 1989 at the K. U. Leuven in the field of low temperature solid state physics before becoming a researcher at the Belgian Institute for Space Aeronomy. His main expertise is in the field of modelling of atmospheric chemistry. He has successfully extended this to chemical data assimilation using a comprehensive chemical transport model using the 4D-VAR method.

His fields of interest range from aerosols, heterogeneous stratospheric chemistry, mesospheric chemistry to planetary atmospheres chemistry (Martian atmosphere). He is involved in many international collaborations.

His also co-Principal Investigator of SPICAM Light, onboard the ESA/Mars Express probe.

Prof. Nadezhda BAGDASARYAN
(Social Sciences)

Dean of the Social Science and Humanities Department at the Bauman Moscow Technical University

Professor Bagdasaryan, member of the Russian Academy of Natural Sciences, is the first social scientist to be invited as a jury member.

She has published extensively in the areas of university education, sociology and philosophy of culture, and cross-cultural communications and has worked in collaboration with UNESCO.

Since 1969 She has held a post at the Bauman Moscow Technical University where currently she is the Dean of the Social Sciences and Humanities Department, and senior professor for sociology and cultural sciences.

Michéle PERON
(Astrophysics)

European Southern Observatory
Germany

Michele Peron obtained her Master's degree in applied mathematics from the University Pierre and Marie Curie, Paris in 1985. She started her professional career as an engineer at the Institut d'Astrophique de Paris. In 1989 she joined the European Southern Observatory where she has worked as a scientist ever since.

From the outset, she participated in the development of MIDAS, a data analysis system used widely by the astronomical community to process observational data.

In 2000, she became Head of the Data Flow Systems Group (DFS) at the ESO. This group of ~30 physicists, mathematicians and software engineers is

Responsible for the design and implementation of a set of software components which are critical for the end-to-end operations of the Very Large Telescope (VLT) located in Chile's Atacama desert.

The VLT observatory is the World's largest and most technologically advanced ground-based optical astronomical facility. The DFS system includes, in particular, observation preparation tools, archival systems and data processing packages.

## GUEST JURY MEMBER

Mr. Johannes STEENBAKKER
(Engineering)

Principal Director of the European Patent Office, Munich

Jan Steenbakker studied mechanical engineering at the University of Delft, Holland. Graduating in 1976, he commenced in the same year at the Dutch Patent Office, moving in 1979 to the European Patent Office. In addition to his background in mechanics, he has substantial experience of assessing inventions across a range of technical fields including telecommunications, biotechnology and vehicles, and has a particular interest in medical and agricultural applications.

He was nominated Principal Director of the European Patent Office in 2002, in which role he is now responsible for all matters relating to the search, examination, granting and opposition of European Patents in the field of telecommunications.

## The ALUMNI JURY

As a way of reinforcing the links between the past and present, from 1997 each year three different past prize winning contestants are invited back to interact with the new contestants. In line with the nature of the Contest these Alumni can also award modest prizes to those projects that they believe to be the best in terms of their visual display and the quality of the oral explanation.

The prizes, although modest, nonetheless provide good incentives to the contestants to sharpen their presentational skills. Three prizes of € 400 can be awarded.

This year's alumni jury are:

### Eike HUEBNER

First prize winner in 1997 (Milano)

Currently 23 years old and working on his Ph.D. at the University of Constance, Eike started studying at chemistry in Constance because of his interest in polymerisation catalysts. His diploma thesis dealt reactions belonging to the activation step of "zirconium" catalysts.

During his studies became more and more interested in computational chemistry and combined calculations with the experimental results. Recently he set up a cluster of multiprocessor workstations to perform quantum chemical calculations. He is currently working in the group of Dr. N. Burzlaff together with five Ph.D. students at the research group of Prof. Dr. H. Fischer where the focus is on cataysis.

### Lorraine RUZIÉ

Second prize winner in 1999 (Thessaloniki)

In 1999, Lorraine became the youngest contestant (16) ever to obtain a second prize and a special award with the Royal Geographical Society. At school, she developed a passionate interest in the study of volcanoes. Since 1999, she has been intent on to becoming a volcanologist. At the moment she is studying at the Lycée Saint-Louis Earth Sciences and plans to go to University next year. She says: "Participation in the Contest really was great for me, and was one of the major factors that made me decide to pursue a scientific career.

### Emil LASLO

Second prize winner in 1996 (Helsinki)

Emil studied programming during the secondary school at Neumann Janos Computer Science Secondary School (Budapest) and is now studying electrical engineering at BMF Kando Kalman Faculty of Electrical Engineering. After the secondary school he found a company interested in exploiting his work on microcomputer devices, network development and internet based applications and these devices were installed and work in real applications, such as security systems and industrial networks. In the last two years Emil is working on image processing and combining his studies with development work in the field of medical x-ray imaging.

**The contestants compete on the basis of their work and interviews with the Jury for a number of 'core' prizes. In addition to this, a limited number of honorary and special prizes are also offered to some contestants where, in the judgement of the Jury, they would benefit from the specific experiences that these prizes offer. At the discretion of the Jury, a prize winner can receive both a core prize and either an honorary or a special prize.**

The **core prizes** are:

- **Three first prizes worth € 5000.**
- **Three second prizes worth € 3000.**
- **Three third prizes worth € 1500.**

## The HONORARY PRIZES

### London International Youth Science Forum

Up to two contestants will have the opportunity of an all expenses paid trip to London to attend the London International Youth Science Forum which will take place between 28th July to 11th August 2004 (The prize covers the costs of travel from country or origin, accommodation, meals; registration, and participation in full programme of activities).

The Youth Science Forum brings together 250 science students from about 60 countries world-wide. The programme of visits to research establishments, and lectures, demonstrations and seminars from leading scientists, underlines the links between individual fields of study, and introduces all participants to the latest thinking across the broad range of science.

Participants are able to question the speakers, to debate issues, and to explore the way in which their chosen subject relates not only to other studies, but also to their impact on the world at large.

Each year's Science Forum becomes a multi-cultural community, and, with its busy social activities programme, provides a unique opportunity to meet and develop friendships and contacts across the world. The participants in the forum are usually between the age of 17 and 22 years.

For further information, contact:

London International Youth Science Forum, PO Box 159, London SW10 9QX, United Kingdom. Tel.: +44 (0) 20 73 73 4568. Fax: + 44 (0) 20 78 35 1070.
E-mail: liysf@aol.com. Website: http://www.liysf.org.uk

### Stockholm International Youth Science Seminar

Up to two contestants will have the opportunity of an all expenses paid trip to Stockholm to attend the Stockholm International Youth Science Seminar (SIYSS) which will take place between 4th to 11th December 2003. (The prize covers the costs of travel from country or origin, accommodation, meals; registration, and participation in the programme of activities).

Participants in the Youth Science Seminar must be at least 18 years old and generally are prize winners within the field of natural sciences and must have the ability to speak a satisfactory level of English. The programme brings together around 30 young people from around.

During the week the participants will take part in scientific activities, attend lectures and have the opportunity to render an account of their own interest in science. The highlight of the week will be attendance at the formal Nobel Prize awards ceremony, and a chance to meet the laureates.

