



EUROPEAN COMMISSION

PRESS RELEASE

Warsaw, 23 September 2014

Europe's top young scientists chosen in Warsaw



Finally, the wait was over. For the past week, the University of Warsaw library had been packed with promising young scientists. 110 researchers aged 14 to 20 presented their projects during an intense competition, in the hope of impressing an international jury. They were competing for honours in the 26th annual [European Union Contest for Young Scientists](#) (EUCYS), which concluded with the awards ceremony today. Aside from the right to count themselves among the best young scientists in Europe, the winners also divided up a total of €62.500 in prize money, as well as other coveted prizes such as science trips ([MEMO/14/536](#)).

The three first prizes of €7000 each were awarded to João Pedro Estácio Gaspar Gonçalves de Araújo from Portugal for "A natural characterization of semilattices of rectangular bands and groups of exponent two", Mariana De Pinho Garcia and Matilde Gonçalves Moreira da Silva from Portugal for "Smart Snails" and Luboš Vozdecký from the Czech Republic for "Rolling Friction". This year, second prizes went to projects from Ireland, Bulgaria and Slovenia for original projects in the areas of Mathematics and Chemistry. The three third prizes were given to projects from Lithuania, the United Kingdom and Germany (see annex 1 for details).

The contest also featured a Prize for International Cooperation, for the best project from invited guest countries: USA, Canada, China, New Zealand, South Korea and Switzerland. The prize, underlining the benefits of international scientific cooperation in research, was won by Eric Giles Schertenleib from Switzerland for "Jet and Film – On the interaction between a laminar jet and a soap film".

Máire Geoghegan-Quinn, European Commissioner for Research, Innovation and Science said: *"The quality of the entries to this competition continues to amaze me, and I congratulate all the participants. Research and innovation spring from a diversity of ideas, so we must allow young people the freedom to develop their ideas and create. We also have to work harder to increase female participation in science and technology. These are real challenges for our education systems."*

The Warsaw contest brought together 77 projects from 36 countries, including EU Member States and associated and international countries. All entries had already won first prize in their country's respective national science contests in their specific field. The project

topics covered a broad spectrum of scientific areas: biology, physics, chemistry, computing, social sciences, environment, mathematics, materials, engineering and medicine. This year's jury was chaired by Dr Henrik Aronsson, from the University of Gothenburg and was composed of 18 International scientists in the different scientific fields.

Background

The European Union Contest for Young Scientists was set up by the European Commission in 1989 to encourage co-operation and exchange between young scientists and to give them an opportunity to be guided by some of Europe's most prominent researchers. The first competition took place in Brussels and has been held in 24 different European cities since then.

The contest seeks to support efforts made in participating countries to attract young people to studying STEM (Science, Technology, Engineering and Maths) and to choosing careers in science and research. The number of young scientists has gone from 59 at the first edition in 1989 to 110 this year. The record was 137 contestants in 2009 in Paris. Past winners have gone on to prestigious careers in research, for instance at the European Space Agency and CERN. One of this year's Fields Medal winners, Professor Martin Hairer, won a prize at the 1991 contest.

Female participation in the contest reflects the broader issue of underrepresentation of women in STEM. This year, 37% of the participants were female (41 participants vs. 69 male participants). In 1997 female participation in EUCYS exceeded 30% for the first time, and since then has usually been between 30% and 35%, with a peak of 41% in 2005. Over the 26 years, 183 young women and 614 young men have won prizes.

Full details of this year's contest can be found at: <http://media.eucys2014.pl>. All three first prize winning teams were awarded €7000; second and third-placed teams received €5000 and €3500 respectively. Other prizes included trips to the London International Youth Science Forum and the Stockholm International Youth Science Seminar, prizes from corporate sponsors including trips to Intel ISEF in the US, as well as awards from the European Commission's in-house science service, the Joint Research Centre, pan-European research organisation group Euroforum and the European Patent Office.

