





The future of science **EUCYS2021.COM**







EUCYS 2020 SALAMANCA

32nd European Union Contest for Young Scientists 2020-2021

INSTITUTIONAL SPONSORS







SPONSORS AND PARTNERS









































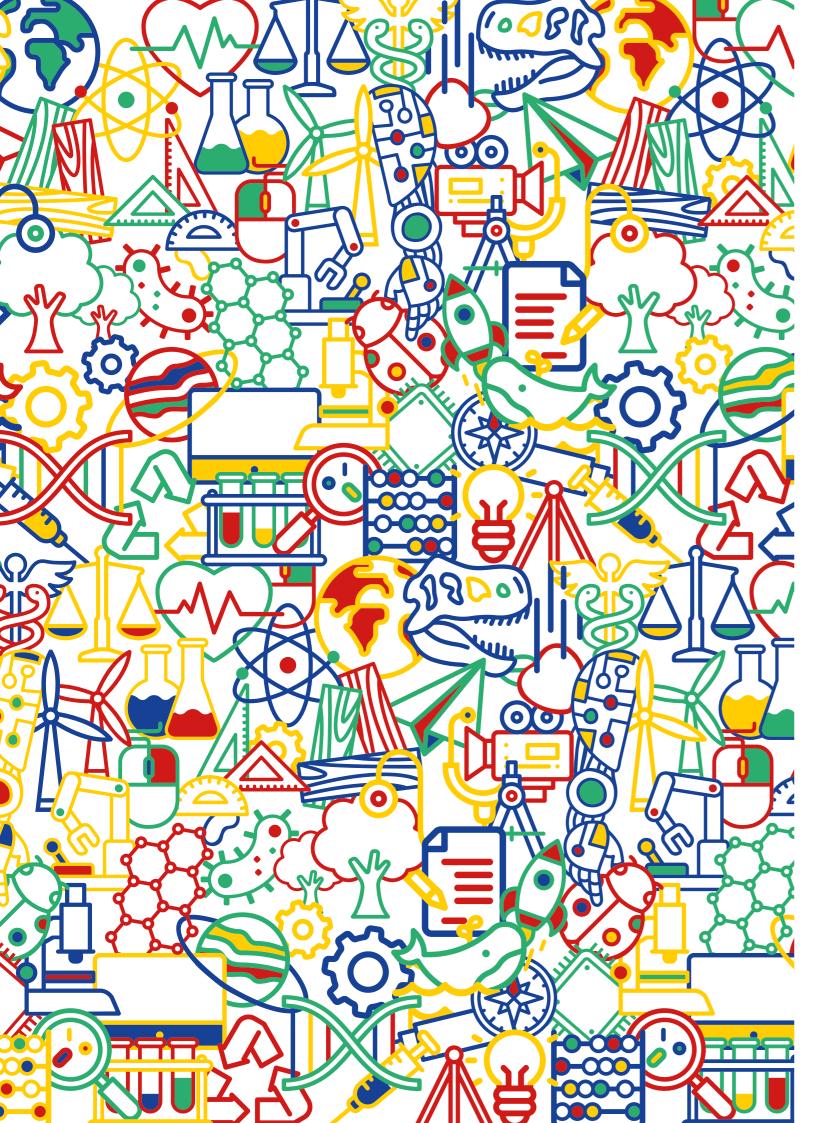








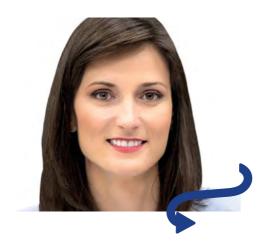




Contents

Welcome to European Union Contest for Young Scientists 2020-2021	Ç
The European Union Contest for Young Scientists in Salamanca	19
EUCYS in the University of Salamanca	25
EUCYS 2020-2021 Programme	35
Programme	36
Dr. William Daniel Philips	37
Venue	38
Projects	43
Projects by field	44
Projects by country	51
The jury	111
The prizes	125
National Organisers	143
Winners 1989-2019	151
European Union Initiatives for Research and Youth	177
EUCYS 2022	184





Dear Young Scientists,

Welcome to the 32nd edition of the European Union Contest for Young Scientists and our first ever virtual EUCYS! You are here because you won first prize in your national science competition and are now representing your countries at this prestigious competition. This is a fantastic achievement and you should be very proud! Congratulations!

I am so sorry that you will be unable to travel to Spain to meet your peers and the panel of judges to compete in person and to visit the beautiful city of Salamanca. Your safety is our first concern and in view of the ongoing COVID-19 situation across Europe the difficult decision was taken to move the contest on-line for this year. I am very grateful to our Spanish hosts who have worked very hard to make this happen.

The Corona virus has dominated our lives since early 2020. Europe came to a standstill; workers moved home to work, and homes became classrooms for students. The world became very small again; planes stopped flying and airports stood still. However, thanks to the continuous improvement in technology we continued to work and to communicate with our zooms, our webinars and our on-line conferences.

I have been greatly impressed with the work of our health service personnel and scientists during the past year. They faced huge challenges with this worldwide pandemic but within a year had come up with vaccines to make us all safe again. If the last year taught us anything it was the importance of investing in education, science, technology, and innovation.

EUCYS is about expanding your talents. It is about encouraging you and helping you to pursue careers in science, research, and innovation. Incredible things happen when great minds meet. To solve the great challenges of our time we need more scientists and innovators in Europe. You are our future scientists and innovators and you are the reason why the European Union is investing millions of euros in young scientists and science education by means of its Horizon Europe research and innovation programmes and the ERASMUS programme.

I wish you well in your pursuit of science and I hope that participating in the contest will encourage you to go on to achieve even greater things!

I am sure that this year's EUCYS will be memorable!

Mariya Gabriel Commissioner for Innovation, Research, Culture, Education and Youth





Dear Young Scientists,

The University of Salamanca welcomes you to this event being held in this university city par excellence, a place which is both welcoming and dynamic and has devoted more than 800 years to education and research.

It is an honour for me and for the institution I represent that the city of Salamanca is hosting the European Union Contest of Young Scientists (EUCYS), the most relevant event of its kind in Europe. It is an interesting initiative promoted by the European Commission which unites young people like yourselves with the aim of exchanging scientific knowledge.

The current pandemic has highlighted the importance of science as a key component in tackling the major challenges facing humanity. It is you, young researchers, who must take the lead in the pursuit of new advances in research in addition to the designing of innovative strategies for the future. In this sense, for the University of Salamanca research is a strategic issue. We believe that universities should facilitate the development of the capacities of young people in the field of science.

I invite you to take advantage of this excellent opportunity to meet other young people with similar interests and skills and to obtain advice and guidance from leading European scientists.

Welcome!

Ricardo RiveroRector of the University of Salamanca





Dear Young Scientists,

Science is the most noble of human activities. Science is the source of our capacity to generate wealth and well-being for people as a whole. It is our defence against illness and catastrophes. It is also what broadens our horizons of discovery in every domain and is thus intertwined with creativity in all its expressions including art, music, and literature.

Furthermore, science stands firm against ignorance, superstition, and the assault on reason so dominant in the fake news of the social media. It is therefore the best antidote we have against the manipulation of minds by would-be tyrants and demagogues. The advancement of science is crucial to foster the positive side of humanity against the demons of destruction which inhabit us. This is why science and ethics are necessary companions in the endless search for our enlightenment.

Youth is the age of discovery and creativity; it is the moment in our life cycle when we feel everything is possible for us and for the world. And it is. It suffices to translate all this young energy in the betterment of our lives, using, as a paramount tool our scientific capacity to understand and act upon this understanding. This is why I truly believe that there is nothing more exhilarating than being a young scientist precisely at a time when knowledge is advancing by quantum leaps and when pandemics, and human-induced catastrophes loom on the horizon. Yet, the difficulties of the task are enormous and you will need all your enthusiasm and determination, but also patience in the pursuit of this noble endeavour. Institutions in all countries usually speak highly of science but do not follow up this praise in terms of their budgetary priorities.

Dark forces of domination need to subdue science to keep people ignoring the true situation of their lives. Bureaucracies, including scientific bureaucracies, often resist innovation, thus stalling attempts by young scientists to shift the paradigms of knowledge in each field. In fact we know that the relentless critique of established beliefs is the very essence of science.

But you are young, and you are scientists, and if you really believe in what you do and want to do, nothing and no one can stop you for the benefit of all of us. Wishing you good luck is wishing luck to all of us humans as a last hope to rise above our sorry state.

Professor Manuel Castells *Minister of Universities, Government of Spain*



Representing a country is a great responsibility but also the greatest honour a person can be given. You are the winners of your respective countries and are assembled here at the 32nd edition of the European Union Contest for Young Scientists to compete in this European Scientific Olympic Competition to try and get on the podium of Science.

This year's contest comes in a particularly difficult and challenging period. We are still suffering from the havoc caused by the pandemic and we feel knocked out. But as in the boxing ring, we still have the strength to recover, to stand up, and to continue the fight, because we are resilient and we want to live with our family, friends and colleagues around us.

You are our most precious hope. In you we trust, because your youth, your hard work, and your endeavours will help us win this race against disease. The future of the world is in your hands, in your brains, and in your hearts. Science should constitute the beacon of society, and Europe is ready to launch a far-reaching and shining beam. Your projects and ideas are the fuel that will feed the stream of light. You are a paradigm of strength, enthusiasm and hard work.

In Castilla y León we are privileged to have been selected as hosts of this event. "Faster, Higher, Stronger – Together" reads the motto of this year's Olympic Games. "Better, wiser, tougher - all committed to humanity" can be the motto of this European Scientific Olympic Competition that will take place in the city of Salamanca. You represent your countries, and Europe has placed all her hopes in you, therefore, ready, steady, go.

Rocío Lucas Navas Regional Minister of Education, Junta de Castilla y León.







Dear Young Scientists,

Salamanca is deeply proud to welcome you despite the distance. There are few cities such as ours with such a long and established link with knowledge, the discussion of ideas, and research, all of which are strongly related to our daily life.

From the so called School of Salamanca, the origin of Human Rights, the source of sovereignty of peoples, and the starting point for modern economic theory, to our University which is eight centuries old and a world point of reference for teaching including our research centres, our city is a constant laboratory of thinking and analysis.

The Municipality of Salamanca is deeply concerned with science and research. In fact, we are the first Spanish local government to develop a specific programme aimed at the promotion, protection, and encouraging of talented young scientists.

Thanks to this programme we help both secondary and university students with scholarships and also allow promising researchers working abroad to be able to return to Salamanca so as to continue with their academic training, encouraging their own research teams and developing highly innovative projects which may improve the city's quality of life.

I am deeply convinced that this meeting will be extremely useful in order to give greater visibility in Europe to our strong and deep bond with research which will no doubt be strongly reinforced.

Carlos García Carbayo *Mayor of Salamanca*



Dear Young Scientists,

The road towards EUCYS2020/2021 has not been an easy one. During our preparation of EUCYS2020 in Salamanca, COVID-19 burst into our lives. Now that the entire world has undergone the devastating consequences of a new virus, it has become clearer than ever how our future societies will need to rely on knowledge and science in order to face the challenges that are to come. And science needs people. In particular young people like you, with unique skills such as innovation, creativeness, and above all inquisitiveness. Science and our world needs you and we are here to support your first steps as scientists.

This EUCYS edition has its unique signature. We have made a special effort to organise EUCYS thinking of you, the participants. Apart from the contest itself, which will take place on a virtual platform, we have drawn up a programme of very attractive activities —a round table with prestigious scientists, a Nobel prize plenary lecture, outreach talks—, which we hope will benefit your careers. We hope that these activities will allow you to detect the challenges you will face as young scientists and to learn how to tackle them within our state-of-the-art scientific environment.

Science, like music or art, is universal. And by being universal, nowadays we cannot devote ourselves to science without team work, which makes cooperation and collaboration very valuable -if not mandatory— skills for scientific research. We know how delightful it is to win a EUCYS prize, but bear in mind that the best prize you can obtain from EUCYS2020/2021 is the friendship of your peers. In this edition we cannot benefit from faceto-face interaction in Salamanca, but we strongly encourage you to take advantage of the virtual platform to interact as much as possible with your peers, and, hopefully to establish meaningful friendships with future colleagues. We hope that you remember EUCYS Salamanca as one of the milestones of the beginning of your scientific careers.

As researchers ourselves, and professionals who dedicate our lives to supporting and disseminating science and research, we sincerely hope that you will enjoy EUCYS2020/2021 as much as possible. Please do not hesitate to contact us; we are here to help you. We wish you all the best for your scientific future.

Carlos Hernández-García on behalf of the EUCYS2020/2021 team

ORGANIZING COMMITTEE

Dr. Carlos Hernández-García. Senior Researcher in Physics, Ramón y Cajal fellow, ERC grantee.

diarium.us al. es/carlo shergar / carlo shergar@us al. es

Dr. María Jesús Santos Sánchez

Associate Professor in Physics / smjesus@usal.es

Marta Romo González

PhD student in Biochemistry / martarogo@usal.es

PROJECT MANAGERS

Dr. José Manuel Iglesias Pérez Dr. Fernando Gutiérrez Chico

DEPARTMENTS OF THE UNIVERSITY OF SALAMANCA

Innovation and Digital Production

Dr. Gustavo Lannelongue, Director of Department.

Graphic and digital designers: Pilar Vega Pérez, Sara Alejandra Labrador Martín, Marta Férnandez-Roldán Galán.

Audiovisual media: Ana Hernández Martín,

Pedro Luis Martín Montero.

Scientific Culture and Innovation

Miguel Battaner-Moro







Iberdrola, the utility of the future

With a history of over 170 years, today lberdrola is a global energy leader, the number-one producer of wind power and one of the world's biggest electricity utilities by market capitalisation. The group supplies energy to almost 100 million people in dozens of countries, has more than 600,000 shareholders, and a workforce comprising more than 38,000 employees. Iberdrola is leading the transition towards a sustainable energy model through investments in renewable energy, smart grids, large-scale energy storage and digital transformation, offering the most advanced products and services to our customers.

IBERDROLA, LEADERS IN DRIVING THE SDGS SDG 13: CLIMATE ACTION

- Pioneers in the energy transition with an investment of 120 billion euros for 20 years.
- Leaders in renewable energy, smart grids, large-scale energy storage and digital transformation.
- 79 % of the group's installed capacity comes from emissions-free sources.
- Iberdrola has committed to become a zero-carbon company in Europe by 2030. The objective is to achieve global carbon neutrality by 2050.
- Investing €150bn between now and 2030 to maintain our leadership in the energy transition.

LEADERS IN SUSTAINABLE INNOVATION

- Iberdrola is the leading private utility in Europe and the second in the world by investment in R&D, according to the European Commission.
- In 2020, Iberdrola invested in R&D 300 million euros, with an accumulated investment of more than 2 billion euros in the last decade.
- By 2022 this investment will rise to 330 million euros per year and by 2025 to 400 million euros per year.
- R&D in renewables, the production of green hydrogen, the development of floating wind and photovoltaic installations, pumped hydroelectric plants, batteries and new solutions for customers.

2021-BUSINESS

- Iberdrola develops and expands smart grids and grid digitisation
- Thanks to smart grids, Iberdrola can give us a headsup on possible incidents and help to resolve them with greater speed and efficiency.

- Iberdrola is leading the energy sector that produces and supplies electricity to some 100 million people.
- Iberdrola is moving forward in the international commitment to offshore wind power.
- 100% of our generation assets (48 GW of capacity, of which around 30 GW renewables) is already managed digitally and automatically.
- Sustainable Mobility Plan with the investment of 150 million euros to boost electric mobility over the next five years.
- Iberdrola is spearheading the development of green hydrogen to meet the electrification and decarbonisation needs of sectors such as industry and heavy transport.



- Iberdrola U, the energy that transforms the future .
- Iberdrola U, the Iberdrola Universities Program, aims to support the transfer of knowledge, talent and social contribution.
- Iberdrola encourages young talent to participate in the changes to the energy sector and fosters entrepreneurship and technological innovation among students.
- Iberdrola, through its constant support and collaboration with education and entrepreneurship achieves the goal of developing students' skills and capacities.
- The future of energy will be written by the youth, and that's why Iberdrola wants to encourage new ideas and provide youth with the tools they need to make it happen.



Dear Young Scientists,

Welcome and congratulations. Having reached the final stage of this European contest is already a reason for celebration. Most of all however it must be an incentive to continue innovating and to prepare for the challenges of tomorrow, always with the aim of improving the quality of life in our communities.

In addition, this competition is hosted by the University of Salamanca, the oldest in Spain and one of the three oldest in Europe. For more than 800 years of history, this university has maintained its position among the most prestigious in the world thanks to its openness and innovative spirit; there couldn't be a better educational institution for a competition such as this one.

At Iberdrola, one of the largest utilities worldwide and the largest renewable player globally, we firmly believe that the new generations are the driving force for transformation. For instance, your enthusiasm has been essential to convince the world of the importance of fighting climate change. Without your inspiration, the Paris Agreement would never have been reached and we would not have more and more movements calling for action and urgent solutions all around the globe, in particular in the European Union, which continues to lead the way to decarbonization.

For these reasons, it is an honour for Iberdrola to support this European Competition which over the years has become the best stage for the most promising research students to present their scientific achievements and share innovative ideas and proposals.