SIYSS

For further information, contact:

Stockholm International Youth Science Seminar, Swedish Federation of Young Scientists, Drotninggatan 120, SE-11360 Stockholm, Sweden. Tel.: +46 83 46 260. Fax: +46 83 16 923. E-mail: kansli@fuf.org. Website: http://www.fuf.org/siyss

## The SPECIAL PRIZES

### European Space Agency

Up to two contestants will have the opportunity of an all expenses paid trip to Vancouver to attend the International Aeronautical Federation Congress which will take place between 4th to 9th October 2004. (The prize covers the costs of travel from country or origin, accommodation, meals; registration, and participation in the programme of activities).

This prize is being offered by the European Space Agency under its Student Participation Programme. The programme started in 1999 provides the opportunity to students to participate in the Congress where they can make valuable contacts with space professionals.

The students are incorporated in the congress as normal participants, allowing for an intense "generation hand-over" of the existing expertise and knowledge. They will benefit from interaction with like-minded students from across the world, and indeed senior participants very much value the stimulus that the presence of students brings to the Congress.

The student participants must be at least 18 years old at the time of the Congress.

### The Norwegian Polar Institute

Up to two contestants will have the opportunity of an all expenses paid study visit at the Ny-Alesund Large-Scale Facility (LSF) for Arctic Environmental Research. (The prize covers the costs of travel from country or origin, accommodation, meals and participation in the programme of activities lasting about eight days).

The facility is composed of five research installations, each of which is owned by the different research organisations, with the Norwegian Polar Institute acting as the overall co-ordinator and managing the Ny-Alesund LSF secretariat.

*Sundown over Ny-Ålesund*

The main objective of the Facility is to enhance the international scientific co-operation at the Ny-Alesund International Research and Monitoring Facility and to improve European scientists' possibilities to carry out high quality Arctic research. The winners will be able to participate in ongoing research activities in areas such as observations and investigations of Arctic seals, reindeers, Arctic foxes or sea birds and investigations of ocean currents and marine biology in the fjord and vicinity of Ny-Alesund.

The minimum age requirement is 18 years.

## The European Patent Office

The European Patent Office in Munich offers the possibility to the contestants of up to three projects to attend a 5-day programme of activities to deepen their knowledge of intellectual property, and encourage the development of certain skills that are essential to a successful inventor. The judging criteria for this prize for originality are based on:

- Quality and clarity of the written report.
- The application of original (i.e. self-generated) ideas in solving a problem or set of problems.
- The logical exploitation of scientific/technical theories or principles in order to achieve a practical solution to a problem or set of problems.

The prize will be awarded to those contestants showing the best ability across all three of the above areas.

Further details of the prize and its requirements are available from Grant Philpott, European Patent Office - Munich: gphilpott@epo.org

*The EPO Headquarters in Munich*

## Hungarian Sponsors Prizes

In addition, the Hungarian sponsors also offered special prizes that will be presented at the award ceremony by the heads of these organisations.

Special prizes are offered by:

- Hewlett-Packard Hungary Ltd.
- Paks Nuclear Power Plant Co
- Hungarian Patent Office
- EGIS Ltd.
- Gedeon Richter Ltd.
- Ministry of Education
- Danubius Hotel

## Important note

Details of the honorary and special prizes given are indicative and may be subject to change. Prize winners will be informed accordingly.

## ANNUAL LECTURE

Prof. Ferenc VONDERVISZT

University of Veszprém

Ferenc Vonderviszt studied biophysics at the Eötvös University in Budapest. After graduation he joined the Structural Biophysics Group at the Institute of Enzymology of the Hungarian Academy of Sciences. He obtained his Ph.D. In 1989. As a postdoctoral fellow, he spent several years in Japan working on the structure and self-assembly of bacterial flagellae. He was appointed associate professor at the University of Veszprem in 1992. He received his Habilitation in Biology at the Eötvös University in 2002. His research interest is focused on molecular machines working in living organisms, like bacterial flagellum, which is the organelle of bacterial motility.

### Prospects of Molecular Nanotechnology

The ability to control the arrangement of atoms lies at the foundation of technology. Our modern technology builds on an ancient tradition. We still rely on macroscopic manufacturing, in which atoms and molecules are handled in bulk amounts. Until now, technological progress has involved making things smaller and smaller approaching the sub-micron level. But instead of miniaturizing current technologies there is another possible approach building molecular devices from atoms and molecules. This new technology, called molecular nanotechnology, will handle individual atoms and molecules with control and precision, creating highly complex systems on the nanometer scale.

Nanotechnology is still in an exploratory phase. On the other hand, it is a proven technology. Living organisms have been using molecular nanotechnology over the past 4 billion years with great success. Molecular machines of living cells are mainly made of proteins, have the capability for self-assembly and can fulfill complex functions in a highly controlled fashion. Enzymes are molecular machines that make, break, and rearrange chemical bonds at a rate of up to a million per second. Muscle fibers work like molecular-scale linear motors. DNA serves as a digital data storage medium, directing ribosomes in manufacturing proteins.

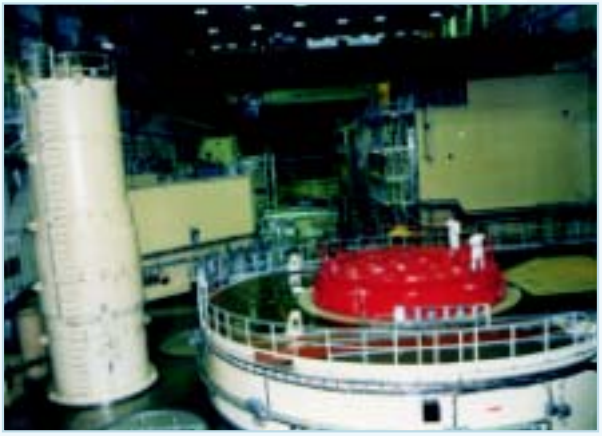
How to develop molecular nanotechnology? Given their key role in natural molecular machines, proteins are obvious candidates for early work in self-assembling artificial molecular systems. The operation of many naturally occurring molecular machines has been elucidated. Based on this knowledge, one promising approach would involve designing new protein-based devices. Observing examples from nature indicates that protein-based nanotechnology has an enormous potential.

To achieve molecular manufacturing, there is a lot of work still ahead. But there are great promises as well. Nanotechnology may provide humanity with unprecedented control over the material world changing our life in more ways than we can imagine.

## Scientific and Cultural Programme

### Scientific Excursion - Paks Nuclear Power Plant

The scientific excursion will be held in Paks, where the participants will be the guests of Paks Nuclear Power Plant Ltd.



A brief introductory lecture will be held about the Power Plant (approximately 20 minutes), in Paks, at the Energetic Educational Institution.

Following the lecture, the participants will be divided into four groups of approximately 45 persons. These groups have different programmes:

- Group I.: visit at the Maintenance Training Centre
- Group II.: following the Unit II visitors' path
- Group III.: following the Unit IV visitors' path
- Group IV.: following the Unit IV visitors' path

After scientific program the participants will be guided to the "Szent Lélek" (Holy Ghost) Church that was designed by the famous Hungarian architect, Imre Makovecz.

By the end of the day the participants will be invited to "Topáz" restaurant for dinner, and then folklore program will also be provided.

The Paks Nuclear Power Plant (NPP) Company was founded in 1976 and has been operating as a share company since 1992. Its site is located in the middle of Hungary, 5 km from the town of Paks. More than 40 percent of the electrical energy generated in Hungary is produced here. Considering the load factors, the Paks units belong to the leading ones in the world and have been among the top twenty-five units for years. The Paks nuclear power plant was the first among NPPs of the former eastern block to fulfil the most up-to-date requirements. The reliability of the most important safety systems in Paks conforms to Western European norms (WENRA).