More information about the contest and the winners can be found at:

http://ec.europa.eu/research/youngscientists/index_en.cfm

Contacts:

[Michael Jennings](#) (+32 2 296 33 88) Twitter: [@ECSpokesScience](#)

[Monika Wcislo](#) (+32 2 295 56 04)

ANNEX 1

Prize-winners 26th European Union Contest for Young Scientists

A. CORE PRIZES

Three first prizes (€7 000 per project)

Country: Portugal
Contestant: João Pedro Estácio Gaspar Gonçalves de Araújo (16)
Field: Mathematics
Project title: A natural characterization of semilattices of rectangular bands and groups of exponent two
Abstract: In a recent paper, R. A. R. Monzo characterized semilattices of rectangular bands and groups of exponent 2. However, his characterization does not point directly to the properties of rectangular bands and groups of exponent 2 (namely, idempotency and commutativity). My work consisted in proving a natural characterization of this type of semilattice.

Country: Portugal
Contestants: Mariana De Pinho Garcia (16) and Matilde Gonçalves Moreira da Silva (16)
Field: Biology
Project title: Smart Snails
Abstract: The development of a chronic mollusc toxicity test is currently a work item on the agenda of the OECD. We report the improvement and standardization of a toxicity bioassay using eggs of the great pond water snail <i>Lymnaea stagnalis</i> L., which have a biological indicator of water pollutants. We optimized both isolation and synchronization methods to reduce variability, and identified sensitive developmental stages and parameters to assess the putative toxicological effects (i.e. heartbeat, period of development, hatching success, mortality and movement). Our work is an invaluable advancement to develop a reliable, fast and inexpensive environmental embryo toxicity test for molluscan species.

Country: Czech Republic
Contestant: Luboš Vozdecký (19)
Field: Physics
Project title: Rolling Friction
Abstract: There are many theories in books or on the Internet, each of which describes rolling friction in a different way. The basic idea that is used in almost all theories is that the deformations of underlay cause a force which we observe as rolling friction. Some theories claim that there is a bulge formed in front of the rolling body and this bulge is supposed to cause rolling friction. Although there are no experiments that would either confirm or disprove the theory, this theory seems to be generally accepted. The aim of this work is to design and do an experiment that would capture the deformations of an underlay under a rolling body and that would afterwards either confirm or disprove the theories described above. Another aim of this work is to introduce a theory that would describe the origin of rolling friction and that would correspond to the performed experiments.

Three second prizes (€5 000 per project)

Country: Ireland
Contestant: Paul Clarke (17)
Field: Mathematics
Project title: Contributions to cyclic graph theory
Abstract: Graph theory is an area of pure mathematics which studies properties of linkages and networks. It has applications in several areas including computing, molecular structure, neuroscience, search engines, engineering etc. This project makes a profound contribution to the study of graphs. It identifies key concepts and provides the methodology to apply them to some long-standing major problems in the subject with great success.

Country: Bulgaria
Contestant: Petar Milkov Gaydarov (17)
Field: Mathematics
Project title: Hamming Distance of Polynomials over GF(2)
Abstract: In the project we examine an issue linked to the conjecture of Gilbert Lee, Frank Ruskey and Aaron Williams concerning irreducible polynomials over GF(2). This issue is interesting because it examines random sets of polynomials close to the set of irreducible polynomials. Their conjecture states that the Hamming distance of every polynomial over GF(2) and its closest irreducible is at most c : The purpose of the present research is to find the mathematical expectation for a given polynomial to have a certain small Hamming distance from this uniformly chosen at random set. This may help us check which properties of the set of irreducible polynomials may lead to the proof of the conjecture.

Country: Slovenia
Contestant: Aleš Zupančič (18)
Field: Chemistry
Project title: Self-cleaning fabrics based on nanocoatings
Abstract: The aim of our research was to develop a nanocoated fabric with a variety of nanoparticles which would have the highest level of the self-cleaning effect and would be environment- and people-friendly. For studying we used lyocell fibres, which were processed in different ethanol suspensions of nanoparticles. We investigated the photocatalysis of TiO ₂ , ZnO, and Fe ₂ O ₃ nanoparticles. By measuring the absorption spectrum, we determined the optimal ratio between the individual nanoparticles for the highest absorption in visible range. We carried out a test of the self-cleaning effect. We examined how many of the nanoparticles had been released into the environment during the shaking of the fabric in water, and whether the nanoparticles that had been released during the reaction in water were toxic for various aquatic organisms: crustacean <i>Daphnia magna</i> , marine bacteria <i>Vibrio fischeri</i> , and tropical fish <i>Danio rerio</i> . The results show that the tested method can be used for preparing effective coatings that are highly homogeneous and cover the fibre completely.