We do so as part of our global university programme 'Iberdrola U', which includes collaborations with prestigious centres such as the Massachusetts Institute of Technology and Yale University, in the United States; the University of Strathclyde, in Scotland; the Technology Institute of Monterrey in Mexico; the University of Pernambuco, in Brazil; the Hamad Bin Khalifa University, in Qatar; and, in Spain the Comillas Pontifical University and the University of Salamanca.

'Iberdrola U' connects some 300,000 students in different fields related to the energy transition and includes initiatives such as University Chairs, R&D projects, scholarships, and different schemes to support

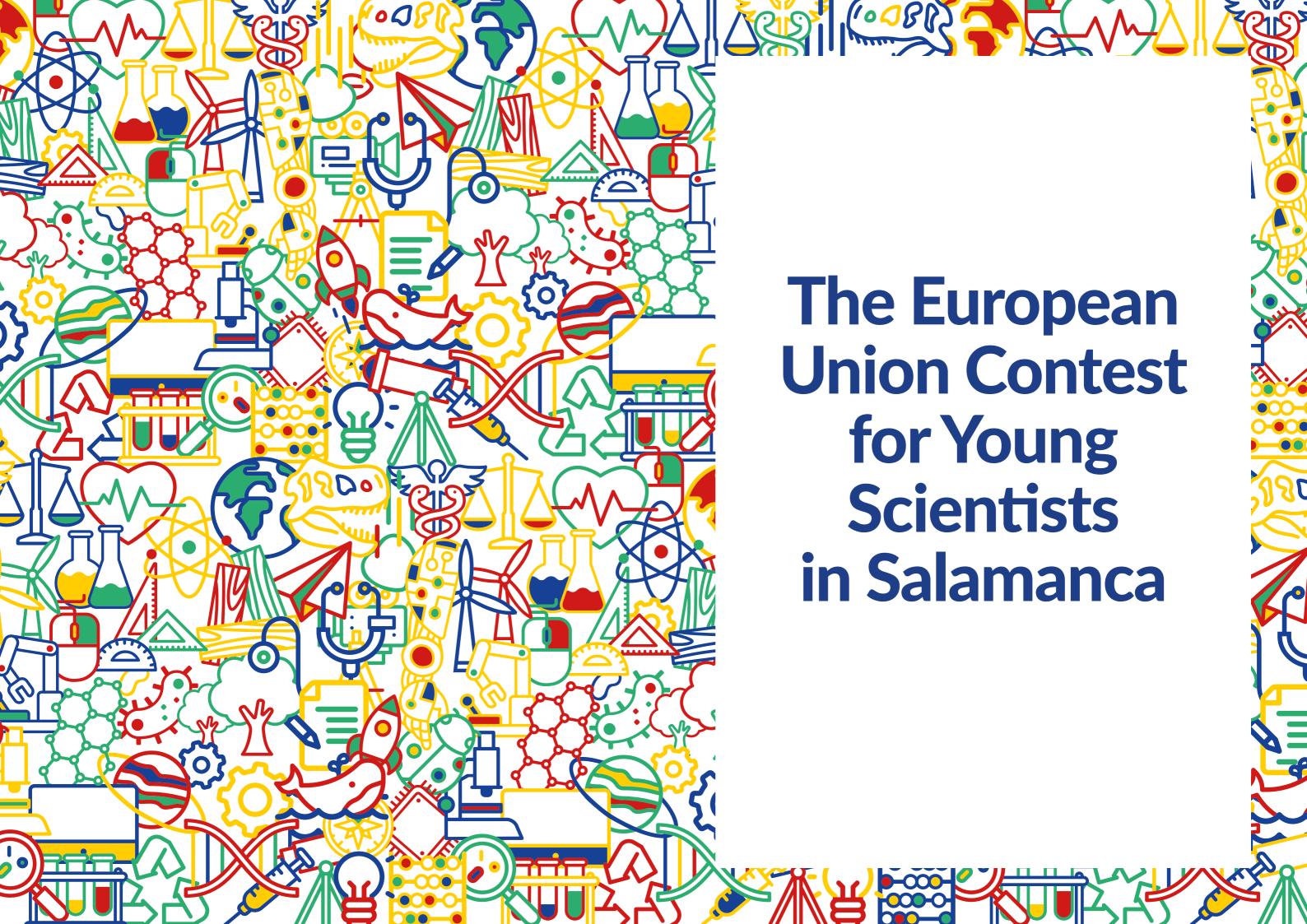
entrepreneurship in areas as renewable energy, sustainable development, electric mobility, biodiversity, and smart grids.

I am sure that the participants in this Congress will show once again that supporting young talent is the best way to promote employability for jobs in the future, especially in STEM disciplines. Iberdrola is also developing initiatives for the promotion of gender equality in these studies, in which the presence of women has been traditionally lower. Examples of this are the creation of specific Schools of Electricians for women in Brazil; the "Impulso STEM" programme in Mexico; the POWERful Women initiative, in the United Kingdom; WomENergy, in the United States; and the STEAM Alliance for female talent "Girls for science", in Spain.

Dear Young Scientists, you are all called to a wonderful mission: to create, develop and implement projects to make this world, the world you will inherit, a better place. Let us start to make a difference here and now. I wish you all a great time during the competition and the very best of luck to all those participating in this wonderful learning experience.

Ignacio S. GalánChairman and CEO of Iberdrola





THE EUROPEAN UNION CONTEST FOR YOUNG SCIENTISTS IN SALAMANCA

The 32nd edition was due to take place in Salamanca in 2020 but due to the worldwide COVID 19 pandemic, the European Commission took the necessary but difficult decision to postpone. The University of Salamanca kindly agreed to host the contest in 2021 instead. Thus the 32nd edition of the contest is unusual in many ways: it combines two contests 2020 and 2021, and is a hybrid event for the first time. Due to the evolving COVID situation in Europe, and indeed worldwide, a decision was taken to welcome the jury to Salamanca and to have the contestants and National Organisers in their home countries.

The Contest is co-funded under Horizon 2020: The EU Framework Programme for Research and Technological Development and is part of a broader initiative to reinforce the links between science and society, responsible research and innovation, and to further the emergence of a European Research Area and the Innovation Union.

Only projects that have won a first prize at a national science competition are invited to participate at EUCYS. Thus, the Contest represents an additional scientific challenge for many young scientists who compete annually in their national contests.

The Contest is more than just a competition. The young people 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 already made in each participating country to attract young people to careers in science and technology.

The first Contest Finals 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, Vienna, Budapest, Dublin, Moscow, Stockholm, Valencia, and Copenhagen again for the 20th anniversary of the Contest, Paris, Lisbon, Helsinki, Bratislava, Prague, Warsaw, Brussels again in 2016, Tallinn in 2017, Dublin again in 2018 and Sofia in 2019. Next year, the contest will take place in Leiden in the Netherlands.

This year the European Union Contest for Young Scientists is taking place in Salamanca and we are pleased to be in Spain for the third time.

The European Commission is very grateful to the organisers for their professionalism and support.

For more information on the EU Contest please visit the following web sites:

ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/eucys_en eucys2021.com

FOR MORE INFORMATION ON THE EUROPEAN UNION CONTEST FOR YOUNG SCIENTISTS PLEASE CONTACT

Karen Slavin

European Commission

Directorate General for Research and Innovation

Directorate ERA & Innovation

ERA Governance & Implementation

B - 1049 Brussels, Belgium

rtd-eu-young-scientists-contest@ec.europa.eu

The European Union Contest for Young Scientists, better known as 'EUCYS', rewards and celebrates Europe's best young scientific talent. Every year, the event gathers promising young scientists from all over Europe and beyond, to present their projects to a panel of international judges. Over the years some astonishing inventions and creative ways of using science in everyday life have been presented. Be prepared to be amazed! The Contest is a good example of an activity that serves not only to encourage interest in science but also to promote the exchange of ideas among Past participants have often expressed the positive impact of this aspect of the Contest. They believe that it has opened up the gateway to Europe and further afield for their careers, and has also fostered a strong interest in learning other European languages. The Contest is also a useful tool in the development of a pan-European scientific community. It has contributed significantly to popularizing science among young people. This year marks the 32nd edition of the Contest and will be a contest like no other!

20

The Contestants

All contestants at the European Union Contest for Young Scientists have previously won a first prize at the national young scientist competition in their own country. They are put forward by the "National Organiser", who is the contact person for their respective national contest. The contestants compete either as individuals or as part of a team. There are strict rules on the age of the contestants, the size of the teams, and the number of contestants and projects that each participating country can send. The Contest accepts projects in all fields of scientific endeavour that have been carried out before the contestants enter university.

Competing in the contest for 2020 are 50 contestants with 41 projects and for 2021 we have 108 contestants with 73 projects.

The Jury

This year, the Jury is composed of 25 highly qualified scientists and engineers with worldwide reputations in their chosen field.

The jury carry out their duties at the contest as independent scientific experts and not as representatives of any institution, organisation or country. The EC appoints the Jury annually basing its selection on the scientific needs of the contest. They are drawn both from academia and industry. The jury base their work at the contest on the Guidelines established by the EC.

The selection and evaluation process

The European Union Contest for Young Scientists takes place in three stages following national competitions, which are held across Europe from October of the preceding year to May of the current year

Selection:

Winners of the national competitions are selected by their respective national contest jury and nominated to represent their country at the Contest. The National Organisers submit their projects to the EC in June.

Preview:

During the summer, the Contest Jury members review the written descriptions of the projects that they will assess during the exhibition in September.

Contest:

The Contestants display their projects at exhibition stands, and are interviewed by members of the Jury. The Jury use the following criteria to make their final assessment:

- originality and creativity in the identification of and 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 presentation;
- ability to discuss the project with the Jury members.

In applying all these criteria, allowance shall be made for the age and education level of the contestants, the quality of the resources available to them and their linguistic ability to speak a non-mother tongue language if required.

The decision of the jury is final.

The Prizes

The contestants compete for a number of prizes on the basis of their projects. The core EU monetary Prizes are the main prizes awarded.

THESE INCLUDE FOR 2020 CONTESTANTS:

- Two First Prizes worth € 7,000 each
- Two Second Prizes worth € 5,000 each
- Two Third Prizes worth € 3.500 each

THESE INCLUDE FOR 2021 CONTESTANTS:

- Four First Prizes worth € 7,000 each
- Four Second Prizes worth € 5,000 each
- Four Third Prizes worth € 3,500 each

The jury also select the best and most appropriate contestants for several Special Donated Prizes of study visits or similar to leading scientific European organisations as follows:

- a one-week stay at one of the eight EIROforum organisations: CERN, EUROfusion (JET), EMBL, ESA, ESO, ESRF, ILL, European XFEL;
- · a two day stay at the Joint Research Centre at Ispra in Italy;
- · visits organised by the Bioeconomy BBI undertaking and Food industries;
- visit to a PRACE super computing facility;
- · visit to the International Swiss Talent Forum;
- · visit to Expo-sciences Luzembourg.

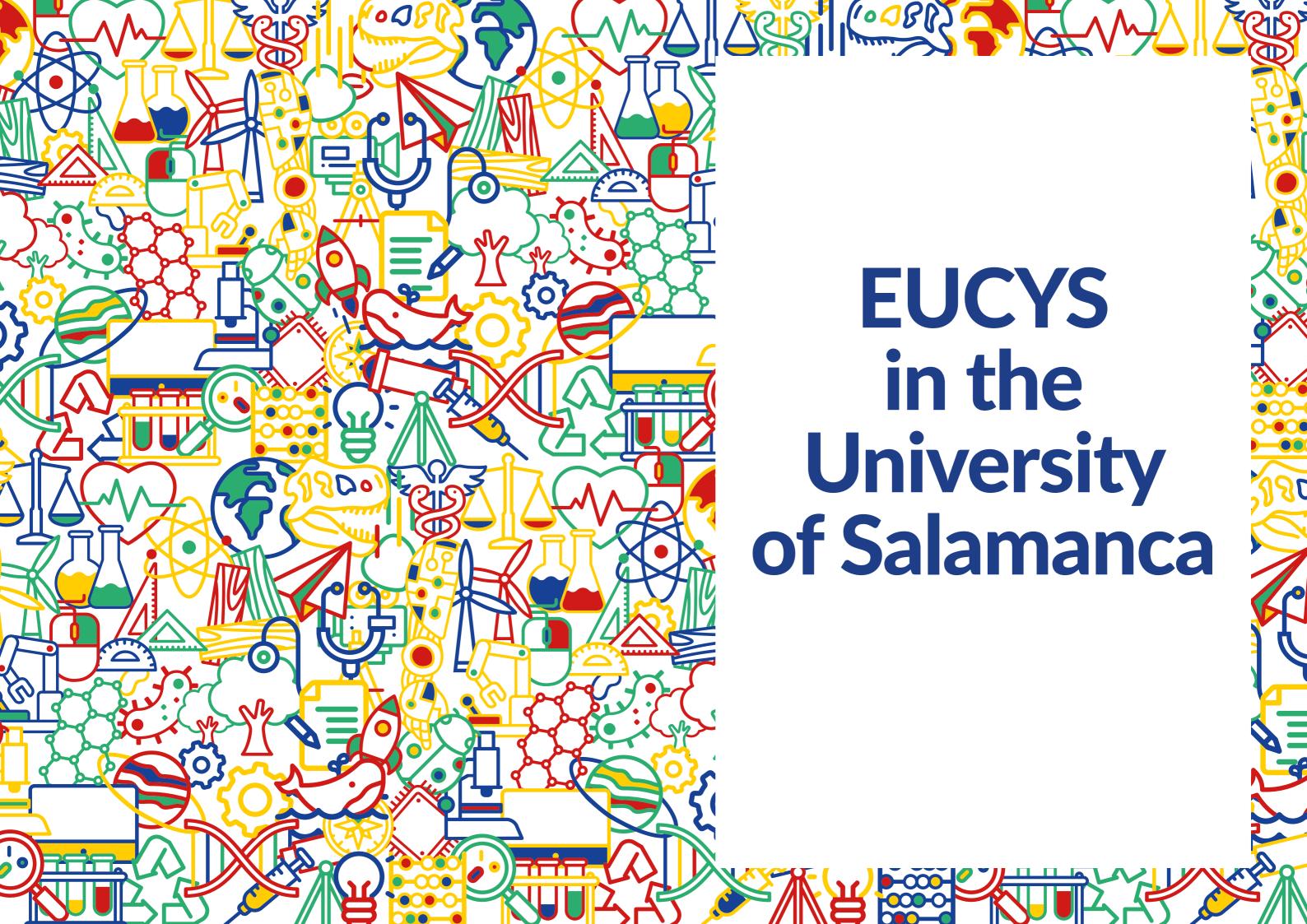
EuChemS kindly offers a prize to the best chemistry project, FoodDrinkEurope and PEPSICO kindly offer prizes to the best food related projects.

These prizes are offered to contestants who, according to the Jury, would benefit from the specific experience that these prizes offer. At the discretion of the Jury, a prize winner can receive both a core Prize and a Special Donated Prize.

The participating countries

The following countries will participate at EUCYS on a competitive basis: Austria, Belarus, Bulgaria, Canada, China, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey and Ukraine.

Serbia and Malta have not sent a team this year. The EC is negotiating with Armenia, Croatia, Macedonia and Moldova to welcome them at future contests.



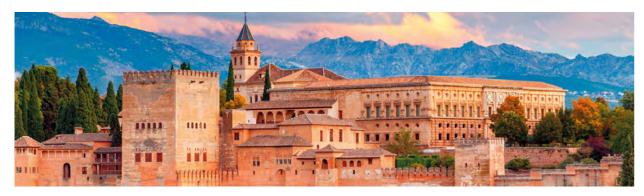
EUCYS in Spain

Did you know that Spain is the third country in the world with the most UNESCO World Heritage sites?

In Spain there are more than 15,600 monuments, archaeological sites, gardens, and historical sites and ensembles which have been declared Assets of Cultural Interest (Bienes de Interés Cultural, BICs). All this constitutes an extraordinary and extremely valuable heritage which stands out for its richness and diversity and which includes numerous examples of the various civilisations, cultures, and historical periods which developed in Spanish territories ranging from the Iberians and Celts to the Romans and Arabs via the Phoenicians, Greeks, Visigoths...



Moreover, within this whole we can also find unique and characteristic artistic styles such the pre-Romanesque of Asturias, Mudejar architecture, and Andalusian art. It is thus not surprising that Spain is the third country in the world with the most sites included on the World Heritage list of the UNESCO. From the cave paintings of the Cueva de Altamira and the findings of Atapuerca via the Aqueduct of Segovia, the Alhambra of Granada, and the Mosque of Córdoba to the cathedrals of Seville, Burgos, and the Sagrada Familia of Barcelona to mention but a few, Spain is an essential cultural destination. The 15 Spanish Cultural Cities of Humanity also deserve special mention and are always well worth a visit.



Throughout history many Spanish figures have left their mark on various fields of the arts and culture (Murillo, Zurbarán, Miró, Sorolla, Maruja Mallo, Cervantes, Lorca, Falla, Buñuel, Balenciaga, Ramón y Cajal...). This situation has continued to the present day: Antonio López, Miguel Barceló, Paco de Lucía, Camarón de la Isla, Montserrat Caballé, Pedro Almodóvar, Blanca Li, Manuel Pertegaz, Severo Ochoa, Margarita Salas, and Ana María Matute are but a few examples of the long list of men and women devoted to literature, painting, music, the cinema, fashion, dance, science, and arts of all kinds, the prestige and recognition of whom are international.