## Cultural Programme - Visegrád

For almost 200 years, Visegrád was Hungary's 'other' (often summer) capital and important diplomatic centre. Indeed, in 1335 King Charles Robert met the Polish and Czech kings as well as princes from Saxony and Bavaria to discuss territorial disputes - the origin of the Visegrád co-operation these days.

During a walk in the Solomon's Tower, one can see a museum containing many of the precious object unearthed at the royal palace including the celebrated Lion Fountain and the red marble Visegrád Madonna relief. The top of the tower offers a beautiful view of the Danube Band.

The highlight of the programme is the knights-tournament performed by the the knights of the St. George Order. The legendary knighthood was founded by King Charles Robert, in 1326 as a secular one and refounded in 1990. During the combat the knights demonstrate the small arms of that age (battle, broadsword, sabre, club, lance). There is also falconer show and renaissance dance in the programme.

## MEETING of the NOBEL MINDS

**The Nobel minds meeting will be held at the Theatre Hall of the Millenary Park at the presence of the participants and some invited guests. The seating of the contestants will emphasize the informality of the meeting.**

After introducing the Nobel-laureates and the president of the Hungarian Academy of Sciences (who is the host of the event), they answer contestants questions created on the spot personally. The event is moderated and guided by István Palugyai, a scientific journalist, with remarkable scientific background. He will create the interactive connection between the three Nobel-laureates, the president of Academy, and the contestants.

### Professor Sir Harold KROTO

Joint Winner of the 1996 Nobel Prize in Chemistry for the discovery of fullerenes

Harold Kroto was born in 1939 in Wisbech, Cambridgeshire, and brought up in Bolton, Lancashire. He graduated in Chemistry at the University of Sheffield in 1961 and in 1964 received his PhD there for research with R N Dixon on high-resolution electronic spectra of free radicals produced by flash photolysis. After two years postdoctoral research in electronic and microwave spectroscopy at the National Research Council in Ottawa, Canada, he spent one year at Bell Laboratories NJ studying liquid phase interactions by Raman spectroscopy and he also carried out studies in Quantum Chemistry.

In 1967 Harold Kroto returned to the United Kingdom to an academic appointment at the University of Sussex at Brighton , where he became a professor in 1985. In 1991 he was made a Royal Society Research Professor. In 1996 Harry received a Knighthood by Queen Elizabeth II. Later that year he was jointly awarded the Nobel Laureae for chemistry with Richard Smalley and Robert Curl of Rice University, Texas.

It is science of fullerenes that has dominated Sir Harold Kroto research activities and his current research programme looks at the role and application of fullerenes in chemistry, physics, materials science and astrophysics. Together with Dr. Patrick Reams, he set up the Vega Science Trust in 1994, to produce scientific films for the education and science communities in order to improve knowledge and raise awareness of scientific achievement.

*Nobel minds meeting in Vienna 2002*


### Professor Ivar GIAEVER

Joint winner of the 1973 Nobel Prize in Physics for the experimental discovery regarding tunneling phenomena in semiconductors and superconductors

Ivar Giaever was born in Bergen in 1929 and graduated from what is now the Norwegian University of Science and Technology in Trondheim in 1952 with a degree in mechanical engineering. After completing his military service and working as a patent examiner he emigrated to Canada in 1954.

He started work at General Electric while studying at the same time physics at Rensselaer Polytechnic Institute in Troy, New York, where he obtained his doctorate in 1964. From 1958 to 1969, Ivar Giaever worked in the fields of thin films, tunnelling and superconductivity. He shared the Nobel Prize in Physics for 1973 with Leo Esaki and Brian David Josephson, for his contribution to understanding tunnelling phenomena in superconductors.

From 1970 Prof. Giaever's work has been concentrated on biophysics. He became professor at Rensselaer Polytechinc Institute in 1988, and is also a professor at the University of Oslo as well as being president of Applied BioPhysics, Inc.

## Professor Ben MOTTELSON

Winner of the Nobel Prize for Physics in 1975

After graduating in 1944, Ben Mottelson studied physics and naval science and tactics at Purdue University.

From Purdue he went to Harvard University where in 1950 he completed his Ph.D. dissertation on a problem concerning the structure of the nuclei of the lithium isotopes. Harvard ganted a Sheldon travelling fellowship enabling him to spend a year at the Institute for Theoretical Physics in Copenhagen.

This fellowship was followed by a two-year support from the US Atomic Energy Commission, then a post for theoretical studies funded by the Centre Européen de Recherche Nucléaire, and then in 1957 a permanent position at the Nordic Institute for Theoretical Atomic Physics in Copenhagen.

In 1975 he won the Nobel Prize for Physics and continues to explore various phenomena in the dynamics and structure of atomic nuclei.

**Since 1989, more than a thousand young students from all over Europe and beyond have been exhibiting their projects at the Contest. Irrespective of whether they win prizes or not the Contest gives talented 'young scientists' an unforgettable experience and many have gone on and established themselves as highly acclaimed professional scientists in their own right.**

The publication "Science, Our Future: 15 years of the EU Contest for Young Scientists"[2] tells where the past winners are today, gives an insight into the influence of the Contest on the development of their careers. It also shows how studying science can open up opportunities for further development in areas that the contestants would never have guessed at beforehand.

Since this year the Contest is held in Budapest here is a success story from Hungary:

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Gábor BERNÁTH

First Prize Winner in Porto, Portugal 1998

It was in 1997 that I first heard about the Contest for Young Scientists. My first thought was " This is not for me, I am no scientist." Fortunately, both my dad and my physics teacher had heard about the Contest and more or less forced me to start working on a project. My goal was to develop a 3D scanning tool at a reasonable price without compromising the quality of the product. So I started to work on "ScanGuru", my 3D scanner.