Three third prizes (€3 500 per project)

Country: Lithuania
Contestant: Matas Navickas (17)
Field: Biology
Project title: Flowering Apple Tree "Malus baccata x Malus prunifolia" in vitro
Abstract: The main idea of my research is to develop a miniature flowering apple tree "Malus baccata x Malus prunifolia" by growing it in a test tube. This sort of apple tree grows up to 7 m in height, blossoms red flowers, and grows apples of about 1 cm in size. In my test tubes, though, it is only 5 cm in height; moreover, after flowering it could be transferred and grown in pots. Lots of experiments on selecting plant hormones, testing medium for growing and propagating the tree, and flowering initiation were performed. Genetic analysis in order to find a flowering initiation gene was carried out as well. The developed flowering technology enables people to grow this mini-tree easily and widely, and could also be useful for scientists working on shortening the juvenile period of plants – the time until the first flowering.

Country: United Kingdom
Contestants: Ameeta Kumar (18) and Aneeta Kumar (18)
Field: Medicine
Project title: pHLIP? Beacon of hope
Abstract: Over 14 million people are diagnosed with cancer every year worldwide. It is also the cause of over 8 million deaths globally every year. With early diagnosis and initiation of treatment, the mortality and morbidity rate could be reduced. We investigated the effectiveness of novel pH Low Insertion Peptide (pHLIP) in imaging cancers, by utilising the low extracellular pH environment found around cancer cells. This was studied by growing 3D spheroids as models for tumours and incubating them with pHLIP. The spheroids were then imaged using confocal microscopy. We believe pHLIP imaging could be developed into a powerful tool in the fight against cancer.

Country: Germany
Contestants: Anselm Bernhard Peter Dewald (19), Philipp Mandler (18) and Robin Braun (18)
Field: Engineering
Project title: Hexapod - Construction and Programming of a six-legged exploration robot
Abstract: Exploration robots can explore collapsed buildings and send real-time images from inside – an important tool for emergency services in disaster areas. Specifically for this purpose, Philipp Mandler, Anselm Dewald and Robin Braun developed and programmed a six-legged walking robot that can be controlled via smartphone. "Hexapod" is more agile and more compact than comparable systems. The mobility talent masters even steps on a staircase and narrow access points. And if Hexapod should lose one of its legs during a deployment, it will continue to move safely even on unknown terrain.

The international cooperation prize (€5 000 per project)

Country: Switzerland
Contestant: Eric Giles Schertenleib (20)
Field: Physics
Project title: Jet and Film – On the interaction between a laminar jet and a soap film
Abstract: This project explains the physics behind the interaction of a thin liquid jet with a soap film. Three different shapes were observed: absorption, refraction and a critical regime. The work was compared to a previous study and shortcomings were identified. The project is both theoretical and experimental.

B. HONORARY AWARDS

Stockholm International Youth Science Seminar 2014

Selected winners attend the 2014 Nobel Prize ceremonies, meet the Nobel Laureates and take part in a series of other scientific/cultural activities during the week.

Country: Switzerland
Contestant: Eric Giles Schertenleib (20)
Field: Physics
Project title: Jet and Film – On the interaction between a laminar jet and a soap film

Country: Czech Republic
Contestant: Luboš Vozdecký (19)
Field: Physics
Project title: Rolling Friction

Country: Bulgaria
Contestant: Petar Milkov Gaydarov (17)
Field: Mathematics
Project title: Hamming Distance of Polynomials over $GF(2)$

London International Youth Science Forum 2015

Selected winners meet young scientists from around the world and take part in the annual two-week intensive summer science festival during July-August 2015.