EUCYS in Salamanca

The golden city of a thousand legends

To speak of culture is to speak of Salamanca. Strolling through the streets of its historical centre which has been declared a World Heritage Site by the UNESCO means exploring centuries of history, art, and knowledge and allowing oneself to be charmed by wonders such as its famous University, which is one of the oldest in Europe and continues to attract thousands of students every year.

Taking a closer look at the monuments of Salamanca is immersing oneself in a world of legends and stories to be discovered. Begin a fine walk in its world-famous Plaza Mayor, the meeting point of the city par excellence. Having a coffee at the legendary Novelty, contemplating its 88 arches, or relaxing at any of its pavement cafés is extremely worthwhile.

If you feel like investigation you can begin at the two Cathedrals of Salamanca: yes, there are two! At the Puerta de Ramos entrance of the New Cathedral you can search for the figure of an astronaut sculpted in stone and then climb to its towers on the leronimus visit which provides matchless views.

The University of Salamanca hides a stone frog on its façade which is said to bring luck to students, the palace known as the Casa de las Conchas is reputed by legend to contain a treasure, the garden of Calixto and Melibea has literary associations, it is said that the Devil taught witchcraft at the Cave of Salamanca... And a thousand more stories in a city which has dozens of places to discover such as the Casa Lis, the Cielo of Salamanca, the Clerecía, the Roman Bridge...



Plaza Mavor

It is one of the most beautiful plazas in Spain; it was built in the baroque style by Alberto Churriguera. On its north side stands the Town Hall, which is also baroque with its five granite arches and a steeple among four allegorical figures. Its decoration is noted for its iconic circular portraits of Charles I, Alfonso XI, Ferdinand VI, Cervantes, and Saint Teresa, among others. The façades of the buildings have three stories and are supported by a series of round arches and crowned by a balustrade. The Plaza Mayor is currently one of the liveliest and most popular places of Salamanca.

Domus Artium 2002 (DA2)

The Domus Artium 2002 (DA2) was created in the year 2002 to coincide with Salamanca being the European Cultural Capital. The building, which was formerly used as a prison, was renovated and extended. The main themes of this museum are contemporary art and new technologies.







Casa de las Conchas

The Casa de las Conchas is Gothic in style. Its construction was initiated in the late 15th century although it also contains Renaissance and Mudejar elements; it is classed as Isabelline art.

Over three hundred shells cover its walls. In the 18th century it suffered from cracking which led to the remodelling of its upper part, which lacks the shells which decorate the remainder of the façade. It is noted for its entrance with its Gothic coat of arms above containing representations of the fleurs-de-lys. It currently houses the Salamanca Public Library and an information office.



Cathedrals

The Cathedral of Salamanca includes two buildings joined together: the Old Cathedral of the 12th-13th centuries and the New Cathedral of the 16th century. The Old Cathedral is Romanesque is style and is noted for the Torre del Gallo, the Chapel of San Martín or of El Aceite, the 15th-century main altarpiece which was created by several painters under Dello Delli, the mural of the vault by Nicolás Florentino, and the fine sepulchres of bishops and figures of the nobility in the interior.

The New Cathedral, which was completed in the 18th century by Churriguera, contains the image of the Virgin of La Asunción which was carved in 1626 by the sculptor Esteban Rueda. It is noted for the choir stalls designed by Joaquín Churriguera in 1727 and the baroque retrochoir with its Renaissance images such as the Virgin of Loreto and those of St John the Baptist.



Casa Lis Art Nouveau and Art Deco Museum

This museum is located in the Casa Lis which was the first modernist building in the city (1905).

The museum displays 19 collections of decorative art from the late 19th and early 20th centuries. It contains some 2,500 exhibits including glass pieces; porcelain dolls; chryselephantine, enamel, bronze, and ivory figures; paintings; furniture; jewels; toys; a Fabergé egg... It also holds an important pictorial collection of 19th-century Catalan works and paintings by Salamanca artists such as Celso Lagar and Mateo Hernández.

EUCYS in the University of Salamanca

Universitas Studii Salmanticensis

The University of Salamanca, which was founded in 1218 by King Alfonso IX of León, is one of the oldest universities in Europe and has been an academic point of reference for its eight centuries of existence and for countless generations of students from all over the world.



The University attained its greatest splendour in the 15th and 16th centuries when it became the centre of the world debate on people's rights. Its teachers discussed Colombus' project and once America had been discovered debated whether the natives should be given full rights. Some of the women who studied in its lecture halls are considered to be among the first female university students in the world such as Lucía de Medrano and Beatriz Galindo. The former subsequently became the first woman university lecturer.

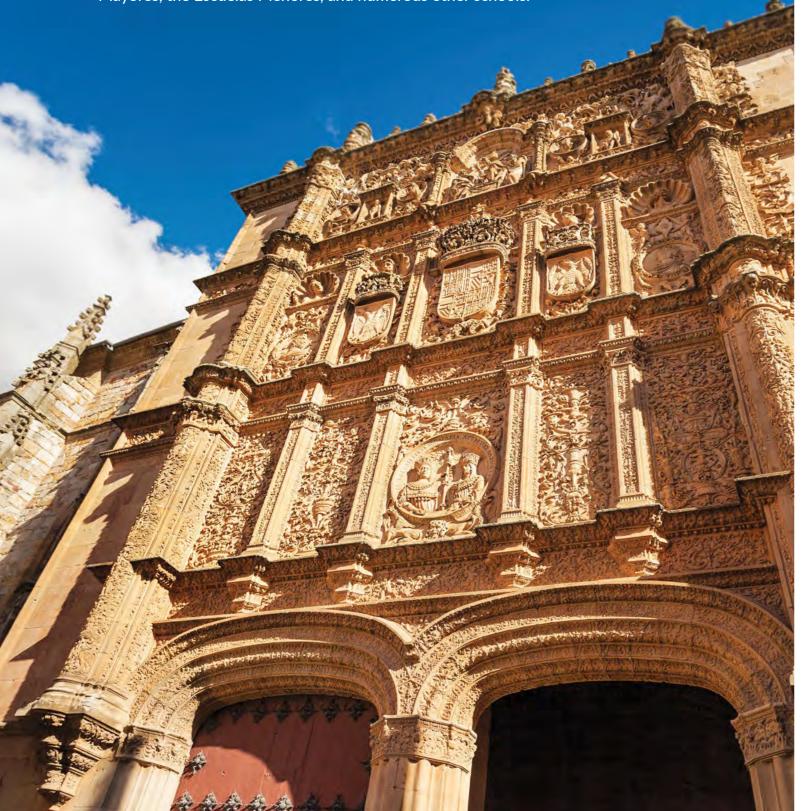




EUCYS IN THE UNIVERSITY OF SALAMANCA

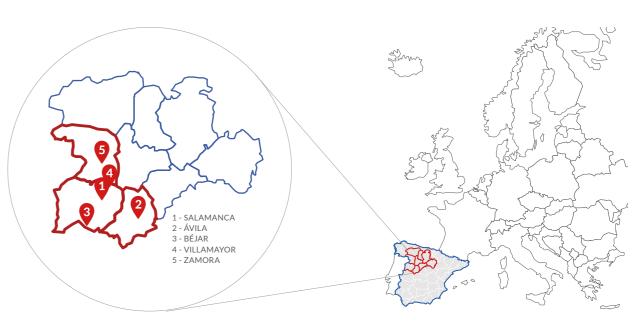
The construction of the Historical University Building began in 1411 and was completed in 1533. It is one of the most important monuments in Spain and one of the most valuable examples of Spanish Renaissance art. It is noted for its plateresque façade built of the golden stone of Villamayor. The interior of the building includes very special places such as the Fray Luis de León Hall and the spectacular Noble Staircase. Other unique spaces of great importance include the Ancient Library which contains very valuable manuscripts and other incunabula.

Adjacent to the University buildings others arose such as the Study Hospital, the Escuelas Mayores, the Escuelas Menores, and numerous other schools.



9 university campuses distributed in three provinces: Salamanca, Zamora, and Ávila

The University of Salamanca has a long humanistic and scientific tradition and a presence in four towns (Salamanca, Zamora, Ávila, and Béjar). Over 30,000 students study at its 26 faculties and university schools each academic year.





The University of Salamanca is established in a World Heritage city which is both dynamic and of great architectural value. Its wide range of academic, cultural, and sporting activities have made the USAL the second most important Spanish university with most students from outside its university district. Owing to all this Salamanca is known the world over as one of the major university cities.



Moreover, the University of Salamanca has an important heritage of historical buildings and emblematic spaces still in use for academic activities, including the Escuelas Mayores building.



International character

It is a university with a marked international character which welcomes each year over 7000 students from the five continents thanks to its major programme of international student mobility.



Research in the University of Salamanca

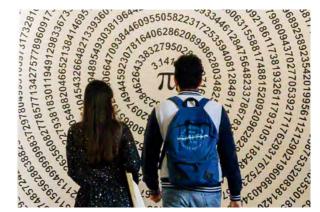
The University of Salamanca is an academic institution devoted to teaching and research in all branches of knowledge: Arts and Humanities, Sciences, Social Sciences and Laws, Health Science and Engineering and Architecture.

It has a present focused on innovation and the quality of teaching / learning, research, knowledge transference and culture, with a clear international vocation; a committed and responsible future with sustainable development. The research activity is organized in Research Groups integrating Departments, Institutes and Research Centers. In the present moment it has various research centers and institutes with a status to apply for the excellence programs of the Government of Spain.



During 2020 the research production of the University of Salamanca gave rise to nearly two thousand of research papers, one hundred of books, one hundred and fifty PhD. Thesis and more than two hundred of communications to congresses. It accounts with a technical unit, Nucleus, which provides research support services.





One of the main assets of the University is the pursuit of excellence in the field of Spanish Language, which was recognized in 2013 with the mention of International Campus of Excellence in Spanish Language and values of the Hispanic World. The University of Salamanca is also a reference institution in the assessment and certification of the Spanish Language.



Programme

17-19 September 2021

VIRTUAL IMMERSIVE AND INTERACTIVE PROJECT EXHIBITION during the contest.
Online Streaming at eucys2021.com and interactively through the virtual contest platform.

FRIDAY 17th

9:30h CEST **Opening Ceremony**

Paraninfo University of Salamanca.

18:00h CEST

Plenary Talk by Dr. William D. Philips, Nobel Prize in Physics 1997

"A new measure: the quantum reform of the International System of Units"

The metric system began with the French revolution, and now we are experiencing the greatest revolution in measurement since the French revolution. The definitions of the kilogram, ampere, kelvin, and mole are all changed, being based on chosen and fixed values for Planck's constant, the electron charge, Boltzmann's constant, and Avogadro's number. This talk will explain how this is possible and why it was necessary.

SATURDAY 18th

18:00h CEST **Round Table with Recognized Scientists**

Salamanca Congress Palace.

Topic: The challenges that young scientists will face in our world.

SUNDAY 19th

12:00h CEST **Awards Ceremony**

Salamanca Congress Palace.

On-site EUCYS 2020-2021 Exhibition in Salamanca

TArzobispo Fonseca College, University of Salamanca.

Dr. William Daniel Phillips

Nobel Prize in Physics, 1997

William D. Phillips received a B.S. in physics from Juniata College in 1970, and his Ph.D. from the Massachusetts Institute of Technology in 1976; after two years as a postdoctoral researcher at MIT, he joined NIST (then the National Bureau of Standards) to work on precision electrical measurements and fundamental constants. There, he initiated a new research program to cool atomic gases with laser light. His research group has been responsible for developing some of the main techniques now used for laser-cooling and cold-atom experiments in laboratories around the world. Atomic fountain clocks, based on the work of this group, are now the primary standards for world timekeeping. Among the group's current research directions are the use of ultra-cold atoms for quantum information processing and quantum simulation of important physical problems.

Dr. Phillips is a member of the American Academy of Arts and Sciences and of the National Academy of Sciences. In 1997, Dr. Phillips shared the Nobel Prize in Physics "for development of methods to cool and trap atoms with laser light."



Dear Young Scientists,

When I am asked what advice I have for young people, my answer is always "Stay curious". When we are young, our curiosity is insatiable. We want to experience and to explore everything around us. The necessities of maintaining order in classrooms, of keeping children safe from all sorts of dangers, and the myriad concerns of the adults who care for those children, slowly but surely squeeze out much of that curiosity from most children. Those who retain their childlike curiosity are the ones who become scientists and other adventurers of the mind. Life is an adventure and one of the greatest and sweetest parts of that adventure is learning. I am fond of saying that a good day is a day in which I learn something new. During this time of competition, and more importantly, for the rest of your lives, I wish for you many such good days.



Venue

University of Salamanca Assembly Hall



The assembly hall is located on the lower north gallery of the patio of the Escuelas Mayores on the east corner between the Fray Luis de León Hall and the Francisco de Vitoria Hall.

It contains various works of art such as crimson velvet standards, grisailles, portraits (such as that of Charles IV), and tapestries (eight in total dating from the 17th century).

The assembly hall is the venue for numerous academic ceremonies as important as those of the inauguration of the academic year and the Doctor honoris causa investiture ceremony. Owing to its surface area of 350 m² it has even been used for classes of canon law which were in great demand.

Arzobispo Fonseca College, University of Salamanca

Alonso de Fonseca, a student of the University of Salamanca and archbishop of Toledo, was not only a great patron of the arts but also the founder of the College, the construction of which was initiated in 1521 according to the project of the famous contemporary architect Juan de Álava. This was carried out in various stages with the participation of other architects: Diego de Siloe, the designer of the doorway; Rodrigo Gil de Hontañón who extended the chapel; and Alonso de Covarrubias. In 1557 work was begun on the so-called Hostelry which was used for various purposes over the centuries including as the Faculty of Medicine in the 20th; it currently houses several departments of the University of Salamanca. The expansion of the rectory (today known as the paintings' room) was carried out in the mid-18th century by Juan de Sagarbinaga who was also the architect of the former San Bartolomé or Anaya College, which currently houses the Faculty of Philology.





Salamanca Conference Centre

The Salamanca Conference Centre, which is one of the buildings of the old part of the city, is an international point of reference in the organising and staging of all kinds of events.

Juan Navarro Baldeweg is the prestigious architect who designed this beautiful building. It is noted for its Great Hall which has been designed to provide the best possible acoustics. The canopy of its cupola appears to float over the Hall, displacing the effort and concentrating the loads on the vertexes of the supporting arches. It rests on the latter to combine the constellation of gravity with that of lighting thanks to the filtering of the light overhead. This building in the historical centre is open to the city and its cultural, economic, business, and social life.

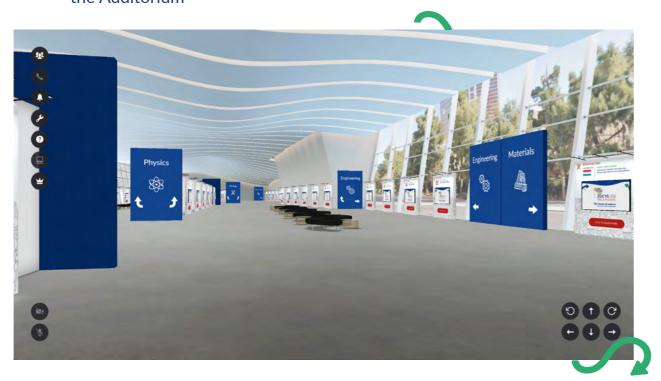
Virtual venue contest

Beyond competition, the spirit of EUCYS is allowing young scientists worldwide to meet others with similar abilities and interests. Although the Covid-19 pandemic do not allow to enjoy the face-to-face contact that characterizes this Contest, the Host Organiser has made its best in order to bring this aspect to an online format in the most engaging way. For this reason, EUCYS 2020/2021 features a Virtual Venue in which interaction among Contestants will not only be possible but intensively fostered.

Contestants will only need a web browser, an internet connection, and a microphone. A webcam is also highly recommendable.

There are three main spaces that configure this Virtual Venue:

- the Main Exhibition Hall
- · the rooftop Networking and Outreach area
- · the Auditorium



The main exhibition hall

The main exhibition hall will host a stand per project containing all the projects from 2020 and 2021 Contestants. Each stand features a short explanatory video of the Project, recorded by the Contestants themselves, as well as a link with more details, including infographic resources in the form of scientific posters. Wander with your robot around this hall, showing your Project to your peers and examining other colleague's work, debate about your achievements, and overall, let your scientific curiosity bloom.

Also, in this same exhibition halls, the interviews with the Jury members will take place by means of private talks, in a very similar way it would happen in an in-person EUCYS. Be on time at your stand and convince the Jury members that your project deserves a Prize.

The rooftop Networking and Outreach area

Not everything in EUCYS is competing and talk about own and others' scientific achievements. The rooftop of the venue is a space with wonderful views which has been designed to encourage more relaxed talks. Here, Contestants will be able to meet each other at a more personal level and maybe establish long lasting and meaningful friendships.

Also in the rooftop a very appealing set of scientific outreach contents created by high-level scientific communicators in Spain, just for you.

Finally, the University of Salamanca has reserved a space to let you know the research that is carried out throughout some of its departments and faculties. Maybe some the EUCYS 2020/2021 Contestant will become a researcher at USAL in the future? We'd would love to!