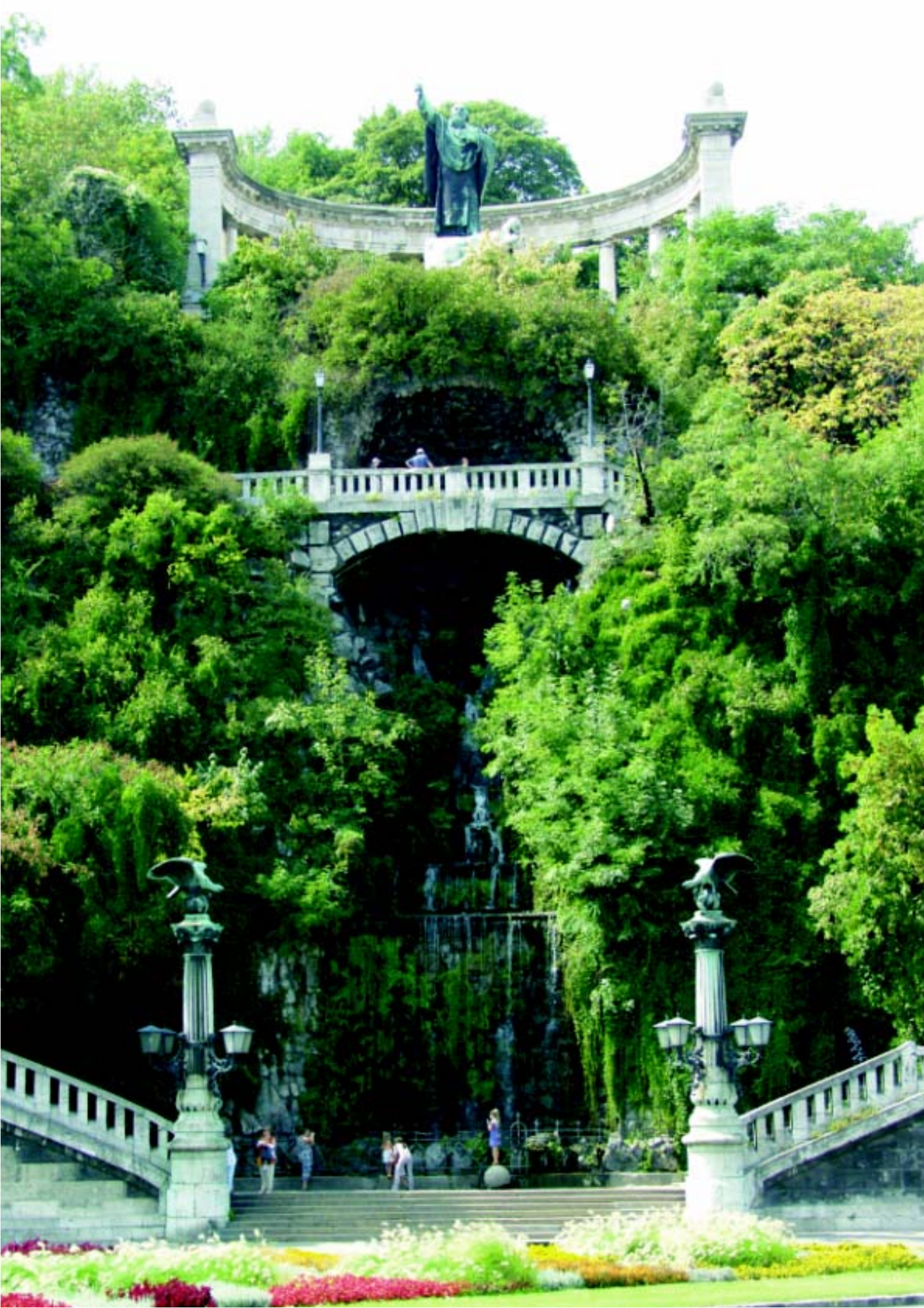
Once I`d started on the project, I was so keen on developing it that I skipped school quite a number of times and on lots of occasions I stayed up all night so I could make faster progress. Finally, I managed to finish the development and documentation just before the deadline of the Hungarian Contest for Science and Innovation, and then I breathed a sigh of relief because I thought that I`d done everything.

As it turned out, I won an award and a very good chance to take part in the EU Contest and some other international science events. It was then that I realized that the development was only part of the story. Not only did I have to learn to present the project, I had to manage it as well.

The project won 1st prize at the 10th European Union Contest for Young Scientists and at the 50th Intel International Science and Engineering Fair, and this in turn led to my meeting a benevolent businessman who was enthusiastic about ScanGuru. In 1998, he and I set up a small company, EasyScan Ltd., and we started the application procedure for a patent. Since then, the company has developed the 3D scanner for different purposes. The biggest project of EasyScan Ltd. right now is the production of made-to-measure shoes utilizing a ScanGuru-based 3D system. Apart from this project, there have been others - though with less success than the first one.


Obviously I`m now very glad that my dad "put the pressure on" because I learnt a lot of technical stuff up till the development phase, and later I was able to travel a great deal and to get to know very many really interesting people. Now, five years later, I`m a student at the Technical University of Budapest and it`s a comforting feeling to have the background and experience I gained from taking part in the various science contests.

[2] Available free of charge on request from the EU Contest Secretariat



# The EU CONTEST PAST WINNERS

The names of the first prize winners since the European Commission took over the running of the European Contest in 1989 are listed below by year, project and country. Up to 1994 six first project prizes were awarded but thereafter only three first project prizes were given to reflect the introduction of special and honorary prizes.

## BRUSSELS 1989

| | | |
|---|---|---|
| Mogens MARKUSSEN | DK | Eyewriter, an eye operated control unit |
| Stephan SCHLITTER | DE | Conducting polymers in batteries |
| Grace O'CONNOR<br>Sinead FINN | IE | A crop fractionation industry |
| Lina TOMASELLA | IT | Toxicity of colour dyes used as tracers |
| Nicola KIRK | GB | Walking aid for a disabled person |
| Jean-Pierre WYSS<br>Matthias ZIMMERMANN<br>Elmar ARTHO | CH | Recognition of handwritten signs |

## COPENHAGUEN 1990

| | | |
|---|---|---|
| Paul VAUTERIN<br>Bruno CALLENS | BE | Automated meteor observation station |
| Waltraud SCHULZE | DE | The effect of assimilatory starch for the growth of Arabidopsis |
| Annagh DALTON (née Minchin) | IE | Colpomenia Peregrina, an inmigrant alga to Europe |
| Donatella MANGANELLI | IT | Silence, micro-organisms at work |
| Brian DOLAN<br>Lee KIERA<br>Ann Marie MALON | GB | A study of the transition to turbulence in Reynold's experiment |
| Marco ZIEGLER | CH | Drinking water examination with special consideration ofcorrosional aspects |

## ZURICH 1991

| | | |
|---|---|---|
| Robert NITZSCHMANN | DE | Development and construction of a scanning tunnelling microscope |
| Barry O'DOHERTY<br>Daniel DUNDA | IE | The dynamics of a two-well potential oscillator |
| Paul HOFFMANN | LU | Computer assisted text conversion to Braille |
| Angus FILSHIE | GB | Clearway: a mucus extractor |
| Christian TOST<br>Sabine ZANGL | AT | Catalytic converter restoration |
| Torkild JENSEN | NO | Birdlife in Oslofjord |
| Hans Jacob FEDER | NO | Earthquakes as a self-organised critical process |

## SEVILLE 1992

| | | |
|---|---|---|
| Hendrik KÜPPER<br>Frithjof KÜPPER<br>Martin SPILLER | DE | Environmental relevance of heavy metal substituted chlorophylls |
| Oliver TRAPP | DE | Study on the effect of a chelator on yeast |
| Anders SKOV | DK | The bent perspective |
| Martin HESSELSØE | DK | Green toad (Bufo Viridis) in the great belt |
| Jean BYRNE<br>Elizabeth DOWLING | IE | Population dynamics of a thistle predator: Terellia Serratulae |
| Dominik ZEITER<br>Ewald AMHERD<br>Reinhard FUBBER | CH | Graphtal plants varieties of trees |

## BERLIN 1993

| | | |
|---|---|---|
| Henrik MOURITSEN | DK | Abiological expedition to the rainforests of the Philippines |
| Lars KNUDSEN<br>Peter ANDERSEN | DK | Droppy, the computer controlled intravenous drip feed |
| Albert BARMETTLER<br>Günther EDERER | AT | An alarm processing system |
| Jan HAUGLAND | NO | The minimum overlap problem of Paul Erdös |
| Rodger TONER<br>Donal KEANE | IE | Mate selection by a male crustacean |
| María SALVANY GONZÁLEZ<br>Antoni CAMPRUBÍ I CANO<br>Fidel COSTA RODRÍGEZ | ES | The geological mapping of a Neollithic mine |