Country: Portugal
Contestant: João Pedro Estácio Gaspar Gonçalves de Araújo (16)
Field: Mathematics
Project title: A natural characterization of semilattices of rectangular bands and groups of exponent two

Country: Portugal
Contestants: Mariana De Pinho Garcia (16) and Matilde Gonçalves Moreira da Silva (16)
Field: Biology

Project title: Smart Snails

C. SPECIAL DONATED PRIZES

There are 30 special donated prizes:

- JRC (Joint Research Centre): The European Commission's internal science service
- a five-day visit of a technical and cultural nature to the **European Patent Office** in Munich, Germany
 - a one-week stay at each of the eight members of **EIROforum**
 - CERN - The European Laboratory for Particle Physics
 - EUROfusion - JET
 - EMBL - The European Molecular Biology Laboratory
 - ESO - The European Southern Observatory
 - ESA - The European Space Agency
 - ESRF - The European Synchrotron Radiation Facility
 - ILL - The Institute Laue-Langevin
 - XFEL - the European X-Ray Free-Electron Laser Facility
- Intel ISEF 2013 Prizes
- EuCheMS
- Wolfram

JRC - Joint Research Centre

3 prizes: one week stays at the JRC's Institutes in Ispra, Italy

Country	Name of contestant	Age	Field	Project title
Germany	Adrian Huck Daniel Heid Rafael Dieter Quadbeck	19 19 17	Biology	Thiothrix sp. – Investigation of sulfur oxidizing bacteria for the sensor-controlled desulfurization of biogas
Estonia	Tatjana Punger	19	Medicine	Characterization of Virus-Like Particles Pseudotyped with Influenza Virus Antigens
Poland	Monika Barbara Leończyk	18	Biology	The huge importance of small insects - research about bumblebees

EPO - The European Patent Office

3 prizes: five-day visits of a technical and cultural nature to the European Patent Office in Munich, Germany

Country	Name of	Age	Field	Project title
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	contestant			
Turkey	Güner Ali Yenal	16	Biology	Alternative Chemotherapeutic Agents: Artemisia dracuncululus and Hibiscus sabdariffa's Antitumor Effects on Breast Cancer
Italy	Federico Buttò Maddalena Bucchi Maria Veronica Di Lenardo	20 19 19	Environment	Herbicides and secondary metabolites: a new protocol for their identification and disposal
Lithuania	Monika Orlovaite Violeta Kalasinskaite	18 18	Environment	Natural Implements to Control Bee Mite Infestation

EIROFORUM PRIZES

- **CERN** - The European Laboratory for Particle Physics

One week stay in Geneva, Switzerland

Country	Name of contestant	Age	Field	Project title
Ireland	Paul Clarke	17	Mathematics	Contributions to cyclic graph theory

- **EUROFusion - JET**

One week stay at Culham, United Kingdom

Country	Name of contestant	Age	Field	Project title
Bulgaria	Grigori Dobri Matein	18	Physics	Analyzing the Sound Produced by Heated Water Solutions with Different Concentrations

- **EMBL** - The European Molecular Biology Laboratory

One week in Heidelberg, Germany

Country	Name of contestant	Age	Field	Project title
Slovakia	Lukáš Jánošík	18	Biology	Effect of deletion of Mhb1 protein gene on cellular response and replicative aging in yeast <i>Yarrowia lipolytica</i>

- **ESO** - The European Southern Observatory

Visit to ESO site in Chile

Country	Name of contestant	Age	Field	Project title
Spain	Sergio Hernandez Cuenca	19	Physics	Astronomical Model. Development and programming of new algorithms of Positional Astronomy

- **ESA** - The European Space Agency

Participate at a major European space science conference under the sponsorship of the European Space Agency, including coverage of their travel and accommodation costs.