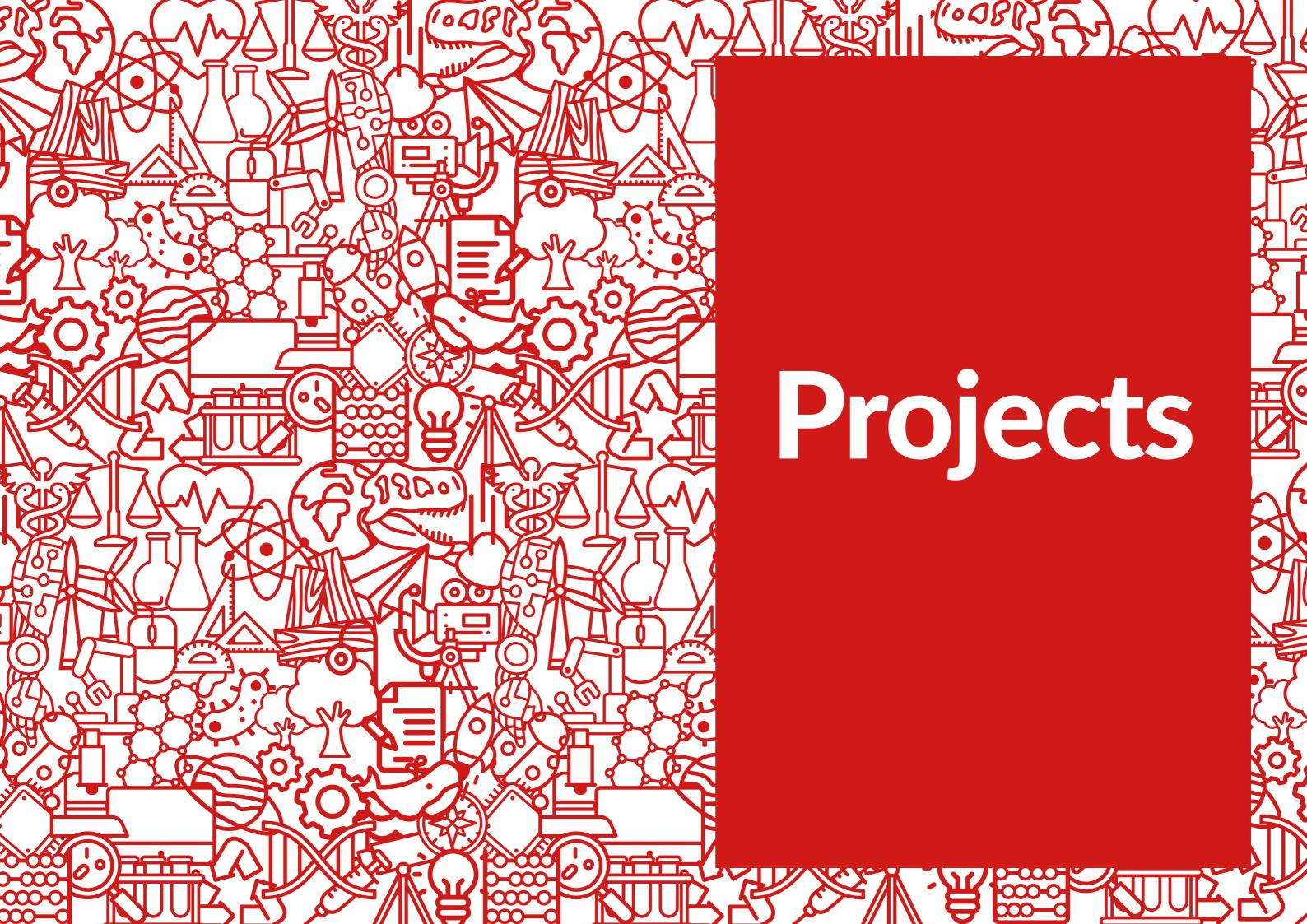






The Auditorium

The Contest Ceremonies will be carefully streamed for you. Come to them in the company of your peers.



☒ Biology

BIOLOGY-01 | 2020

LUXEMBOURG

Charlotte Marie Scheideler

Exploring the similarities and relationship between sugar addiction and opioid addiction

BIOLOGY-02 | 2020

ISRAEL

Noa Prisalac

The role of ARTS in stem cell apoptosis: identifying a novel compound for regenerative medicine and disease therapies

BIOLOGY-03 | 2020

SLOVENIA

Brina Avsec

The effect of smoking cannabis and smoking cannabis and tobacco combined on forced vital capacity and forced expiratory volume in one second of 18-year-old males

BIOLOGY-04 | 2020

FINLAND

Shähla Idikut

A comparison of direct reversal and nucleotide excision repair in UVB-Treated bacteria

BIOLOGY-05 | 2020

POLAND

Aleksander Leon Łysomirski

Fisetin, a natural flavonoid, diminishes the metabolic activity of senescent colorectal cancer cells and may affect the process of autophagy in HCT116

BIOLOGY-06 | 2020

TURKEY

Sila Karakusoglu

Lara Yucebas

The design of microfluidic pump for medical field

BIOLOGY-01 | 2021

SLOVAKIA

Laura Burdova

Application of a combination of extracellular pH acidification and rottlerin in cancer cells as one of the anticancer therapies

BIOLOGY-02 | 2021

BULGARIA

Teodor Kirilov Kirilov

Image analysis of single DNA molecules

BIOLOGY-03 | 2021

LUXEMBOURG

Estelle Elise Rollinger

Investigating the effect of alcohol on hepatocyte function

BIOLOGY-04 | 2021

SPAIN

Alba Serrano Garcia

Patricia Marco Gaya

Triops cancriformis. How to survive at climate change?

BIOLOGY-05 | 2021

GERMANY

Marik Müller

Enzymatic inactivation of the veterinary antibiotic Florfenicol

BIOLOGY-06 | 2021

ISRAEL

Tamar Meshorer

Brain circuits underlying category learning

BIOLOGY-07 | 2021

ESTONIA

Eliis Grigor

Characterization of the activities and biochemical parameters of maltase AG2 from the non-convential yeast Blastobotrys adeninivorans

BIOLOGY-08 | 2021

SWEDEN

Milla Linnéa Astrid Glännfjord Linus Patrik Widholm

Investigation of silver ions' antibacterial effect on E. Coli and B. Subtilis

BIOLOGY-09 | 2021

SWITZERLAND

Sophie Lynn Wiesmann

Temperature-dependent toxin production of the cyanobacterium Microcystis aeruginosa

Solution Chemistry

CHEMISTRY-01 | 2020

RUSSIA

Anna Levchenko

Synthesis of helper lipid as a component of cationic liposomes for gene therapy

CHEMISTRY-02 | 2020

ESTONIA

Paul Erik Olli

Metal-air battery

CHEMISTRY-01 | 2021

FRANCE

David Barbin

Louenn Colineaux

Is the study of chemical reactions possible on the scale of a drop?

CHEMISTRY-02 | 2021

ITALY

Andrea Letizia

Sara Peverali

GOLD RICE: Gold Nano-sensors for the protection of the Health and the Environment

CHEMISTRY-03 | 2021

LUXEMBOURG

Sophia Simao Avelino

The impacts of antibiotic-clavulanate on the human microbiota

CHEMISTRY-04 | 2021

SOUTH KOREA

Suhyun Lee

Haeun Choi

Creating a biodegradable mask from lignin extracted from chestnut

CHEMISTRY-05 | 2021

TUNISIA

Mohamed Hedi Daimi

Abdelhafidh Jlali

Treatment of Methylene blue by CZTS nanoparicles for industrialization

CHEMISTRY-06 | 2021

POLAND

Jakub Lewandowski

Igor Piotr Jaszczyszyn

Synthesis and characteristic of a composite based on metal oxides and silica for use in photocatalysis and capturing pollutants

CHEMISTRY-07 | 2021

NORWAY

Mattieu Raphael Raphael Bou

Optimising fly ash based geopolymer concrete

CHEMISTRY-08 | 2021

TURKEY

Mehmet Sertaç Çeküç

Artificial antibodies: development

of Mcro-Fluidic sensors for The detection

of environmental contaminants and apply to mathematical models

CHEMISTRY-09 | 2021

ROMANIA

Luiza Natalia Ionescu

Strong electric field electroosmosis - physical principles and measurements in the strongly nonlinear regime

Computing

COMPUTING-01 | 2020

HUNGARY

Boglárka Ecsedi

Rip current detection – An orientation-aware machine learning approach

COMPUTING-02 | 2020

BELARUS

Tikhon Belousov

A programming language creation

COMPUTING-03 | 2020

DENMARK

William Bille Meyling

Universal autonomous graph-based image segmentation with near-linear average complexity

COMPUTING-04 | 2020

TURKEY

Olcay Oransoy

Proposal for an algorithm for finding the crossing number of a graph

COMPUTING-05 | 2020

UKRAINE

Iryna Bobkova

ANDROID-Application with the function of automatic removing of moving objects

COMPUTING-01 | 2021

IRELAND

Gregory Guy Tarr

Towards detecting state-of-the-art deepfakes

COMPUTING-02 | 2021

SLOVAKIA

Miroslav Cibula

Omnis: modular question answering web search engine

COMPUTING-03 | 2021

BULGARIA

Viktor Stilianov Kolev

Neural Abstract Reasoner

COMPUTING-04 | 2021 EGYPT

Mostafa Ahmed Gasser Galal

Utilizing computer vision and machine learning algorithms to control smart systems helping physically disabled people

COMPUTING-05 | 2021

SPAIN

Carla Caro Villanova

Formulation and implementation of a support vector machine on D-Wave's quantum annealer

COMPUTING-06 | 2021

GERMANY

Lukas Weghs

Photometric search for exomoons by using deep learning and convolutional neural networks

COMPUTING-07 | 2021

TUNISIA

Khalil Terras

DiGI BANK (Digital Customer Relationship)

COMPUTING-08 | 2021

CZECHIA

Michal Bravanský

Be Informed: a news agregator

COMPUTING-09 | 2021

ISRAEL

Inbar Kedem

Detection and quantification of Macrobrachium rosenbergii larvae in culture tanks, using image processing with artificial intelligence

COMPUTING-10 | 2021

FINLAND

Roope Palomäki

Markus Niemi

Oskari Niemi

Strategies of the board game African Star

COMPUTING-11 | 2021

ESTONIA

Jaak Pärtel

The capability of artificial intelligence to identify Estonian plants

COMPUTING-12 | 2021

POLAND

Jakub Krzysztof Bachurski

Approximate pattern matching with bounded absolute error

COMPUTING-13 | 2021

TURKEY

Emírhan Kurtuluş

Deep learning based sterotactical cranial surgery planning

COMPUTING-14 | 2021

LATVIA

Maksim Tihomirov

Miroslavs Vlads Pochapskis

Analysis of application of simulation modelling technologies in traffic iams control

Engineering

ENGINEERING-01 | 2020

HUNGARY

Mátyás Rózsavölgyi

Remote controlled mars rover and its applications in the teaching of the mechanical, computer, and physics sciences

ENGINEERING-02 | 2020

BULGARIA

Yordan Tsvetkov Tsvetkov

Training quadrupeds to walk via evolution strategies and sinusoidal activation functions

ENGINEERING-03 | 2020

RUSSIA

Andrey Igorevich Lebedev

Complex with an unmanned aerial vehicle «Kestrel» to search and rescue people

ENGINEERING-04 | 2020

DENMARK

Nicolai Emil Damm

Adian Khair Øllegaard

Markus Valdemar Grønkjær Jensen

The Self-sorting Recycling Bin

ENGINEERING-05 | 2020

SWITZERLAND

Cédric Emmanuel Willemin *Meteor and aircraft detection*

ENGINEERING-06 | 2020

ROMANIA

Andreea Magdalena Sovei Robin-Cristian Bucur-Portase

Study of microbiological structures with the purpose of creating MEMS actuators with various applications in medicine

ENGINEERING-01 | 2021

HUNGARY

Radó János

PenAlone, development of a writing and drawing tool compatible with arbitrary surface

ENGINEERING-02 | 2021

GEORGIA

Natalia Kajaia

Mariam Tsiviladze

Universal device for people with disabilities

ENGINEERING-03 | 2021

FRANCE

Clément Desjonqueres Nahomé Vesvard

Marin Luet

Intra Body Communication

ENGINEERING-04 | 2021

BULGARIA

Hristo Todorov Todorov

Limited query black bBox adversarial attacks in the real world

ENGINEERING-05 | 2021

EGYPT

Sarah Mohamed Sohaila Mohamed

Crack defection detector

ENGINEERING-06 | 2021

AUSTRIA

Diana Scharbl Fabio Wiesinger

EyeSpeaker

ENGINEERING-07 | 2021

CZECHIA

Adam Schuppler

Oliver: open source MSLA 3D printer

ENGINEERING-08 | 2021

PORTUGAL

Rita Fernandes de Matos

Hugo Daniel Oliveira Vieira Remelgado

Hugo Ferreira Costa

Development of an integrated ionizing radiation detection and alert system

ENGINEERING-09 | 2021

DENMARK

Filip Kikkenborg Kikkenborg Thorbjørn Valdemar Ræder Clausen

Asger Ren Nordbjerg

Error detection by sound recognition in automated pipetting

ENGINEERING-10 | 2021

SWITZERLAND

Julian Benjamin Weber

Drone-based detection of persons buried in an avalanche, system for locally autonomous search from the air

ENGINEERING-11 | 2021

ROMANIA

Grigoras Rares Antonie Codina Sergiu

Hulubeac Alexandru Mihai

InoShoes

Environment

ENVIRONMENT-01 | 2020

EGYPT

Abdelrahman Waleed

Mostafa Ahmed

Detect The Defect (D.D)

ENVIRONMENT-02 | 2020

BELARUS

Lizaveta Zhyk

Induction of phytoimmunity by peptide elicitors PEP13 and AVR9

ENVIRONMENT-03 | 2020

LUXEMBOURG

Mara Rachel Manieri

Water quality in Luxembourg

and its consequences on aquatic microorganisms

ENVIRONMENT-04 | 2020

POLAND

Jarosław Jakub Brodecki

An assessment of the pollution of urban rivers by microplastics and their penetration of food webs based on the example of the river system in the Łódź agglomeration (central Poland)

ENVIRONMENT-01 | 2021

CANADA

Calvin Karthik

A mighty mushroom and the power of poop: testing biogas production using spent mushroom substrate phase 2

ENVIRONMENT-02 | 2021

ITALY

Leonardo Cerioni Linda Paolinelli Matteo Santoni

Laying waste to energy problems

ENVIRONMENT-03 | 2021

LUXEMBOURG

Paula Elisabeth Van de Paverd Bartolomé An investigation into the effect of ibuprofen on chlorella pyrenoidosa growth

ENVIRONMENT-04 | 2021

SOUTH KOREA

Hyejin Jun

A study on removal of heavy metal and green algae in river using chestnut by-products

ENVIRONMENT-05 | 2021

LITHUANIA

Dominykas Laibakojis

Sustainable solution for crop damage caused by drought

ENVIRONMENT-06 | 2021

AUSTRIA

Johannes Stöllberger Alexander Brunnauer

Organic straw insulation

ENVIRONMENT-07 | 2021

ISRAEL

Noa Rachel Gonen

The effects of flame retardants on microorganisms in the marine environment

ENVIRONMENT-08 | 2021

PORTUGAL

Sara Ribeiro Couto Klára Sofia Varga João Carlos Pereira Carvalho

ATMOS

Materials

MATERIALS-01 | 2021

TUNISIA

Mariem Jmal

Nebrass Abdallah

Baraa Chraki

Paper sunflower seeds' shells (P3S)



Mathematics

MATHEMATICS-01 | 2020

BELARUS

Dmitriy Gorovoy

On graphs with unique geodesics or antipodes

MATHEMATICS-02 | 2020

FINLAND

Valtteri Aurela

Sampling from a discrete probability distribution using a discrete uniform probability distribution

MATHEMATICS-03 | 2020

POLAND

Adam Stanisław Barański

On divisibility of the solutions of Pell's equation

MATHEMATICS-01 | 2021

CZECHIA

Zdeněk Pezlar

Interesting uses of algebraic number theory

MATHEMATICS-02 | 2021

POLAND

48

Radosław Marek Żak

Isogonal conjugate and a few properties of point X(25)

MATHEMATICS-03 | 2021

TURKEY

Zeynep Parla Parmaksiz

Mathematical decision algorithims in the diagnosis, treatment and vaccine priority of COVID-19

MATHEMATICS-04 | 2021

UKRAINE

Illia Nalyvaiko

Properties of possible counter examples to the Seymour's Second Neighborhood Conjecture

MATHEMATICS-05 | 2021

SWITZERLAND

André Louis Gaël Mudry

Group testing protocols in higher dimensions to combat the COVID-19 pandemic

Medicine

MEDICINE-01 | 2020

LITHUANIA

Monika Šiugždinytė

Dogs excrements - a source of potentially dangerous escherichia coli in the environment

MEDICINE-02 | 2020

LUXEMBOURG

David Emanuel Lawyer

Etienne André Lerov

Sarah Mackel

Modelling treatment for ALS

MEDICINE-03 | 2020

SLOVENIA

Aleks Brumec

The effect of oxidative stress genes on the response to Anti-TNF therapy in patients with crohns' disease