## LUXEMBOURG 1994

| | | |
|---|---|---|
| Oliver KRÜGER | DE | The ecology of the common buzzard and goshawk |
| Eike LAU | DE | Internal addresses in the Mandelbrot set |
| Jane FEEHAN | IE | The Calluna Case-Carrier |
| Christian KRAUSE | DK | Telephone break-in security |
| Henrik STRÖM | NO | An anti-boot virus program |
| Samuel SCHAER | CH | Supersonic plasma rings |

## NEWCASTLE-UPON-TYNE 1995

| | | |
|---|---|---|
| Sven SIEGLE | DE | Natural pulping or paper from straw |
| Brian FITZPATRICK<br>Shane MARKEY | IE | Plants can tell us when they need a drink of water |
| Christopher MEAD<br>Matthew TAYLOR | GB | Radio waves from comet Shoemaker-Levy 9 |

## HELSINKI 1996

| | | |
|---|---|---|
| Tobias KIPPENBERG | DE | A car ice-detection system based on electromagnetic waves |
| Yann OLLIVIER | FR | Flexibility of an articulate lattice |
| Wouter COUZIJN | NL | "Locator", a self-positioning robot |

## MILAN 1997

| | | |
|---|---|---|
| Eike HÜBNER | DE | Permanent self-conducting polymers |
| Fiona FRASER<br>Ciara McGOLDRICK<br>Emma McQUILLAN | IE | Unravelling the secrets of the preservation of Europe's bog bodies |
| Christoph LIPPUNER<br>Antoine WÜTHRICH | CH | The digestive system of carnivorous plants |

## PORTO 1998

| | | |
|---|---|---|
| Gabor BERNATH | HU | ScanGuru: the 3D scanner |
| Paul PAK<br>Peter WEILENMANN | AT | The virtual blind man's cane |
| Robert CARNEY<br>Matthew TOMAS | GB | Yellowing of alkyd-based paints in the dark |

## THESSALONIKI 1999

| | | |
|---|---|---|
| Sarah FLANNERY | IE | Cryptography: a new algorithm vs. the RSA |
| Sverrir GUDMUNDSSON<br>Pall MELSTED<br>Tryggvi THORGEIRSSON | IS | The galaxy cluster MS1621 +2640 |
| Michal KSIAZKIEWICZ | PL | Estimation of urban pollution using Epiphytic Lichens |

## AMSTERDAM 2000

| | | |
|---|---|---|
| Grzegorz NIEDZWIEDZKI | PL | New Finds of dinosaur tracks in the Holy Cross Mountains |
| Joanne DANIEL<br>Gemma DAWSON<br>Ally WILKIE | GB | Designing a disposable sample device |
| Nickoloz TCHANKOSHVILI | GE | The monitoring and protection of bats in Georgia |

## BERGEN 2001

| | | |
|---|---|---|
| Thomas AUMEYR<br>Thomas MOROCUTTI | AT | CURE - Controlled Ultraviolet Radiation Equipment |
| Sebastian ABEL | DE | Cloud |
| James LEE MITCHELL | GB | Characteristics of Azole drug resistance in candida tropicalis |

## VIENNA 2002

| | | |
|---|---|---|
| Pawel PIOTROWSKI | DE | Special wings and ground effect for efficient transportation |
| Martin ETZRODT<br>Martin VON DER HELM | DE | The slime mold physarum as a model organism for biotesting |
| Lauri KAUPPILA | FI | "Comparing the oxidiser/fuel ratio and heat released from rocket fuelcombustion" |

*The Vigadó Concert Hall*

## What is the European Patent Office?

The European Patent Office (EPO) was created in 1977 with the aim of providing a centralised system for granting patents in European countries and rationalising the patent procedure. There are currently 27 member states in the EPO.

The EPO has three official languages: German, English and French. You may file a patent at the EPO in any one of these languages. The EPO is entirely self-financing and is overseen by an administrative council comprising representatives from the member countries. At present the EPO has a staff of nearly 6000, with offices in Munich, The Hague, Berlin and Vienna. If you would like to know more about the EPO or patents in general, the EPO has a stand at the Contest where they will be happy to answer your questions. There is also a patent awareness lecture during the Contest.

## From School Project to Licence Agreement - A Patenting Success Story

*Karsten Weiss - 2nd prize winner in Porto 1998*

It all started when Karsten Weiss entered the 1997 "Jugend Forscht" (Germany's young scientist contest) and won a top prize for his project on sensors and conductive foam material. A senior official from the veterinary office of the state of Baden-Würtenburg spotted a write-up of the project on the Internet and wondered whether the technology involved could be adapted to overcome problems encountered with automated milking equipment. Karsten took up the challenge and designed a machine that is capable of reproducing the techniques of hand-milking. "Digikuh" allows the user to measure the force applied on the cow's teats at any given point and time, solving the problem of ill-fitting devices that lead to discomfort and infection.

The resulting apparatus won a second prize at the 1998 EU Contest for Young Scientists. The judges commented that his project was a "fine combination of sensor technology, electronics and computer software that solved a real-life problem in a simply executed and well-thought out way". Karsten was given good advice on patenting, and filed for a national German patent at an early stage. As the project developed he filed for a further national German patent to cover new aspects of his invention, and then later still, filed for patent protection around the world. As a result he has been able to sign a lucrative exclusive licensing agreement with a major agricultural machinery company, from whom he also receives continuing support for both his patenting strategy and further product development. Asked if he had any patenting tips to pass on to young scientists in the light of his experience, Karsten gave the following advice:

- File a national patent application as early as possible.
- Start looking for a licence agreement as soon as you have filed your national patent application.
- Take professional advice; at the very latest when going beyond the national phase.

## Patenting, The EU Contest and Young Scientist Competitions

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.

Normally participation in a young scientist competition leads to ideas "being made available to the public". 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 also important not to make details of an invention "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. This advice may seem rather late for many contestants, but it is hoped that even if a patenting opportunity has been lost this time, the lesson will not be forgotten!

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. Generally speaking, patent costs are low to start with but increase with time. Whilst not usually obligatory, it is recommended that contestants make use of a patent attorney. Patent attorneys are highly qualified specialists with a technical or scientific background who assume much of the responsibility for processing the patent application.

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 is a good starting point for this.