Country	Name of contestant	Age	Field	Project title
Norway	Sander Sebastian Henschien Coates	19	Physics	Investigating "pumping", a technique applied in skateboarding quarter pipes

- **ESRF** - The European Synchrotron Radiation Facility

One week stay in Grenoble, France

Country	Name of contestant	Age	Field	Project title
Hungary	Szabolcs Rozsnyik	18	Chemistry	Research of Multi-walled Carbon Nanotubes Composites' photochemical properties

- **ILL** - The Institute Laue-Langevin

One week stay in Grenoble, France

Country	Name of contestant	Age	Field	Project title
Slovenia	Aleš Zupančič	18	Chemistry	Self-cleaning fabrics based on nanocovers

- **XFEL - the European X-Ray Free-Electron Laser Facility**

One week stay in Hamburg, Germany

Country	Name of contestant	Age	Field	Project title
Slovakia	Jakub Šalko	18	Physics	Observation and Modeling of Planetary Nebulae Spectra

Intel ISEF 2014 Prizes

3 prizes: participate at Intel ISEF in May 2015, Pittsburgh (PA), USA

Country	Name of contestant	Age	Field	Project title
Bulgaria	Marin Blagoev Shalamanov	17	Computing	Genetic Algorithms for Foreign Exchange Trading
	Vasil Georgiev Vasilev	18		
Czech Republic	Vojtěch Boček	19	Computing	LORRIS TOOLBOX - Microprocessor Application Development Kit
Poland	Jerzy Krzysztof Szuniewicz	17	Physics	Optimizing the Process of Single Photons Coupling into Single-Mode Fibers by Using a Genetic Algorithm and Spatial Light Modulation

EuCheMS special donated prize for chemistry

€1 000

Country	Name of contestant	Age	Field	Project title
New Zealand	Thomas Andrew Morgan	19	Chemistry	The effect of UV light on vitamin D2 concentration in oyster mushrooms

WOLFRAM

Wolfram Research

All Mathematics students are awarded a free one year Mathematica Student Edition license + free one-year subscription to WolframAlpha Pro

D. HOST ORGANISER SPECIAL DONATED PRIZES

University of Warsaw

5 prizes: Internships in the faculties of Mathematics, Informatics and Mechanics, Biology and Chemistry

Country	Name of contestant	Age	Field	Project title
Italy	Antonio Pio Di Virgilio	20	Medicine	A new method for the diagnosis of Enterobius vermicularis infestation
	Domenico Parigino	18		
	Francesco Antonio Tucci	20		
Turkey	Emre Girgin	17	Mathematics	On a New Class of Triangle Centers and Their Pedal Triangle
	Osman Akar	18		
Finland	Maura Kere	18	Medicine	How do varying concentrations of caffeine affect the expression of the selected genes ATM, CYP1A2, ADORA2A, DRD2, NRCAM, and COMT in the human neuroblastoma cell line SH-SY5Y?
Czech Republic	Emil Skříšovský	19	Mathematics	The Simson-Wallace Theorem and Its Generalizations in the Plane and Space
Austria	Dominik Heinz Dörler	19	Chemistry	Development of a procedure for recovering phosphorus from sewage sludge ash and development of a low-cost rapid measuring instrument for the quantification of phosphorus
	Hanna Franziska Weiss	18		
	Simon Moll	18		

PZU Foundation Prizes

2 prizes of €2 500

Country	Name of contestant	Age	Field	Project title
USA	Faye Jong Sow Fei	15	Environment	Bio-Waste Materials as Eco-Friendly Mordant in Fabric Dye Process
Canada	Daniel Malcolm McInnis	16	Engineering	Picture This!: A Novel Approach to Limb Donor Identification & Prosthetic Design

Ministry of Science and Higher Education Prizes

2 prizes of €2 500

Country	Name of contestant	Age	Field	Project title
Switzerland	Camill Eric Oberhausser	20	Social sciences	Moral Attitudes – Differences between Women and Men
South Korea	Jiyeon Kim	17	Social sciences	Investigating Mathematical Nature of Korean Traditional Music; Comparing Folk Music and Royal Music

Samsung Electronic's Prizes

3 electronic devices

Country	Name of contestant	Age	Field	Project title
Spain	Aina Guijarro Baude	19	Social sciences	Learning Spanish as a foreign language. Error analysis
Belarus	Ilya Novoselskiy	16	Environment	Bioconversion of chicken manure into the biomass of microalgae (<i>Dunaliella salina</i>)
Belarus	Nikita Kondratyionok	16	Mathematics	Continued Fractions and Euclidean Algorithm in Norm Unique Factorization Domain