MEDICINE-04 | 2020

ESTONIA

Anna Pauliina Rumm

Immune response against cytomegalovirus and its association with inflammatory diseases in old individuals

MEDICINE-01 | 2021

HUNGARY

Erik Seitz

Development of a new, multicellular network model of the epithelial-mesenchymal transition (EMT) and finding a new potential drug target by building hybrid EMT in the model

MEDICINE-02 | 2021

CANADA

Hardit Singh

Speculor: a comprehensive teleophthalmology platform for people centered eyecare

MEDICINE-03 | 2021

SLOVAKIA

Matus Mlynar

The dynamic effect of oxytocin treatment on autistic-like behaviors in a genetic model of autism

MEDICINE-04 | 2021

EGYPT

Mona Alaa

Rawan Khaled

Wearable exoskeleton for upper limb rehabilitation

MEDICINE-05 | 2021

LATVIA

Krists Kristaps Ročāns

Threat of Mosquito-borne Disease Spread in Liepaja linked to climate change and other factors

MEDICINE-06 | 2021

ROMANIA

Despina Luliana Gica

Demyelination: a research into the use of electrical models in studying demyelinating diseases

Physics

PHYSICS-01 | 2020

RUSSIA

Yulia Nikolaevna Karavashkina

Development and manufacture of an operating model that defines the basic parameters of gasoline in one drop

PHYSICS-02 | 2020

ISRAEL

Uri Sadan-Yarchi

Using cylindrical capsule and magnetic fields to achieve ignition conditions in the ICF method

PHYSICS-03 | 2020

CHINA

Mingvu Tian

Using C2H N=1-0 spectral line to analyse the line-of-signt structure of ophiuchui molecular cloud

PHYSICS-04 | 2020

SLOVENIA

Gal Završnik

Biomechanics of the human jaw and teeth

PHYSICS-05 | 2020

TURKEY

Feridun Balaban

Investigation of spectral response and efficiency of boron and nitrogen doped diamond-like carbon as a top junction on multijunction solar cells

PHYSICS-06 | 2020

SWITZERLAND

Ophélie Léna Rivière

Sinking bubbles - on the behavior of air bubbles in a vertically oscillating column of liquid

PHYSICS-07 | 2020

UKRAINE

Yana Holovatska

Spring based on ring magnet

PHYSICS-01 | 2021

HUNGARY

Gábor Gergő Balázs

In the footsteps of an invisible companion around an exotic eclipsing binary star system

PHYSICS-02 | 2021

GEORGIA

Anastasia Chalagashvili

Mariam Mikadze

Fabric modification with an electrically conductive compound containing carbon nanoparticles to obtain a virus-protective system

PHYSICS-03 | 2021

ITALY

Giovanni Benetti

Distorted Interstellar Bubbles: a new mathematical and computational model

PHYSICS-04 | 2021

AUSTRIA

Michael Pichler Marie Strasser

Determination and impact of radioactive contamination on freshwater and saltwater fauna

PHYSICS-05 | 2021

GERMANY

Leonard Ulrich Münchenbach Leo Neff

Physical description and modelling of paper strip flights

PHYSICS-06 | 2021

FINLAND

Meri Henell

Analysis of violin vibrato based on measurement and modelling

EUCYS 2021 SALAMANCA

PHYSICS-07 | 2021

UKRAINE

Dmytro Zakharov

Simulation of light propagation in an optically inhomogeneous medium

PHYSICS-08 | 2021

SWEDEN

William Daniel McGillivray Linus Karlsson

Viktor Karl Niklas Brink

The Aerodynamics of Paper Airplanes

Social Sciences

SOCIAL-SCIENCES-01 | 2020

IRELAND

Cormac Thomas Harris Alan Thomas O'Sullivan

A statistical investigation into the prevalence of gender stereotyping in 5-7 year olds and the development of an initiative to combat gender bias.

SOCIAL-SCIENCES-02 | 2020

SPAIN

Eduardo Gabriel Guerrero Riesco Transhumanism: will we still be human?

SOCIAL-SCIENCES-03 | 2020

CHINA

Yiwei Liang Tanqing Li

Research on early risk prediction and implementation paths of children with autism based on affective computing

SOCIAL-SCIENCES-04 | 2020

SWITZERLAND

Anusha Chiara Lorraine Spescha

Madmen on a journey: a comparison of Homer's Odyssey and the science fiction series Doctor Who

SOCIAL-SCIENCES-01 | 2021

ESTONIA

Severin Bratus

Gender stereotypes in Estonian word embeddings

SOCIAL-SCIENCES-02 | 2021

NORWAY

Ling Olivia Li

Beauty ideals in China: reconfiguration of the body through the prospect of westernization and modernization



EUCYS 2021 SALAMANCA

PROJECTS BY COUNTRY



Diana Scharbl 20 years diana@mehrgeld.at



Fabio
Wiesinger
19 years
fabio.wiesinger@chello.at





EyeSpeaker

AUSTRIA | ENGINEERING-06 | 2021

Strokes or physical disabilities often end up in a Locked-in syndrome. Mostly only the blinking of the eyelids is still functional. In order to enable communication with the environment, a table system that can be controlled by blinking has been developed. The EyeSpeaker records the blink movements of a patient with the help of a camera. A program based on a neural network analyses the video and then evaluates when the person closes his/her eyes arbitrarily. Furthermore, an active table system was created using GUI programming. If a closed eye is detected, the table scrolling is interrupted and a character is selected. Frequently written words are stored in a database. Furthermore, there is the possibility for the person to control electronic devices.

eucys2021.com/engineering-06-2021



Johannes Stöllberger 19 years jo.stoellb@gmail.com



Alexander Brunnauer 19 years





Organic Straw Insulation

AUSTRIA | ENVIROMENT-06 | 2021

The disposal of conventional insulation boards is proven to be very complex and expensive, and of course also harmful to the environment, people, and animals. Now with our ingredients, these problems are solved. The binder we use is 100% biological, unfortunately we cannot name the binder because of patent application reasons. Our cooperation company the KRAIBURG Austria GmbH & Co. KG supplied us with construction tools so we could perform out tests and produce our plates. The main insulation characteristics as thermal conductivity, fire behaviour, health aspects, etc. were measured and compared to other products. In all these respects we achieved market-relevant results. The unique selling point however is the unproblematic disposal because of our fully biological ingredients.

eucys2021.com/environment-06-2021



Michael Pichler 19 years



Marie Strasser 19 years

marie.strasser11@gmail.com





Determination and impact of radioactive contamination on freshwater and saltwater fauna

AUSTRIA | PHYSICS-04 | 2021

The nuclear accident of March 11, 2011 in Fukushima was a crucial experience for mankind. The whole world was in shock and the effects were still unclear at that time. Later it turned out that numerous waters of the earth and thereby its inhabitants were significantly contaminated. On the occasion of the ten-year commemoration of Fukushima, it was the concern of two students of the HLUW Yspertal (a higher vocational school specialised in science and economy) to examine the aquatic fauna of different regions of the world for radioactive contamination. The results of this diploma thesis show that the radioactive contamination of the freshwater and saltwater fauna is not harmful but still measurable. The radioactive contamination of every measured sample is far below the limit values.

eucys2021.com/physics-04-2021



Tikhon Belousov 17 years





A programming language creation

BELARUS | COMPUTING-02 | 2020

Compiler design is a fairly complex area of computer science that is studied by the university curriculum and is saturated with mathematical theory. However, I believe that absolutely everyone with a passion for programming can make their own language and have a unique experience. My research answers the question: what are the ways to create your own programming language if you are an ordinary interested amateur. The paper presents two examples, an interpreter and a compiler. Although the languages I have made so far are relatively simple, the principles and methods I used to create them can be used to implement something really serious. I have also provided links to useful sources and tried to explain the project in plain language.

eucys2021.com/computing-02-2020



Lizaveta
Zhyk

17 years

elizaveta.zhuk.2016@mail.ru





Induction of phytoimmunity by peptide elicitors PEP13 and AVR9

BELARUS | ENVIRONMENT-02 | 2020

Excessive use of pesticides can lead to a variety of impacts, including environmental degradation and harm to human health. It is necessary to find effective, natural active substances in order to reduce the amount of partially harmful substances in crops and products. The use of elicitors in agriculture can reduce the need for pesticide use. In my research I studied the effect of peptide elicitors PEP13 and AVR9 on the resistance of pea seedlings to oxidative stress. I also studied the effect of elicitors on the formation of lipid oxidation products and the efficiency of processing pea seedlings with elicitors. The results showed that the PEP13 peptide is a promising candidate for the development of immunomodulators.

eucys2021.com/environment-02-2020



Dmitriy Gorovoy 18 years dimgor2003@gmail.com





On graphs with unique geodesics or antipodes

BELARUS | MATHEMATICS-01 | 2020

In 1962, Oystein Ore asked in which graphs there is exactly one geodesic between any two vertices. He called such graphs geodetic. In this paper, we systematically study the properties of geodetic, as well as antipodal graphs, in each vertex of which has exactly one antipode (the vertex farthest from it). We find necessary and sufficient conditions and obtain results related to algorithmic construction, investigate hamiltonian geodetic graphs, introduce and describe maximal hereditary subclass and minimal hereditary superclass of classes of geodetic and antipodal graphs. The main goal of the research is a constructive classification of these graphs.

eucys2021.com/mathematics-01-2020



Yordan Tsvetkov Tsvetkov 20 years





Training quadrupeds to walk via evolution strategies and sinusoidal activation functions

BULGARIA | ENGINEERING-02 | 2020

This project in the field of robotics demonstrates the application of a neural network that uses the sinusoidal activation function for the task of perturbed walking. The usage of such networks is analysed. Furthermore, the most common local minima and the methods of resolving them are presented. The small number of neurons allows the network to be deployed on a single microcontroller, narrowing the sim-to-real gap. The physical robot uses various design optimisations to perform highly dynamic gaits. The quadruped is capable of reaching speeds higher than 1 body length per second without an auxiliary power supply.

eucys2021.com/engineering-02-2020



Teodor Kirilov Kirilov 17 years





Image analysis of single DNA molecules

BULGARIA | BIOLOGY-02 | 2021

The most accurate method for studying DNA replication is the labeling of newly synthesized DNA molecules with halogenated nucleosides followed by immunofluorescence and microscopy detection, known as DNA fiber labeling. The major difficulty of the method is the labor-intensive analysis, which requires measuring the lengths of a large number of labelled fragments. There are very few attempts to automate this analysis and software freely available to researchers is not available. In an attempt to solve the problem, the aim of my latest project was to develop an efficient software tool for the automated image analysis of single DNA molecules. The software is currently successfully used in the Institute of Molecular Biology of the Bulgarian Academy of Sciences.

eucys2021.com/biology-02-2021



Viktor Stilianov Kolev 18 years vkolev@stanford.edu





Neural Abstract Reasoner

BULGARIA | COMPUTING-03 | 2021

Abstract reasoning and logic inference are difficult problems for neural networks, yet essential to their applicability in highly structured domains. In this work we demonstrate that a well known technique such as spectral regularization can significantly boost the capabilities of a neural learner. We introduce the Neural Abstract Reasoner (NAR), a memory augmented architecture capable of learning and using abstract rules. We show that, when trained with spectral regularization, NAR achieves 61.13% accuracy on the Abstraction and Reasoning Corpus. We provide intuition for the effects of spectral regularization in the domain of abstract reasoning based on theoretical generalization bounds and Solomonof's theory of inductive inference.

eucys2021.com/computing-03-2021



Hristo Todorov Todorov





Limited query black box adversarial attacks in the real world

BULGARIA | ENGINEERING-04 | 2021

We study the creation of physical adversarial examples, which are robust to real-world transformations, using a limited number of queries to the target black-box neural networks. We observe that robust models tend to be especially susceptible to foreground manipulations, which motivates our novel Foreground attack. We demonstrate that gradient priors are a useful signal for black-box attacks and therefore introduce an improved version of the popular SimBA. We also propose an algorithm for transferable attacks that selects the most similar surrogates to the target model. Our black-box attacks outperform state-of-the-art approaches they are based on and support our belief that the concept of model similarity could be leveraged to build strong attacks in a limited-information setting.

eucys2021.com/engineering-04-2021



Calvin Karthik 14 years





A mighty mushroom and the power of poop: testing biogas production using spent mushroom substrate phase 2

CANADA | ENVIRONMENT-01 | 2021

Methane produced from animal waste impacts global warming 21 times more than CO2. Globally, around 570 million tons of methane is released and wasted annually. This energy source can be harnessed to produce renewable, sustainable energy. This experiment aimed to optimize anaerobic digestion by (i) comparing biogas production from ruminant vs. monogastric manure and (ii) observing whether adding spent mushroom substrate (SMS) would increase biogas volume. Various combinations of manures and SMS were tested. Results showed that ruminant manure outperformed monogastric when treated with SMS and the addition of SMS always increased biogas yield. Using SMS to efficiently convert manure into useful biofuel could improve its adoption as an energy source and help mitigate climate change.

eucys2021.com/environment-01-2021



Hardit Singh 15 years hsharditsingh@gmail.com





Speculor: a comprehensive teleophthalmology platform for people centered eyecare

CANADA | MEDICINE-02 | 2021

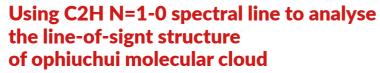
There are over 240 million cases of preventable blindness globally. Many eye diseases are "silent-killers" of vision and current testing methods are often inaccessible for marginalized patients. Thus, diseases go undetected until it is too late. To combat this issue, I developed Speculor combining low-cost portable retinal imagers and smartphones with artificial intelligence algorithms. Imagers have been tested in a clinic and detect all clinically relevant features required for accurate diagnosis of the disease glaucoma. Novel image processing algorithms improve the acquired image quality. A new transfer learning method was invented to train convolutional neural networks on small datasets that has demonstrated the best reported results in literature for the classification of glaucoma.

eucys2021.com/medicine-02-2021



Mingyu Tian





CHINA | PHYSICS-03 | 2020

We present the fitting results of C2H spectra from selected regions of L1688 and L1689 from the Ophiuchus molecular cloud, finding complex structures in the southern part of L1689 and velocity ingredient in the northern part of L1689. Gildas/class was used to fit the spectra lines. The result shows that the northern part of L1689 is a single molecular cloud with velocity gradient at 0.13 km/(s arcminute); The southern part is separated into two parts with a typical velocity difference, which implies the complex structure may exist in most molecular cloud. We suggest that the northern part of L1689 is rotating, and there is a substructure in the southern part of L1689.

eucys2021.com/physics-03-2020



Yiwei Liang 18 years



Tanqing Li 18 years 15956944179@qq.com





Research on early risk prediction and implementation paths of children with autism based on affective computing

CHINA | SOCIAL-SCIENCES-03 | 2020

Having participated in Adolescent Robotics Competition in which a dactylophasia robot was designed for the surdomute, which inspired us to do the study with a hope that potential risks of early childhood autism can be predicted and identified so that the autistic children will be identified, treated earlier and they will recover earlier. Beginning with the current risks the autistic children suffer, the study builds an indicator system of the early risks for the children, decides a framework of our study,APP+ cloud computing tools and C and JAVA languages to have established a big data analysis model of affective computing analysis model. And finally, the study developed a safe inexpensive easy software of early risk prediction system of autism.

eucys2021.com/social-sciences-03-2020



Michal Bravanský 18 years

nichal.bravansky1@gmail.com





CZECHIA | COMPUTING-08 | 2021

The amount of information available to the general public is enormous, and it is challenging to extract meaningful and reliable content from it. Nowadays, the large availability of news sources and their varying trustability are the biggest problems for selecting a proper source of information. This work describes an automated system that can extract such essential and trustworthy news and create automated news coverage on social media networks. It scans numerous Czech news providers, and if it finds any new emerging news story, the application publishes it on various social media accounts. This ensures that the whole provided news coverage is unbiased, fast, and doesn't require any human supervision.

eucys2021.com/computing-08-2021



Adam Schuppler





CZECHIA | ENGINEERING-07 | 2021

Oliver is an open-source MSLA 3D printer that uses light and special resin to craft complex three-dimensional objects. With a price point below 1000 USD and a wide variety of printing materials, Oliver can be used in a range of fields, from prototyping to jewelry and dental industries. The printer is accompanied by an extensive user manual describing both the construction and operation of the printer. The precision of the printer was measured and its function was verified by dozens of test prints.

eucys2021.com/engineering-07-2021

PROJECTS BY COUNTRY EUCYS 2021 SALAMANCA





Interesting uses of algebraic number theory

CZECHIA | MATHEMATICS-01 | 2021

In the text we provide a gentle introduction to algebraic number theory and show its applications in solving certain difficult diophantine equations. We begin with a quick summary of the theory of quadratic residues, before diving into a select few areas of algebraic number theory. Our article is accompanied by a worked problem and a list of other problems solved in our original thesis along with the respective main takeaways. All proofs are omitted for simplicity.

eucys2021.com/mathematics-01-2021



William Bille Meyling





Universal autonomous graph-based image segmentation with near-linear average complexity

DENMARK | COMPUTING-03 | 2020

This project is a generic approach to image segmentation based on the perception of images as graphs. Image segmentation is all about discovering the essential parts of an image - areas of similar characteristics. Images consist of pixels and in this project their relations form a system of differential equations, which provides information to merge pixels into larger groups of pixels. Several iterations are performed to achieve a final segmentation of the image. This technique of merging groups of pixels makes it possible to achieve a fast algorithm with near-linear average complexity. Moreover, the technique is very general, and therefore gives the ability to universally segment images with any number of segments, and do it autonomously meaning without user input.

eucys2021.com/computing-03-2020



Nicolai Emil **Damm**



Adian Khair Øllegaard



Grønkjær Jensen 19 years

Markus

Valdemar





The Self-sorting recycling bin

DENMARK | ENGINEERING-04 | 2020

The project covers the topic of automatic sorting, and in order to showcase this in an useful real-world application we have chosen to direct our attention towards building a self-sorting recycling bin that can help solve the problem of waste-pollution. Here the idea is to use a Machine Learning algorithm analyzing sound in order to distinguish and thereby sort waste consisting of different materials. For now the project focuses on the three recyclables plastic, metal and glass since these materials contribute to a large part of the world's waste. The sorting mechanism uses audio identification to distinguish the sounds emitted by the different materials when they are thrown into the recycling bin, and hereby the self-sorting recycling bin can identify and sort waste automatically.