*N.B. The European Commission is indebted to the European Patent Office in Munich for having kindly supplied this patent information. Copies of the advice sheet "Patenting, the EU Contest and Young Scientist Competitions" 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 of this advice sheet are also readily obtainable in English, French and German on request from the EU Contest office in Brussels.*

## For more information

The EPO or your national patent office will be pleased to help you further at http://www.epo.org (which will also provide a direct link into the national office sites). If you do not have an Internet link, write to us at the following address:

Directorate 5.0.1
European Patent Office
Erhardtstrasse 27
D-80331 Munich
Germany

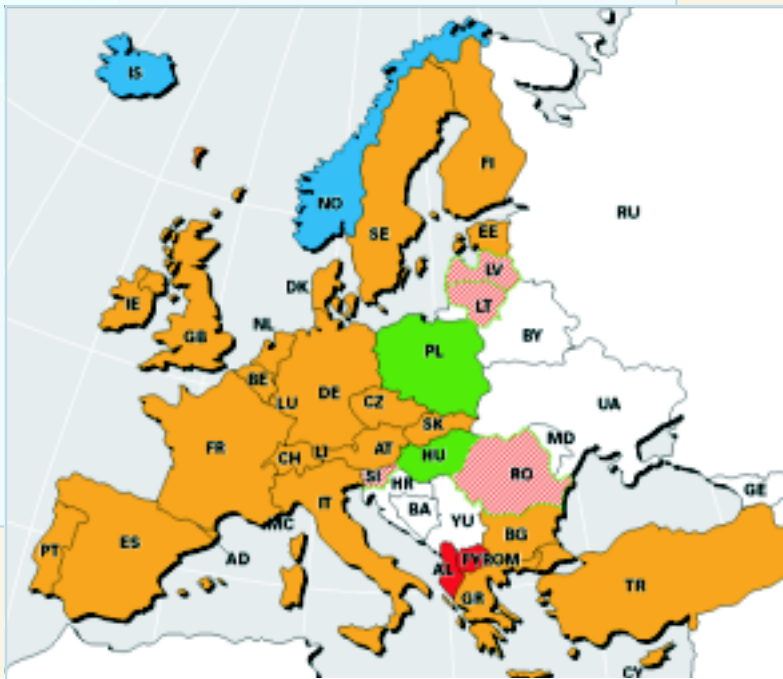
**EPO Member States**
AT Austria, BE Belgium, BG Bulgaria, CH Switzerland, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR, France, GB United Kingdom, GR Ellas, IE Ireland, IT Italy, LI Liechtenstein, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SK Slovakia, TR Turkey

**States entitled to join the EPC**
IS Iceland, NO Norway

**States which have been invited to join the EPC**
HU Hungary, LT Lithuania, LV Latvia, PL Poland, RO Romania, SL Slovenia

**States recognising European patents ("EXTension states")**
AL Albania, LT Lithuania, LV Latvia, MK Former Yugoslav Republic of Macedonia (FYROM), RO Romania, SL Slovenia

*The EPO member states and associated countries*



**The European Commission has been actively supporting initiatives and programmes aimed specifically at young people for a number of years. Young people are key to the future of our societies and it is essential that they each have the best opportunities for their own personal development and the acquisition of useful skills and experiences – in a society that is open and free from all forms of discrimination.**

The **European Union Contest for Young Scientist** is a good example of an activity that serves not own to encourage interest in science but also to promote exchanges among young people from across Europe. Almost without exception, the participants in the Contest have remarked on the positive impact of this aspect of the Contest.

The annual **European Science & Technology Week**[3] supports a programme of activities that, although aimed at the broad general public, focus very often on the participation of the younger generation. There few constraints on the types of activities that can be funded and the Week has been very successful in identifying innovative concepts that have a real impact on improving young people's awareness of science.

Direct financial support for training and mobility at the pre-and post doctoral level is offered through the **Marie Curie Fellowships**[4] scheme. These fellowships are for research work in both can be located in academic and industrial settings in EU Member and Associated States to encourage young researchers to spend time outside their own country to complete their training. The scheme particularly encourages participation of female researchers. In a more general sense mobility and non-formal education is also supported by the **Youth Programme**[5], which targets young people aged between 15 and 25 years and offers possibilities to young people in the form of both exchanges and voluntary work. This programme is complemented by the **Socrates**[5], which promotes European co-operation in all areas of education including schools and teaching.

SCIENCE and SOCIETY

## But society is always evolving

More so than ever before, however, the pace of change in our modern societies is quickening – largely as a result of the rapid advances being made in science and technology. The use of scientific knowledge and its exploitation through technology have become so important to the way that our societies are developing that we must ensure that the needs of society itself are our prime consideration. For far too long it has been presumed that science generates knowledge that is automatically converted into applications that society will automatically accept and use.

In December 2001, therefore, the Commission has produced the Science and Society Action Plan[6] to strengthen the links between the development of science and society. This Action Plan is part of a broader strategy launched by the Commission in 2000 to create a European Research Area. Many of the 38 actions set out in the Plan are being implemented within the three key areas identified:

- **scientific education and culture in Europe;**
  All possible avenues will be explored to promote science among European citizens. Special events and publicity campaigns will be organised to raise

[3] The European Science and Technology Week is run by DG Research Directorate Science and Society. Full information is posted on: www.cordis.lu/scienceweek. More general information is posted on www.cordis.lu/science-society

[4] The Marie Curie Fellowship scheme is run by DG Research Directorate Human Mobility and Marie Curie Actions. Full information is posted on: www.cordis.lu/improving/fellowships/home.htm

[5] The Youth and Socrates Programmes are run by DG Education and Culture. Full information is posted at: http://europa.eu.int/comm/youth/program/index_en.html and http://europa.eu.int/comm/dgs/education_culture/index_en.htm

awareness and stimulate debate. Research organisations, the media, business and the general public will be encouraged to get involved in discussing the issues.

- **science policy and European citizens;**
  Action will be taken to broaden and diversify scientific perspectives. This will be done by inviting contributions from different actors, encouraging girls and boys to take up science, and supporting women scientists. Multidisciplinary research will be encouraged to develop greater diversity in scientific ideas.
- **responsible science at the heart of policy making.**
  Scientists will be supported to make their work more accessible so that they gain and maintain public trust. Because scientific progress is essential for our future quality of life, policy makers will be given access to the best possible scientific expertise before taking decisions.

Resulting directly from this action plan and on the basis of preparatory work being undertaken this year a major pan-European initiative will be launched in early 2004 to support science teaching in schools. The aim is to make science more attractive to young people so that they continue their science studies and pursue worthwhile and rewarding careers both on a personal level and in terms of the contribution that they make to society as a whole.

## Other information: Stages

The European Commission offers short-duration in-service training periods[7] *(stages)* for young university graduates and public service employees. These training periods involve work experience in one of the Commission's departments, and typically entail writing minutes of meetings, research on a particular topic, assessment of economic, financial and technical co-operation projects or programmes at a level suitable for junior executive officers.

With a view to contributing to the European education and vocational training of young people and to enabling them to understand the way in which the institution functions, the European Parliament also offers each year a number of traineeship options within its Secretariat[8].

## More information about the EU

European integration has delivered half a century of stability, peace and economic prosperity. It has helped to raise standards of living, built an internal market, launched the euro and strengthened the Union's voice in the world.

The process started shortly after the devastation of 2nd World War and was launched on 18 April 1951 with the signing of the Treaty establishing the European Coal and Steel Community (ECSC) which would involve six countries: Belgium, Germany, France, Italy, Luxembourg and the Netherlands. On 25 March 1957 the Treaty of Rome was signed establishing the European Economic Community (EEC) in order to promote the free movement of people, services and capital. A major revision of the Treaty of Rome was signed on 17 February in Maastricht, which would lead to the strengthening of the economic and monetary ties between the members and define what we now call today the European Union.

Over the years membership grew: in 1973: Denmark, Ireland and the United Kingdom joined. Greece 1981: Greece, Spain and Portugal followed in 1981, and 1986. And in 1995 Austria, Finland and Sweden brought the membership up to 15 Member States.

[7] More information is available from Traineeships Office - B-100 01/7, European Commission, B-1049 Brussels and http://europa.eu.int/comm/stages/index_en.htm

[8] European Parliament, Bureau des stages, KAD 02C007 L-2929 Luxembourg, Stages@europarl.eu.int

[6] The « Science and Society Action Plan » can be obtained in any of the 11 official EU languages writing to RTD-sasap@cec.eu.int.