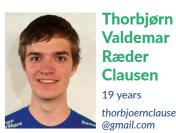
eucys2021.com/engineering-04-2020



Filip Kikkenborg **Kikkenborg**



Asger Ren **Nordbjerg**



Valdemar Ræder Clausen 19 years thorbjoernclausen





Error detection by sound recognition in automated pipetting

DENMARK | ENGINEERING-09 | 2021

Our project details the development of a sound recognition algorithm used for detecting errors in automated pipetting to insure continues quality control. The system was developed in cooperation with TechVolver Aps, where we tested the algorithm throughout the development process. By making sound signatures of a pipetting process, meaning a range of amplitude and frequency in which the pipetting normally occurs, we can determine whether a new pipetting is with or without error. We analyzed the construction of the pipette holder to insure that only the sound from the pipette would be recorded by the microphone attached to it. TechVolver estimates that the method has the potential to reduce errors by up to 80%, and reduce pipette inspection by up to 70%.

eucys2021.com/engineering-09-2021



Abdelrahman Waleed 17 years abdelrahman.2118023



Mostafa Ahmed 18 years mohamedashraf02003 @gmail.com





Detect The Defect (D.D)

EGYPT | ENVIRONMENT-01 | 2020

"When the Well is Dry, we will know the Worth of Water". Most of the world's countries including Egypt suffers from water and petrol shortage, especially in the previous decays. With the current consumption rate, two-thirds of the world's population may face water shortages by 2025. Also, every day more than 3.3 billion liters of treated water are lost through leaking pipes in England and Wales. Out of our responsibility towards the world in which we live, we had to come up will a solution that lowers the loss of water and petrol. we designed a system that can detect fluid leakage and deal with it fast to prevent the wasting of fluid by building wireless devices that connect together and with the cloud system to mentor and control the fluid.

eucys2021.com/environment-01-2020



Mostafa Ahmed 19 years mostafamary10 @gmail.com



Gasser Galal 18 years gassergalal@icloud.com





Utilizing computer vision and machine learning algorithms to control smart systems helping physically disabled people

EGYPT | COMPUTING-04 | 2021

Between 110 million and 190 million people suffer from physical disability according to WHO. Eye tracking systems for helping handicapped have limited self-reliance features, long delay in controlling, and high cost. This project tackles the problem of Lacking Community engagement of the physically disabled by enabling them to use computers without (Mouse-keyboard) by wearing mask only by developing a novel Algorithm. A mask was designed by researchers has 3 colors placed on its surface that allow user to control computer's cursor by moving attached colors using his tongue through our developed software via camera. The project was tested in two phases: algorithmic and real-world viability. Algorithmically, the performance was measured by testing 1500 (open sources) videos full of colors.

eucys2021.com/computing-04-2021



Sarah Mohamed 18 years Sarah.1218137 @stemalex.moe.edu.e



Sohaila Mohamed 19 years sohaila.1218146 @stemalex.moe.edu.es



Crack defection detector

EGYPT | ENGINEERING-05 | 2021

The project is an AI model to detect the tiles' cracks by analyzing the images based on CNN and VGG19. Using a 40000-image, the data set was divided into three sections: 60% for training, 20% for validation, and 20% for test. The images were selected randomly for the test to ensure the model's accuracy. The model could correctly inform the user about the cracked state of the image as an alert message. The results showed that this solution had great success because the accuracy, precision, and recall reached 96.8%, 98.24%, and 94.98%, respectively, meeting the chosen design requirements achieving the project's target.

eucys2021.com/engineering-05-2021



Mona Alaa 17 years monaa.alaa.1414 @gmail.com



Rawan Khaled 17 years rawannkhaledd0





Wearable exoskeleton for upper limb rehabilitation

EGYPT | MEDICINE-04 | 2021

Upper limb impairment and deterioration of motor function require rehabilitation by professional therapy to restore the limb function partially or entirely. Due to limitations in the number of therapists among other factors, much research has been conducted into robot-assisted rehabilitation of upper limb impairment. A new low cost, portable exoskeleton for hand impairment is presented in this project. This exoskeleton is a soft-actuated model that provides assessment with daily tasks such as grasping and reaching. It is constructed from 3D printed, easily-available, and low-cost components. An app is used to allow the exoskeleton to read and perform pre-determined movements. Simulation of the exoskeleton kinematics validated the design and control of the prototype.

eucys2021.com/medicine-04-2021



Paul Erik Olli 20 years paulerik.olli@gmail.com





Metal-air battery

ESTONIA | CHEMISTRY-02 | 2020

Metal-air batteries, such as Al-air, Zn-air, Mg-air are a novel green energy storage devices, which overcome the limitations of hydrogen technology and Li-ion batteries in replacing fossil fuels. Using mainly chronopotentiometry and impedance spectroscopy techniques in a three-electrode system, the emphasis was on testing 171 cathode prototypes to develop a state-of-art cathode. The developed cathodes were used in a full-sized battery cell which was assembled in a tic-tac case combined with different anodes and electrolytes. Measured voltages and currents were converted to powers and efficiencies. Cathodes developed demonstrated superior results compared to literature. Our batteries reached high power output of over 100 mW cm-2 and coulombic efficiencies within 64% and 100%.

eucys2021.com/chemistry-02-2020



Anna Paulina Rumm 19 years pauliina.rumm@gmail.com



Immune response against cytomegalovirus and its association with inflammatory diseases in old individuals

ESTONIA | MEDICINE-04 | 2020

Persistent cytomegalovirus (CMV) infection is one of the drivers of immunological ageing, which impairs the immune function of elderly people. In this study we show that higher anti-CMV antibody levels are associated with several chronic diseases in old individuals. We found that people diagnosed with either type 2 diabetes, chronic kidney disease or disorders of the thyroid gland had significantly higher CMV-specific antibody titres compared to healthy people. Females had higher anti-CMV antibody titres than males and higher antibody levels correlated positively with age. Our results show that age-related disorders are associated with CMV infection and confirm the age- and sex-associated differences of CMV-specific antibody levels demonstrated by previous studies.

eucys2021.com/medicine-04-2020



Eliis Grigor 19 years

Eliis.Grigor25@gmail.com





Characterization of the activities and biochemical parameters of maltase AG2 from the non-convential yeast Blastobotrys adeninivorans

ESTONIA | BIOLOGY-07 | 2021

Non-conventional yeasts and their enzymes are scarcely studied but they could have unique characteristics with biotechnological applications which are uncommon for enzymes of bakers' yeast. A-Glycosidases are enzymes which hydrolyze sugars, but some of them synthesize short saccharides. The aim of the study was to characterize the activities and biochemical parameters of A-glucosidase AG2 (BaAG2) from evolutionally old yeast Blastobotrys adeninivorans. Protein sequence of BaAG2 was analyzed and several experiments were carried out to determine its biotechnological potential. The results showed that BaAG2 is a highly active enzyme with a common buffer component as an inhibitor. Assay of products showed that BaAG2 synthesizes rare trisaccharide that could potentially promote humans' health.

eucys2021.com/biology-07-2021



Jaak
Pärtel
19 years
jaakpartel@gmail.





The capability of artificial intelligence to identify Estonian plants

ESTONIA | COMPUTING-11 | 2021

The aim of this study was to evaluate the accuracy of artificial intelligence based plant image identification applications among the Estonian Flora. Automated identification is relatively new and has not been examined using an extensive dataset. Two applications, Pl@ntNet and Flora Incognita, were used to identify 1501 images from a national database (551 taxa) and 1000 observations from field conditions (281 taxa). The results displayed that the applications were more accurate in the field (success ca 80% both), with the correct species suggested among top five close to 90% of the occasions. Accuracy varied in the database part. Images with flowers were identified better than others, both applications were quicker than manual identification. Flora Incognita was translated into Estonian.

eucys2021.com/computing-11-2021



Bratus
19 years
s.poletica@gmail.com





ESTONIA | SOCIAL-SCIENCES-01 | 2021

Word embeddings are an influential machine learning framework in natural language processing that represents each word in a large text body with a vector. Geometric relationships between the vector representations capture meaningful semantic relationships between the corresponding words. The research paper "Gender stereotypes in Estonian word embeddings" emulated experiments of earlier English literature on the subject, but in the context of Estonian language, positively showing, in particular, that word2vec word embeddings derived from the largest dataset of Estonian texts, the etTenTen corpus, strongly associate male first names with terms related to career and science, while correlating female names with arts and family.

eucys2021.com/social-sciences-01-2021



Shähla Idikut 20 years shahla.parhad@gmail.com



A comparison of direct reversal and nucleotide excision repair in UVB-treated bacteria

FINLAND | BIOLOGY-04 | 2020

DNA of living organisms are a sensitive target for the Ultraviolet radiation, and especially UVC and UVB brings significant damage to the DNA. Fortunately, living organisms have repairing mechanisms to maintain genetic diversity and be able to reproduce. This experiment compares the effectiveness of two of these repairing mechanisms of DNA, Direct Reversal repair and Nucleotide Excision repair. The findings of this research are relevant to the advantages and disadvantages of UV radiation water treatment technologies, sterilization of surgical instruments, and the possible improvement of them. Energy efficiency differences of the two repairing mechanisms was provided as one of the explanations for the results.

eucys2021.com/biology-04-2020



Valtteri Aurela 18 years

aurela.valtteri@gmail.com





Sampling from a discrete probability distribution using a discrete uniform probability distribution

FINLAND | MATHEMATICS-02 | 2020

Define the simulation of a fair m-sided die with a fair n-sided die as a process of obtaining a random integer from interval [1,m] using a fair n-sided die. Then one can simulate a 4-sided die with a 6-sided die as follows: Roll the 6-sided die. If the outcome is between 1 and 4 inclusive, select it as the result of the simulation. Otherwise roll the 6-sided die again. In a more general case the simulated die doesn't have to be a fair one. In this work, I prove that a certain greedy algorithm minimizes the expected value of the required samples. It turns out, perhaps slightly surprisingly, that the greedy algorithm not only minimizes the expected value of the samples but is at least as good as any other algorithm in a certain sense explained in our main theorem.

eucys2021.com/mathematics-02-2020



Roope Palomäki 18 years roope.k.palomak



Markus Niemi 18 years markus.niemi



Oskari Niemi 18 years





Strategies of the board game African Star

FINLAND | COMPUTING-10 | 2021

We studied the strategies of popular nordic board game African star with computer simulation. We digitized the game using Python coding language and built strategies that navigate the game board using graph theory path algorithms. We divided testing of the strategies into phases. We found out that Cairo is a bit better starting position than Tangier but one shouldn't rush there. We also found that reacting to other players may not be beneficial. Our results are not written in stone because the strategies we used aren't optimal.

eucys2021.com/computing-10-2021

PROJECTS BY COUNTRY EUCYS 2029 SALAMANCA



Henell eri.henell@outlook.com





FINLAND | PHYSICS-06 | 2021

Vibrato is a musical effect consisting of periodic changes in the amplitude and frequency of harmonics and commonly used to enhance sound. On the violin, vibrato can be of very different character depending on the desired effect. The purpose of this project was thus to investigate how vibrato and especially its rate and extent affect the amplitude and frequency of the harmonics of a violin note by recording and analysing notes played without and with vibrato and then modelling the amplitude and frequency of each harmonic with sinusoidal functions. The results show for example that the rate affects mainly the frequencies of the amplitude and frequency modulations while the extent determines the amplitude of the frequency modulation and thus the number of resonance frequencies excited.

eucys2021.com/physics-06-2021



David Barbin 17 years



Louenn Colineaux 18 years





Is the study of chemical reactions possible on the scale of a drop?

FRANCE | CHEMISTRY-01 | 2021

Chemical experimentation on the scale of a one microliter drop imposes many challenges: What drop container could replace the beaker we use at school? How to design a suitable probe to analyze a drop? All these questions, have been the subject of our study for over two years. To answer them, with the advice of our partners, we have built and perfected a device. It currently can generate homogenized drops of reaction mixtures in a cell. A laser beam scans them. The images obtained are read by a photoreceptor. We analyze the evolution curves of the signal and we deduce the drop absorbance. The composition of these reactional millireactors evolves throughout the process. To analyze the content of a drop, we made a system allowing the passage to and from, before the laser beam, of a drops train.

eucys2021.com/chemistry-01-2021



Clément **Desjongueres** 18 years



Nahomé Vesvard 18 years



Luet





Intra body communication

FRANCE | ENGINEERING-03 | 2021

You all know the current contactless that allows us to make a payment or to open doors by placing your smartphone on a terminal. Using it may be very difficult for a person with a disability such as a person who has an amputated hand. In order to help these people, we have created Intra Body Communication: the contactless of the future. With our technology, your body extends your smartphone. If you need to validate a ticket or pay for something, you can do it with any part of your body. No biometric data required! Just keep your smartphone in your pocket and place the part of your body of your choice on the terminal. Our technology takes care of the rest by transmitting information to your smartphone through your body. Naturally, our technology would be useful to everyone.

eucys2021.com/engineering-03-2021



Natalia Kajaia



Mariam **Tsiviladze** 15 years





Universal device for people with disabilities

GEORGIA | ENGINEERING-02 | 2021

We created the universal device for persons with disabilities to make services for people with visual impairment effortless, help them to be more independent. The issues with the perception of visual images will be alleviated by introduction of audio information. Medication selector, the interactive device can receive voice command and rotating sections turn to the position where the requested medication is placed. For those with speaking impairment, card system allows user to insert the card, encoded in Braille, into the card system to get desired medication. Also, device helps a person to take medications the amount of which is determined by the number of drops. Taking medication is forgettable for all age groups. Thus, we created an application that will remind users to take medication.

eucys2021.com/engineering-02-2021



Anastasia Chalagashvili 16 years chalagashvilitass



Mariam Mikadze 16 years mari.miqadze2005 @gmail.com





GEORGIA | PHYSICS-02 | 2021

During the COVID pandemic, it's necessary to follow WHO recommendations, such as: wearing face mask, washing hands frequently. Yet, these norms are not enough, because the virus can invade our body in other ways. Medical gowns are made of polypropylene fiber fabric extracted from the fusion, on which virus lives for 8 hrs. Project goal is to modify a protective gown against virus. Modified disposable gowns will become reusable, which will be cheaper and it will be far effective. Virus will lose activity once it appears on the surface of the modified med. gown. Fabric surface is modified with antistatic substances. As a result, a small electric charge is distributed on its entire surface. Innovation is in coating the fabric with antistatic substances containing nanoparticles.

eucys2021.com/physics-02-2021



Marik Müller 18 years marik.m.mueller@gmail.com





Enzymatic inactivation of the veterinary antibiotic Florfenicol

GERMANY | BIOLOGY-05 | 2021

Large quantities of the antibiotic florfenicol are used in animal farming and aquaculture, contaminating the ecosystem with antibiotic residues and promoting antimicrobial resistance, ultimately leading to untreatable multidrug-resistant pathogens. Marik Müller has devised new strategies for enzymatic inactivation of florfenicol before it enters the environment. Using molecular evolution, he improved a hydrolase enzyme, produced it in bacteria and studied its florfenicol cleavage by nuclear magnetic resonance spectroscopy. For cost-effective florfenicol inactivation, he coupled the enzyme to carrier materials such as silica and validated repeated use of the antibiotic filter. He also established antibiotic inactivation in salt water and cow milk demonstrating potential use scenarios.

eucys2021.com/biology-05-2021



Lukas Weghs



Photometric search for exomoons by using deep learning and convolutional neural networks

GERMANY | COMPUTING-06 | 2021

Astronomers know of more than 4,000 exoplanets. These are celestial bodies that orbit a star other than our Sun. However, none of these has yet been proven to have a moon, although there are some possible candidates. Lukas Weghs wrote an intelligent programme for a high-performance computer that helps identify possible exomoons. This is done using the transit method, which is also used to detect exoplanets: as soon as a celestial body passes in front of a star from the Earth's point of view, it minimally decreases its brightness according to a defined pattern. An existing exomoon would change this pattern a little more. The young researcher's algorithms help search astronomical brightness measurements for traces of exomoons.

eucys2021.com/computing-06-2021



Leonard Ulrich Münchenbach



Neff



Physical description and modelling of paper strip flights

GERMANY | PHYSICS-05 | 2021

When a confetti cannon is fired, a turbulent spectacle follows: hundreds and hundreds of paper snippets swirl through the air in fantastic trajectories. It is this phenomenon that Leonard Münchenbach and Leo Neff devoted themselves to with scholarly rigour in their research project. They constructed a frame that made small strips of paper fall to the floor in the same way each time. A slow-motion camera was used to film the action and computer software helped analyse the footage. The young researchers investigated a wide variety of strip shapes – some long and narrow, others short and wide. Among other things, their findings enabled them to arrive at a formula that can be used to precisely calculate how fast paper strips of a certain shape and size rotate when they fall.

eucys2021.com/physics-05-2021

PROJECTS BY COUNTRY EUCYS 2022 SALAMANCA



Boglárka Ecsedi ecsedi.bogi@gmail.com





Rip current detection - an orientation-aware machine learning approach

HUNGARY | COMPUTING-01 | 2020

A rip current is a natural phenomenon that causes numerous fatal accidents all over the world. I detect and localize rip currents with a deep neural network called Faster R-CNN. I assembled a custom database of rip currents and used transfer learning, resulting in an accuracy of 85.19% (IoU threshold: 0.5) and an AP of 0.37. In addition, I developed an orientation-aware region proposal layer. Based on evaluation using the IoU measure, the findings revealed that the orientation-aware region proposal layer was 11.7% more accurate, allowing the algorithm to adapt to many positions and different perspectives. An automated rip current detection system is under development. This approach contributes to the early identification of the hazard, to preventing accidents and to protecting human lives.

eucys2021.com/computing-01-2020



Mátyás Rózsavölgyi rozsavolgyi.matyas.02@gmail.com





Remote controlled mars rover and its applications in the teaching of the mechanical, computer and physics sciences

HUNGARY | ENGINEERING-01 | 2020

My aim was to build a remote-controlled mars rover based on Opportunity with similar basic functions. The construction of the whole vehicle is unique, I designed all the components myself, both mechanically and electronically, with a few exceptions eg: engines, camera... I also manufactured the whole structure, for which I chose the 3D printing technology. And I made the circuit boards (PCBs) with the help of a milling machine. The use of these machines attracts the fact that the entire mars rover is available in the form of virtual drawings, 3D plans so that it can be reproduced by anyone with sufficient skill. This documentation, and/or the availability of a ready-made functional model, allows it to be used in education, resp. to generate and disseminate scientific interest.

eucys2021.com/engineering-01-2020



János 16 years radojancsi111@gmail.com





PenAlone, development of a writing and drawing tool compatible with arbitrary surface

HUNGARY | ENGINEERING-01 | 2021

Due to the constantly increasing demand for digital devices, smart writing tools based on different operating principles have also been developed. In the frame of Hungarian Contest for Young Scientist I also have developed a digital writing and drawing tool utilizing a silicon-based MEMS (microelectromechanical system) 3D force sensor. One can draw or write on arbitrary surface with this wireless smart device, visualizing a real-time image on the screen of either a laptop or a smartphone. Additionally, the thickness of the drawn line can be tuned by the pushing force as in the case of a real pen.

eucys2021.com/engineering-01-2021







Development of a new, multicellular network model of the epithelial-mesenchymal transition (EMT) and finding a new potential drug target by building hybrid EMT in the model

HUNGARY | MEDICINE-01 | 2021

Epithelial-mesenchymal transition (EMT) contributes to the development of cancer metastases. Our research group built a new, multicellular network model of the process in order to find new possible drugtargets for the abrogation of metastases. My aim was to find a possible drug-target for the treatment of hybrid EMT cells. This phenotype was built in the model and cell-cell simulations were run. A protein has been found, which made the cell lose its invasive properties after being inhibited. This means that a new, possible drug-target has been found for the treatment of cancer metastases.

eucys2021.com/medicine-01-2021



Gábor Gergő Balázs





HUNGARY | PHYSICS-01 | 2021

The J0640+3856 is a subdwarf red-dwarf eclipsing binary system which was discovered in 2015. at Piszkéstető Observatory. The discovered star has an orbital period of 0.187284394 days and the optical eclipse depth in excess of 6 magnitudes. The special featu-re of the described binary is that, it is the binary with the deepest eclipses compared to other binary systems. I studied this binary using 5 years of archival data in order to discover a third companion in the system. As the part of my project, additional measurements were taken for me at the Piszkéstető Observatory with the recently installed 0.8 m Ritchey-Chrétien telescope. As a result, I successfully determined a new, updated ephemeris, so the future times of minima for the following cycles can be predicted more accurately.

eucys2021.com/physics-01-2021



Cormac
Thomas
Harris
18 years
cormacharris@gmail.s



Alan
Thomas
O'Sullivan
18 years
alanosullivan27@gmail.com



A statistical investigation into the prevalence of gender stereotyping in 5-7 year olds and the development of an initiative to combat gender bias

IRELAND | SOCIAL-SCIENCES-01 | 2020

Gender stereotyping negatively impacts on emotional development, mental health and career choices. In this project we carried out a statistical investigation into prevalence of gender bias in 376 pupils aged 5-7. We devised research activities to gauge their views on various aspects of gender stereotyping, such as: linking emotions/feelings to gender; rating the competency of males/females in STEM/Non STEM occupations; drawing male/female engineer. We can conclude that gender bias does exist in 5-7 year olds. Our results show that boys are more confident in male ability than girls are in female ability, and boys are less willing to recognise female ability. To help combat gender stereotyping, we have gathered resources to be used by teachers and parents that explicitly target gender bias.

eucys2021.com/social-sciences-01-2021



Gregory Guy Tarr 18 years





Towards detecting state-of-the-art deepfakes

IRELAND | COMPUTING-01 | 2021

Deep learning, while able to solve complex problems, is likewise capable of creating technologies that threaten privacy, democracy, and national security. One of these technologies is the ability to create images or videos that humans cannot distinguish from authentic media. Such generated media are termed 'deepfakes'. While methods of automatic deepfake detection exist, current methods are unsuitable for deployment at scale, partly due to their inordinate computational cost. This paper performs a comprehensive analysis of recent deepfake detection methods and proposes multiple significant improvements, including a novel face detector. Together these culminate in an order of magnitude improvement of efficiency over the state-of-the-art.

eucys2021.com/computing-01-2021



Noa
Prisalac
18 years
noapriselac24@gmail.com





The role of ARTS in stem cell apoptosis: identifying a novel compound for regenerative medicine and disease therapies

ISRAEL | BIOLOGY-02 | 2020

Although much is known regarding stem cell (SC) self-renewal and differentiation, the specific mechanisms used for their elimination is still unclear. One key pro-apoptotic protein is ARTS. We showed that the absence of ARTS in mice protected intestinal stem cells from apoptosis (cellular suicide), which prevented radiation-induced cell death, as well as enhanced regeneration. We also identified a novel compound which has a significant potential for limiting apoptosis in the intestinal crypt both in healthy and diseased states, like Inflammatory Bowel Diseases. Collectively, our results offer the potential to dramatically advance our basic understanding of SC biology, elucidate novel functional pathways and advance novel SC-based approaches for regenerative medicine and targeted therapies.

eucys2021.com/biology-02-2020



Uri Sadan-Yarchi 18 years urisy21@gmail.com





Using cylindrical capsule and magnetic fields to achieve ignition conditions in the ICF method

ISRAEL | PHYSICS-02 | 2020

As of 2050, the world as whole will consume 2-3 times the energy then the amount it consumes today. Current methods to produce energy, will not be able to answer this need in the future. Nuclear fusion may be the solution. Is a cylindrical capsule, that is considered less efficient than the common spherical one, with the addition of a magnetic field, could achieve similar or mitigating conditions for ignition. For the mechanisms that effects the total energy, an equation was developed that was modified for a cylindrical system. An achievable value for the magnetic field was found, that will satisfy the needed conditions.

eucys2021.com/physics-02-2020



Tamar Meshorer 18 years tamesh52@gmail.co





Brain circuits underlying category learning

ISRAEL | BIOLOGY-06 | 2021

Although categorizing stimuli is a basic cognitive ability, the neural mechanisms of categorization and category learning are poorly understood. Here, we conducted a proof of concept experiment and were able to show that mice can learn categorization of auditory stimuli. This allows us to use mice as an animal model for future categorization studies. We further investigated connections in the mouse' brain between the auditory cortex and frontal cortical areas, responsible for high-level integration and behavior. Seeking connections underlying categorization, we identified projections from the auditory cortex, and especially, temporal association area (TeA), to the orbito-frontal cortex. We propose that the TeA serves as a fundamental region in auditory category perception and learning.

eucys2021.com/biology-06-2021



Inbar Kedem 18 years inkedem@gmail.com





Detection and quantification of Macrobrachium rosenbergii larvae in culture tanks, using image processing with artificial intelligence

ISRAEL | COMPUTING-09 | 2021

Current global trends show that food shortages are expected to occur throughout the world in 2050. Therefore, it is paramount to advance the aquaculture industries to modern technology standards. A key challenge in this field is the tiny size and large numbers of prawns, which are a crucial part of the food supply in Asia. This presents a major difficulty in growing prawns. We developed a system that included three algorithms to evaluate the number of prawns, utilizing artificial intelligence. Those algorithms were successful under lab and industrial conditions. The system increases efficiency in the aquaculture industry by enabling the farmer to feed, plan, and track the growth of the prawns. It provides a major step in creating a fully autonomous robotic system for handling prawn growth.

eucys2021.com/computing-09-2021



Noa Rachel Gonen 18 years noa.rl.gonen@gmail.com





ISRAEL | ENVIRONMENT-07 | 2021

Flame retardants (FRs) are often used in extinguishing forest fires. However, their ecological consequences are often overlooked. After use, FRs wash into nearby drainage basins. They contain biologically available nutrients to marine microbes and may disrupt the food web. FRs may affect relations between microbes and disrupt the system's balance due to different absorption rates between species. These effects are magnified in low nutrient environments, such as the Mediterranean. As part of this project, an experiment was conducted, simulating a marine FR pollution event. The results show that FRs may act as a fertilizer or be toxic, depending on its concentration. While FRs are necessary during emergencies, they affect the marine ecosystem and must be prevented from washing to the sea.

eucys2021.com/environment-07-2021



Andrea
Letizia
18 years



Sara
Peverali
19 years

neverali sara@itiomar.net





GOLD RICE: Gold Nano-sensors for the protection of the Health and the Environment

ITALY | CHEMISTRY-02 | 2021

Our project aims to find new strategies for identifying chemical residues that are toxic to the environment and humans using Green Chemistry principles and Nanotechnologies. The Italian production of rice is about 1,500,000 tons/year, despite these numbers large quantities of rice are imported to meet national needs. We developed a colorimetric sensor based on gold nanoparticles for the detection of bromide ions in rice samples. The nano-sensors obtained can be used to analyse both heavy metals such as chromium (with chromatic change in AuNPs from wine red to blue-violet) and Br- ions (with chromatic change from blue to red). Br - is a dangerous contaminant residue, which can result from the use of illegal material such as methyl bromide used as a fumigant in stored rice samples.

eucys2021.com/chemistry-02-2021



Leonardo
Cerioni
19 years
leonardo.cerioni1501
@gmail.com



Linda
Paolinelli
18 years
paolinda2510



Matteo Santoni 19 years santonimatteo02



Laying waste to energy problems

ITALY | ENVIRONMENT-02 | 2021

The purpose of this research is to use civil wastewaters entering the purification plant and those coming out of it after various treatments to build a galvanic battery and produce electric current. The water sent for purification contains molecules formed by elements such as carbon, nitrogen, sulfur and phosphorus in a predominantly "reduced" state and is scarce in oxygen concentration. The water that comes out of purification contains the same elements in a predominantly "oxidized" state and is rich in oxygen level. A prototype of this cell is assembled in order to analyze the generated potential difference and the involved chemical reactions.

eucys2021.com/environment-02-2021



Giovanni Benetti 19 years gio.benetti2@gmail.com





Distorted Interstellar Bubbles: a new mathematical and computational model

ITALY | PHYSICS-03 | 2021

I present a new physical-mathematical method that describes the shape of a distorted interstellar bubble, namely the surface of a heliosphere deformed by the motion of the circumstellar gas. I created a straightforward but rigorous model, which has been tested on two real objects through a specifically developed algorithm that produces the outline of the bubble. Thus, I obtained a solid of revolution that allows the direct comparison between the mathematical model and the astronomical observations. The test-cases show a segment of the bubble's surface, presenting a bright structure called bowshock, caused by the violent interaction between the stellar wind and the surrounding gas. The comparison has highlighted an excellent match between my theoretical model and the observable dynamics.

eucys2021.com/physics-03-2021



Maksim Tihomirov 18 years



Miroslavs Vlads Pochapskis 18 years



Analysis of application of simulation modelling technologies in traffic jams control

LATVIA | COMPUTING-14 | 2021

As personal transport becomes more available, the task of regulating road traffic and traffic jams management is becoming increasingly important. The present work is focused on the part of the problem of road traffic regulation, which includes simulation modeling of traffic flow. The goal of the work is to study the application of simulation modeling in solving traffic regulation problems, considering a practical example. A model of the existing Riga city road junction was created, where traffic jams often occur, and traffic flow modeling was performed. Then changes were made to the model that could theoretically reduce traffic jams, and traffic IM was repeated. From the obtained results it was concluded that the proposed modifications can reduce traffic jams in the selected road junction.

eucys2021.com/computing-14-2021

PROJECTS BY COUNTRY EUCYS 2022 SALAMANCA



Krists Kristaps Ročans





Threat of Mosquito-borne Disease Spread in Liepaja linked to climate change and other factors

LATVIA | MEDICINE-05 | 2021

Mosquito-borne diseases such as Tularaemia, Sindbis virus, Dengue fever, Zika virus, Yellow fever and Malaria are spread from endemic countries to other parts of the world and climate change might be one of the main causes of this phenomenon. Research highlights that climate change is not the only factor contributing to the spread of these diseases. The study analyzes the posibility of mosquito-borne disease spread in Liepaja and factors that might propagate it. The focus of this study is mosquitoes - vectors that transmit different pathogens to humans and animals. The empirical part of this study includes the collection of mosquito samples. One sample of mosquito (Coquillettidia richiardii) was found to contain francisella tularensis highlighting multiple possible future threats.

eucys2021.com/medicine-05-2021



Monika Šiugždinytė





Dog's excrements - a source of potentinally dangerous escheria coli in the environment

LITHUANIA | MEDICINE-01 | 2020

Now and especially in the near future, one of the most striking dangers to the world, which we have to overcome immediately, is environmental pollution. There are many sorts of contaminants, however, among them, pet excrements are highly harmful. I studied uncollected pet excrements in order to reveal a potential spread of deadly diseases that could escalate into an outbreak or epidemic. Although I studied a rather small area - covering one city in Lithuania, however, results could be easily extrapolated to many cities in other countries, where the number of pets (domestic and abandoned ones) is huge and still growing to this day.

eucys2021.com/medicine-01-2020



Dominykas Laibakoiis 19 years





Sustainable solution for crop damage caused by drought

LITHUANIA | ENVIRONMENT-05 | 2021

Due to global warming, droughts cause great stress to plants, slow down their growth, reduce the supply of plant foods, increase the cost to the customer. Farmers use expensive biostimulants in order to save crops during droughts. So, I decided to look for an effective alternative - calcium compounds, which are widely used in agriculture to regulate soil acidity, and are known for their role in stress signaling. I studied effects of calcium chloride on adaptive responses of three economically important crops to drought stress. I found a significant decrease of proline levels in all calcium-treated plants when drought was simulated. For this reason, calcium chloride could be used in agriculture as a cheap and environmentally friendly alternative to biostimulants.

eucys2021.com/environment-05-2021



Charlotte Marie Scheideler





Exploring de similarities and relationship between sugar addiction and opioid addiction

LUXEMBOURG | BIOLOGY-01 | 2020

3/4ths of all packaged foods contain added sugar, causing us to consume more sugar than required; the more we eat it, the more we tend to crave it, causing many to question sugar as an addiction. In this project, the effects of sugar on the brain and our hormones are explored, while also evaluating the extent that sugar can be seen as an addiction through a comparison to opioid addiction (as they have similar properties) examining a potential relationship between sugar and drug addiction. The findings of my research and literature reviews concluded that although there are several similarities between opioid and sugar addiction in their effects on the brain and symptoms created, implying a high likelihood of an existence of a sugar addiction like that of an opioid addiction.

eucys2021.com/biology-01-2020



Mara Rachel Manieri





LUXEMBOURIG | ENVIRONMENT-03 | 2020

Water samples from different rivers in Luxembourg showed the presence of different levels of concentrations of nitrites, nitrates, and phosphates. Their effects on aquatic microorganisms were assessed by storing the water under different conditions and being filled up with various amounts of manure. Effects of the manure on aquatic organisms were observed not only by calculating their abundance but also by identifying different species of microorganisms. Several species of aquatic microorganisms, bacterial and non-bacterial ones, were identified. The bigger the amount of manure in a water sample is, the bigger is the concentration of nitrates and, consequently, the lower the abundance of non-bacterial aquatic microorganisms. A growth in bacteria is observed.