Today the Union is preparing for the accession of 10 eastern and southern European countries with more to follow.

It is particularly fitting in this context that this year's Contest takes place in Hungary, which is taking its place among the members of the Union. Hungary started accession negotiations with the European Union in March 1999. At the Copenhagen European Council in December 2002 the accession negotiations were concluded with 10 candidate countries, including Hungary. On 12 April 2003 a referendum on accession ratified and four days later the Accession Treaty was signed in Athens.

The European Union is based on the rule of law and democracy. It is neither a new State replacing existing ones nor is it comparable to other international organisations. Its Member States delegate sovereignty to common institutions representing the interests of the Union as a whole on questions of joint interest. All decisions and procedures are derived from the basic treaties ratified by the Member States.

Principal objectives of the Union are:

- *Establish European citizenship.*
- *Ensure freedom, security and justice.*
- *Promote economic and social progress.*
- *Assert Europe's role in the world.*

If you want to know more about the EU, please visit the EUROPA portal at: http://europa.eu.int/

## The HOST COUNTRY HUNGARY

Dear visitor,

You have arrived to a land of excitement, culture, history and joy.

Since we, Hungarians (or Magyars as we call ourselves) arrived to the place where we live today so many things happened to us that a day would be little to tell you all about it. Yet, if you are interested in our story we will tell you some interesting facts about us. The Magyar tribes arrived here in 896. Arpad, our leader found a place for us to settle where we have been living since then. Known for their ability to ride and arrow, the Magyars were invited as allied troops in Europe. Their wars took them as far as Spain, northern Germany and southern Italy. In 1000, Arpád´s great-great grandson Stephen got a crown from the pope by which he was coronized. This moment basically meant the founding of our state and a long-lasting royal dynasty, the Arpád house.

*The Hungarian Holy Crown*

The Arpád kings (around 50 of them) reigned until 1301. From this point on, except for some shorter periods of time, we can say that Hungary was ruled by kings of foreign origin. But let's not run so forward and let's mention a bit about the 13th century! We had a king called Béla who had to leave his own country because the Mongols broke into the

*The herm of Saint László*

Magyar land. When they left, the king returned and had to see that third of the people were killed and the country was burnt. So he called in many foreign people and restarted the construction of his land once again after Stephen. Therefore his nickname is second founder of the state. The second Mongol invasion was repelled with ease in 1285.

*The front page of Képes Krónika (Illuminated Chronicle)*

After the Arpád house we had kings from the Anjou house (partially Italian, French), Lajos (Louis) the Great for example. Imagine, dear visitor, that this king not only became king of Hungarians, but also the Polish and the Czech. His splendid palace in Visegrád were visited by several princes and kings. It was his achievement that the first University was founded in our country in 1367 (it does not exist today). No wonder that Hungary was a relatively well off country during these times and even till hundred years later in the era of the famous Mátyás (Matthias) when it became the second richest country of Europe after France. He was an unbelievably good, but decisive man who always knew the good solutions for the problems of the country. Meanwhile he was sensitive to art as he made several palaces, churches built (e.g. the famous Matthias church). According to our legends he was so good that he mixed with the people in mascara to know how they truly felt about their king. No wonder that even today we have a saying among us: "Matyas died the truth is gone". Where is all what he brought to us?

Well dear visitor from the 14th century there was an incredible threat to Europe that was the Ottoman (a type of Turkish) Empire. Can you hear ding-dong every noon? This is to the memory of the Hungarian general, Janos Hunyadi, who defeated the Turks at Belgrade in 1456 thus stopping them from advancing for 70 years. However, the Muslims managed to break into here and dominated between 1541 and 1686. The middle part of the country was full of Mosque, Minarets and Baths. The western part was invaded by the Austrian Empire; meanwhile Transylvania remained the only Magyar land free. Finally a league of Christians organised by the pope managed to expel the undesirable Turks.

Yet, the Austrians felt the right of staying for a longer time. We tried to get rid of the Habsburg rule constantly but after the largest revolution of 1848 was crushed down brutally we did not want to loose any more heroic life. As a result we compromised with the Habsburg House (Austrian king) in 1867 and decided to be friends from then on rather then enemies. At that time it seemed a great solution for Hungary. It was really the start of an incredible development, economically, culturally. This is the time when most of Pest was built according to the romantic taste of the architect. We can thank many things for Franz Joseph (buildings, bridges) but in reality we had to pay a big price for it. When the First World War came around we had to enter on the looser' side which meant a real tragedy for Hungary of which it has not recuperated yet. After the war in 1920, next to Versailles, the Trianon treaty was signed. (It happened in the Trianon palace). This meant that Magyar speaking lands were cut off of our country so one third of the original territory of us stayed ours. Just to give you an idea Transylvania which is just as big as Hungary today was only part of our country. Even today there are about two million Magyars living in Romanian, as the largest minority over the frontier in Europe.

The decision mentioned above was mostly the reason for we entered on the side of Germany in the second WW. Hitler promised that we would get back all these lands if we participated on the Germans side. During the years of war hundreds and thousands of soldiers died and 6 hundred thousand Jews were killed in the concentration camps.

Only two year after the end of the great burning of the word, it was decided that Hungary would then on belong to the control of the Soviet Union. This meant the beginning of another dark era when people who were not favored by the regime were tortured, condemned and many times even executed. This lead to the revolution of 1956 - an event that for a while shook the world and Communism - that was crushed in only two weeks. The Soviet invasion lasted 42 years all

*Photograph from the weekdays of the 1956 Revolution - Budapest, end of October, 1956*

together during which time we were told what to eat, what to wear, what to see, when to travel and even what to think.

Today, dear visitor you can see a perfectly different Hungary. Since the iron curtain was cut in 1989 new dimensions were opened up for us. We are in the phase of recuperating from the hard years of dictatorship which of course is not free of difficulties. Yet, while intending to revaluate our past we are eagerly looking forward to the future. In May 2004 we will enter the European Union so finally Hungary will get back its ancient place in Europe.

## Nobel Prize winners of Hungarian origin

The knowledge based societies have the future. For this reason the support of the scientific and innovative activities, measurement of the performances and their moral and pecuniary acknowledgement have more and more importance, and therefore the inspiration of the researchers and enterpreneurs to reach new achievements. The system of the prizes is an institution of key significance. The Nobel Prize has been the best known award of outstandig performances in the field of sciences.

There are 13 scientists of Hungarian origin who were awarded this prize of highest order among whom the naturalists dominated:

**Szent-Györgyi, Albert** (1893–1986): The Nobel Prize was awarded to him in 1937, in the field of physiology or medical science **„for his discoveries made in the field of biological burning wit particular attention to the vitamin C as well as to the catalysis of the fumaric acid"**.

**Békésy, György** (1899–1972): The Nobel Prize was awarded to him in 1961, in the field of physiology or medical science **„for the discovery made in the field of the physical mechanism of the stimulus evolving in the cochlea"**.

**Bárány, Róbert** (1876–1936): The Nobel Prize was awarded to him in 1914, in the field of physiology or medical science **„for his work done in connection with the physiology and pathology of the vestibular apparatus (the organ of the equilibrium)**.

**Lénárd, Fülöp** (1862–1947): The Nobel Prize was awarded to him in 1905, in the field of physics **„for his life-work in connection with the cathode rays"**.

**Wigner, Jenő** (1902–1995): The Nobel Prize was awarded to him in 1963 divided it with Maria Goeppert-Mayer (1906–1972) and Hans Daniel Jensen (1907–1973), in the field of physics **„for their development of the theory of the atomic nuclei and the elementary particles, in particular for their discovery and application of the basic symmetry principles"**.

**Gábor, Dénes** (1900–1979): The Nobel Prize was awarded to him in 1971, in the field of physics **"for his contrivance and development of the holographic method"**.

**Zsigmondy, Richárd** (1865–1929): The Nobel Prize was awarded to him in 1925 **„for his explanation of the heterogeneous nature of colloid solutions and for the methods applied during his researches which have essential significance in the modern colloid chemistry"**.

**Hevesy, György** (1885–1966): The Nobel Prize was awarded to him in 1943, in the field of chemistry **„for the application of isotopes as indicators during the research of the chemical processes"**.

**John C. Polanyi** (1929- ): The Nobel Prize was awarded to him in 1986, in the field of chemistry **„for his researches in the field of the dynamics of elementary chemical processes"**.

**Oláh, György** (1927– ): The Nobel Prize was awarded to him in 1994, in the field of chemistry **„for his contribution to the carbocation chemistry"**.

Nobel Prize was awarded to further three persons:

**Wiesel, Elie**: in 1986, Nobel Prize for peace

**Harsányi, János**: in 1994, Nobel Prize in the field of economics,

**Kertész, Imre**: in 2002, Nobel Prize in the field of literature.

**...and some others who are esteemed highly by the world together with the Nobel Prize winner scientists**

**Bay, Zoltán** (1900-1992), physicist

**Csonka, János** (1852-1939), mechanical engineer, head of the engine-room of the Polytechnic University

**Eötvös, Loránd** (1848-1919), physicist

**Kandó, Kálmán** (1869-1931), mechanical engineer

**Kármán, Tódor** (1881-1963), physicist

**von Neumann, John** (1903-1957), mathematician

**Polányi, Mihály** (1891-1976), professor of chemico-physics and philosophy

**Selye, János** (1907-1982), doctor of medicine

**Szilárd, Leó** (1898-1964), atomic physicist

**Teller, Edward** (1908-) atomic physicist

**Zipernowsky, Károly** (1853-1942) mechanical engineer.

*(This Chapter was compiled from the publication "The Nobel Prize is centenarian", issued by the Ministry of Education.)*

*The Gellért Hill*

# The HOST ORGANISER

As a professional federation the Hungarian Association for Innovation focuses its activities on the economy-stimulating role of innovation. Only legal entities can join the Association. It comprises more than 220 members such as universities, research institutes, innovative companies and enterprises, non-profit institutes, and six associations representing a total of 270 members. The activities of the members are grouped into the following sections: research and development, innovation infrastructure, higher education, non-profit section, entrepreneur development.

The Association represents the interests of its member companies and takes part in preparing decisions related to innovation and in elaborating domestic R+D and innovation policies. It maintains official contact with national bodies, legislators and those implementing the law, and with business federations and those organizations dealing with innovation.

The Association publishes information for its member institutes in a fortnightly NEWSLETTER. Many services for the Associations´ members are provided free of charge (consulting, mediating partners, etc.), and it assists its members in gaining access to concrete financial, professional, business information and studies that help their activities related to the creation of intellectual products.

The Association has significant talent recruitment programs, e.g.:

- it annually organizes the National Scientific and Innovation Contest for Youth linked with the EU Contest for Young Scientists
- it organizes annually an event known as Innoforum (Exchange of Intellectual Products) as a means of promoting the selling of unrealized intellectual results.

The Innovation Association has six regional offices located in university towns and has established 11 organizations, that assist in technology transfer in Hungary such as

- the Hungarian Innovation Foundation that awards the Grand Prize for Innovation for the most important, successful Hungarian innovation of each year and provides scholarships for young students
- the Innostart Foundation for promoting innovative SME´s.

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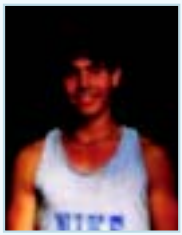

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The European Union Contest for Young Scientists is based on national competitions that take place in the participating countries. There are two classes of participation: full participation in which the contestants are eligible to win prizes; and, guest participation where teams of contestants from countries not formally part of the competitive process can nonetheless demonstrate their projects in line with the general rules.

Whatever the nature of the participation all the national contests have one thing in common: a desire to promote interest in science among boys and girls. The nature of the competitions from one country to the next may not be the same in detail, however, due to the historical development of the national programmes and national or regional considerations.

To find out more about national competitions that lead to the EU Contest for Young Scientists, please find below a complete listing of all the National Organisers involved:

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*The Hungarian Academy of Sciences*

# A warm welcome to the world from Ireland…

'Céad Míle Fáilte' or one hundred, thousand welcomes is what participants and visitors to the 16th European Union Contest for Young Scientists can expect when they arrive in Dublin, next year.

It is a great honour for Ireland to be the host nation for what in effect has become a 'think-tank' for not only Europe but also the world's leading young scientists. Ireland's national youth science exhibition, the Esat BT Young Scientist Exhibition has a long history of nurturing and producing excellence in science among students. Established in 1965 by Dr Tony Scott, who also helped to bring the EU event to Ireland, 2004 also marks the 40th year of the Esat BT Young Scientist Exhibition.

The talents of the winners of national science contests from throughout the EU and other international guest countries will be showcased at Dublin's premier exhibition and conference centre, the Royal Dublin Society.

Our mission is to promote science on a national and international level and we are confident that students, teachers, visitors and supporters will thoroughly enjoy all aspects of our vibrant and historical city and country.

I look forward to welcoming you all next year.

***Andrina Moore***

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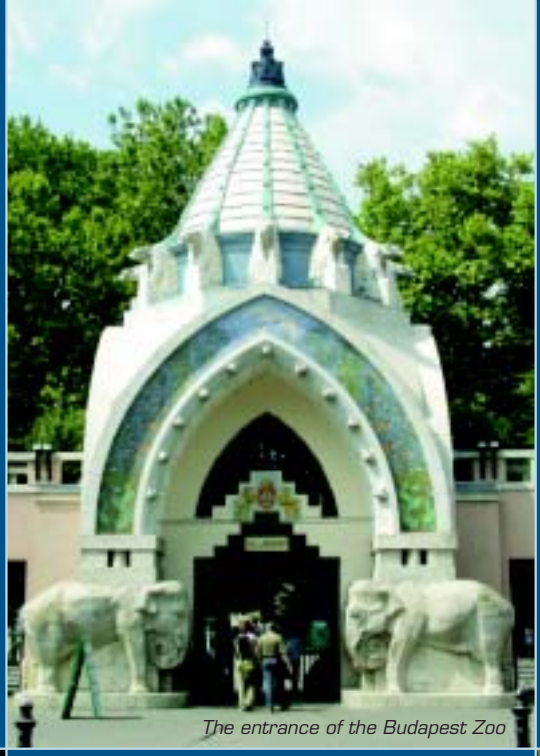
*Fountain on the Elisabeth Square*



The entrance of the Budapest Zoo

The Vörösmarty Square

The Váci Street

The Liberty Bridge

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