eucys2021.com/environment-03-2020



David Emanuel Lawyer



Etienne André Leroy



Sarah Mackel



₩

Modelling treatmeng for ALS

LUXEMBOURG | MEDICINE-02 | 2020

Amyotrophic Lateral Sclerosis (ALS) is a fatal neurodegenerative disease characterized by motor neuron death in the brain and spinal cord. Though cell death in ALS is poorly understood, scientists believe that apoptosis and autophagy play a role. The MAP4K4 kinase regulates these and its inhibition has slowed ALS in ALS-derived Induced pluripotent stem cells, iPSCs. This project examines the pathogenesis of ALS cell death, highlights that inhibiting the MAP4K4 kinase can rescue motor neurons, designs a method for this investigation in vivo, and examines the viability of the treatment.

eucys2021.com/medicine-02-2020



Estelle Elise Rollinger





Investigating the effect of alcohol on hepatocyte function

LUXEMBOURG | BIOLOGY-03 | 2021

How much alcohol is too much? Public health requires a guideline to incentivise responsible teenage vodka consumption and prevent irreversible liver damage. This study attempted to determine a safe concentration by immersing 1.0g pig liver pieces in a 37°C water bath with different vodka concentrations serially diluted. Vodka and hydrogen peroxide volume and mass of pig liver were controlled amongst other variables. Liver function was modelled through the level of inhibition of catalase in the breakdown reaction of hydrogen peroxide, measured by volume of oxygen produced. Results produced a bell curve pattern, with greatest oxygen production at 60% vodka concentration, suggesting some beneficial effects of alcohol at lower concentrations and advising consumption at this concentration.

eucys2021.com/biology-03-2021



Sophia Simao Avelino





The impacts of antibiotic-clavulanate on the human microbiota

LUXEMBOURG | CHEMISTRY-03 | 2021

To maximise the efficiency of antibiotics, working against the proliferation of harmful bacteria, the chemical "clavulanic acid" has been introduced to the medical industry working alongside penicillin branches to prevent bacterial resistance. But, after research, it is evident that its impacts are detrimental to bacteria that present a mutualistic relationship with the human body, such as the ones in the gut microbiota, producing essential vitamins for the overall protection of the site and for the efficiency of our digestion. Given the acid and antibiotic combination is commonly prescribed and belongs to the WHO Essential Medicines List for children, there is an urgent need for further scientific research to prevent the growth of monopoly pharmaceutical companies at the cost of patients.

eucys2021.com/chemistry-03-2021



Paula Elisabeth Van de Paverd Bartolomé



An investigation into the effect of ibuprofen on chlorella pyrenoidosa growth

LUXEMBOURG | ENVIRONMENT-03 | 2021

Increased urbanisation and population have led to higher medicine concentrations detected in water systems worldwide. This study investigates the effect of one of the most widely pollutant medicines (ibuprofen) on Chlorella pyrenoidosa as a model for other microalgae and higher plants. A colorimeter set to 440 nm was used to measure the effect of ibuprofen concentrations Chlorella growth over 11 days. Possible experimental error made it difficult to determine a trend over time, however, when comparing the concentrations to each other on the last day of testing it was found that the $0.4 \mu g/L$ concentration had the most growth and the $0.0 \mu g/L$ the least. This indicates that ibuprofen could cause eutrophication, however further investigation is necessary to adequately determine this risk.

eucys2021.com/environment-03-2021



Mattieu Raphael Raphael Bou 18 years mattieu07bou@gmail.com



Optimising fly ash based geopolymer concrete

NORWAY | CHEMISTRY-07 | 2021

Geopolymer concretes are a sustainable alternative to traditional concrete, characterised by their use of lower amounts of energy and raw materials, whilst having durable chemical and physical properties. Geopolymer concretes are produced through a geopolymerisation reaction, made by activating source materials such as fly ash with alkaline solutions. The investigation's aim was to compare the durability of fly ash based geopolymer concrete, as the ratio between sodium silicate and sodium hydroxide in the alkaline activator solution is changed. The durability was determined through a sorptivity test. A negative relationship between the ratios and the sorptivity of the samples was observed. These findings can be used in industry to produce durable fly ash based geopolymer concrete.

eucys2021.com/chemistry-07-2021



Ling Olivia
Li
17 years
lingolivia03@hotmail.com



Beauty ideals in China: reconfiguration of the body through the prospect of westernization and modernization

NORWAY | SOCIAL-SCIENCES-02 | 2021

This study explores the pattern behind Chinese women's desire to "beautify" their facial features and what builds their standards of a "beautiful face". By examining the evolution of manners toward commodified beauty, the overall progression of China on its way to modernization is unveiled. The essay follows a chronological order from the traditional beauty ideals in late-imperial China, which are derived from ancient times; and transit to the Maoist era when individualities are sacrificed for the state, followed by an introduction to cosmetic surgeries. This then leads to an analysis on the modern beauty ideals and market in China with theoretical underpinnings, where the extent of westernization is examined, assuming that the level of any constantly altering phenomenon is "measurable".

eucys2021.com/social-sciences-02-2021



Aleksander Leon Łysomirski 20 years alysomirski@gmail.com





Fisetin, a natural flavonoid, diminishes the metabolic activity of senescent colorectal cancer cells and may affect the process of autophagy in HCT116

POLAND | BIOLOGY-05 | 2020

Senescence is a state in which cells stop dividing but are metabolically active and release tumour-promoting factors. Chemotherapy can induce transient senescence of cancer cells, which may influence cancer relapse. Hence, eliminating senescent cancer cells with senolytics has potential in anticancer therapy. A process called autophagy may affect the action of senolytics. In my project, I observed that fisetin reduces the metabolic activity of colon cancer cells in two models of senescence induction. Fisetin caused changes of senescent morphology and decreased levels of senescence biomarkers. Results also show that it may affect autophagy in proliferating and senescent cells. These results suggest that fisetin may counteract senescence of cancer cells, but this requires further research.

eucys2021.com/biology-05-2020



Jarosław Jakub Brodecki 18 years jarek.brodecki@gmail.com



An assessment of the pollution of urban rivers by microplastics and their penetration of food webs based on the example of the river system in the Łódź agglomeration (central Poland)

POLAND | ENVIRONMENT-04 | 2020

Despite extensive research, we still don't know everything about microplastic in the environment. That's why, when I accidentally detected microplastic in bird pellet of protected species, I decided to begin researching this topic. The main purpose of this study was to recognize the contamination of small rivers in urbanized areas of my home city and check how the microplastics are capable to penetrate food networks. It turned out that I detected microplastic on all searched sites on chosen rivers, even those far from the city centre. Also, I detected microplastic in excrements and pellets of all investigated vertebrates. My research showed that the problem of microplastic in urban river systems is very serious especially given the possible consequences for nature protection.

eucys2021.com/environment-04-2020



Adam Stanisław
Barański
20 years
as.baranski@student.uw.edu.pl



On divisibility of the solutions of Pell's equation

POLAND | MATHEMATICS-03 | 2020

Pell's equation is a well-known Diophantine equation, which has been studied since ancient times -first by the Greek (the famous cattle problem of Archimedes) and Indian mathematicians (Bhaskara, Brahmagupta), and then in Europe (Brouncker, Euler, Fermat, Lagrange). Pell's equation is related to many important problems in mathematics, and has applications mainly in algebraic number theory and theory of continued fractions. In my paper, I study the question of divisibility of the solutions of Pell's equation by prime and non-prime numbers. To this aim, I use tools from algebra and number theory, such as quadratic residues and Dirichlet's theorem on arithmetic progressions. As a result, for a given integer, I find equivalent conditions to be a divisor of such a solution.

eucys2021.com/mathematics-03-2020



Jakub Lewandowski



Igor Piotr
Jaszczyszyn





Synthesis and characteristic of a composite based on metal oxides and silica for use in photocatalysis and capturing pollutants

POLAND | CHEMISTRY-06 | 2021

Our group's motto in abbreviated form is (CEP) which we interpret as contamination, experimentation and purification. After discovering a gigantic environmental problem, which is water CONTAMINATION by polycyclic aromatic hydrocarbons and nanoplastics, we decided to take the initiative and started our own EXPERIMENTS which enabled us to develop the nanoparticles (NPs) which have the ability to PURIFY water. Our aim was to synthesize NPs that will show photocatalytic, ferromagnetic, sorption and antibacterial properties. As a thoughtful young scientist we decided to use truly exotic metal oxides combined with porous matrix - colloidal silica, which gave us the opportunity to create the composite showing all of these properties and at the same time being innovative on a global scale.

eucys2021.com/chemistry-06-2021



Jakub Krzysztof Bachurski 19 years





Approximate pattern matching with bounded absolute error

POLAND | COMPUTING-12 | 2021

Algorithmics is about solving problems formally. My algorithm belongs to text algorithms that relate to processing sequences of data. The problem itself is a variation of a classical problem in computer science called pattern matching. Its input data consists of two real number sequences - a pattern and a text, and the goal is to find contiguous parts of the text similar to the pattern. I decided to define similarity as maximum absolute error. This is a twist to the basic version where strict equality is required. It took me many weeks to find the core idea that made my method work. But it paid off - the algorithm is simple, effective and its code is short. It has applications in plagiarism detection, numerical data processing (for experiments or simulations), and musical analysis.

eucys2021.com/computing-12-2021



Radosław Marek Żak 18 years radek.zak2002@gmail.com





Isogonal conjugate and a few properties of point X(25)

POLAND | MATHEMATICS-02 | 2021

A seemingly simple question – "where lies the center of the triangle?" – turns out to lack an easy answer. Many different constructions emerged during centuries of mathematical discussion. Each of these points is somehow special, and none is a better fit for "the triangle center" than the others. There is even an "Encyclopedia of Triangle Centers" containing more than 40000 of different points – and my paper increased this number by another 35. I've started from a notion of isogonal conjugate – something already known in geometry. On this basis I've introduced the hodpiece of a point – the main construction of my article. The final and the most important result of my paper is that Bloom's point (X40139) cannot be constructed using only a compass and straightedge.

eucys2021.com/mathematics-02-2021



Rita Fernandes de Matos 18 years



Oliveira Vieira Remelgado 18 years hugod.2x7@gmail.com

Hugo Daniel



Hugo Ferreira Costa 18 years hugofcosta14





Development of an integrated ionizing radiation detection and alert system

PORTUGAL | ENGINEERING-08 | 2021

Given the professional requirements of today's society, workers of various professions, are exposed to high levels of harmful radiations, which increases the risk of contracting severe illnesses. To efficiently monitor the exposure to dangerous ionizing radiations, this project presents a system that analyzes in real-time the exposure to harmful radiation and alerts the user when the daily exposure limit is reached. It integrates a new Arduino-based detector fully developed for this purpose and communicates with a mobile application designed to analyse and record all working sessions. The result is a revolutionary prototype that introduces a new paradigm in the work safety conditions of these professionals, with the objective of reducing the associated health risks and save lives.

eucys2021.com/engineering-08-2021



Sara Ribeiro Couto 19 years



Sofia
Varga
18 years

Klára



João
Carlos
Pereira
Carvalho
19 years
joaocarloscarvalho.09
@gmail.com





ATMOS

PORTUGAL | ENVIRONMENT-08 | 2021

People die prematurely every year due to air pollution, mostly due to car traffic. Green infrastructures can act as PM sinkers, through the deposition and removal of airborne pollutants. ATMOS aimed at quantifying PM retention by trees, developing a new methodology to calculate PM retention, based on volume function and assessing the economic value of the ecosystem service provide by ATMOS evergreen infrastructure.

eucys2021.com/environment-08-2021



Andreea Magdalena Sovei 18 years



Robin-Cristian
Bucur-Portase

17 years
robin.bucur-portase@cnmv.ro





Study of microbiological structures with the purpose of creating MEMS actuators with various applications in medicine

ROMANIA | ENGINEERING-06 | 2020

Our paper presents the study of cellular structures with the purpose of creating microactuators, some of which have applications in medicine. The microactuators were developed after studying various cellular structures ranging from the F1Fo ATP synthase to the sporangium of the Polypodium aureum fern. The geometrical parameters of the sporangium have been used along with additional data to develop diverse models of microactuators. Various materials were tested to serve as the base material for our actuators such as polyethylene, silicon dioxide, and chitosan. The mechanisms developed have various applications ranging from diagnostic tools to a possible treatment for paralysis.

eucys2021.com/engineering-06-2020



Luiza Natalia lonescu 17 years natalia.ionescu.03@gmail.com





Strong electric field electroosmosis - physical principles and measurements in the strongly nonlinear regime

ROMANIA | CHEMISTRY-09 | 2021

Electroosmosis is the motion of an electrically neutral fluid under the influence of an electric field due to interface breaking of local electrical neutrality. We analyzed a simple system in which there are non-linear effects present, related to the bulk electrolyte depletion caused by the accumulation of ions at the electrodes. The apparent electroosmotic velocity was measured and the zeta potential was evaluated for both a short time and a large time scale. Long time scale effects are significant, causing the zeta potential to vary. This can lead to electroosmosis in systems where it was not previously expected; for example, in the interstitial fluid near the tight junctions of the epidermis. In this context, micropumps with the purpose of drug delivery were quantitatively described.

eucys2021.com/chemistry-09-2021



Grigoras Rares Antonie 16 years grigoras.antonie @cnprsy.ro



Codina Sergiu 19 years sergiucodi@gmail.com



Hulubeac Alexandru Mihai 17 years hulubeacmihai





InoShoes
ROMANIA | ENGINEERING-11 | 2021

"InoShoes", the innovative shoe, was created to be comfortable and to provide useful information to the wearer, information that can be used to prevent the appearance and / or accentuation of certain foot disorders related to the walking process, respectively to communicate with the environment. external of the carrier. The shoe is equipped with a multitude of sensors placed in locations where the data collected reflects reality. The functions of the shoe include location through the phone's GPS, transmission of SOS signals, pedometer, monitoring the pressure distribution, monitoring the frequency and characteristics of

eucys2021.com/engineering-11-2021



Despina Luliana Gica





Demyelination: a research into the use of electrical models in studying demyelinating diseases

ROMANIA | MEDICINE-06 | 2021

The aim of our project is to analyse the use of equivalent electrical circuits in the modeling and study of demyelinating diseases. Within that scope, we have carried out a study into the anatomy and physiology of the nervous system, and more importantly, of the myelin sheath. Afterwards, a geometrical, a mathematical, and an electrical model have been used to better describe myelin. Following the implementation of the definition of demyelinating diseases in the thus created framework, we have conducted a couple of experiments highlighting the deformed signal characteristic to them.

eucys2021.com/medicine-06-2021



Anna Levchenko 18 years

annalev1317@gmail.com





RUSSIA | CHEMISTRY-01 | 2020

Gene therapy is a promising approach to the treatment of hereditary and acquired diseases, which consists in the introduction of therapeutic nucleic acids into the cell for a targeted change in its functions. Cationic liposomes are able to protect such nucleic acids from biological factors, and to deliver them into target cells. An important component of cationic liposomes are helper lipids, which stabilize the structure of liposomes and control the release of genetic material. Currently used helper lipids may be destroyed in the bloodstream, therefore the problem of designing more stable analogues is actual task As a result of the work, the new helper lipid which contains serine as a hydrophilic domain was synthesized and it will be used for the preparation of cationic liposomes.

eucys2021.com/chemistry-01-2020

PROJECTS BY COUNTRY EUCYS 2022 SALAMANCA



Andrey **Igorevich Lebedev** lebedewandrew2003@yandex.ru



Complex with an unmanned aerial vehicle «Kestrel» to search and rescue people

RUSSIA | ENGINEERING-03 | 2020

Every day in Russia, about three hundred people get lost, and the percentage of the rescued is not so high. At the moment, special teams of the Ministry of emergency situations and volunteer formations are searching for people. Unmanned aerial vehicles are often involved in the rescue process, as this is a fairly promising area of technology development at the moment. The aim of the research is to develop a complex "Kestrel" with an unmanned aerial vehicle capable of recognizing human images during the flight and be able to be operated in the Arctic region. The objectives of the study are to develop and justify the applicability of such complex during rescue operations in the Arctic conditions and to work out specialized software for the

eucys2021.com/engineering-03-2020



Nikolaevna Karavashkina .karavashkina@mail.ru





Development and manufacture of an operating model that defines the basic parameters of gasoline in one drop

RUSSIA | PHYSICS-01 | 2020

I made a model that is capable of one drop and in a few seconds to determine the quality of gasoline. The device measures and displays the obtained data of two main parameters - the octane number from 80 to 100 and the specific active electrical conductivity of gasoline. To increase the accuracy of the readings, a scheme has been developed to maintain a stable temperature of a drop of gasoline from 20.5 to 21°C. Correction of indications is provided depending on fluctuations in the active electrical conductivity of gasoline. Small size, low cost (not more than 800 ₱) in combination with a small error in the octane number (+/- 0.5) and ease of operation are the advantages inherent in my device.

eucys2021.com/physics-01-2020



Laura **Burdova** 19 years





Application of a combination of extracellular pH acidification and rottlerin in cancer cells as one of the anticancer therapies

SLOVAKIA | BIOLOGY-01 | 2021

We investigated the modifications of the pH of the cell culture medium in the environment of cancer cells with the aim of finding a new anti-cancer therapy. We tried to find out the ideal pH for performing anticancer therapy procedures and apply it to SKBR3 cells. From the observed results, we concluded that the ideal pH for our proposed therapy was 6. Then we focused on studying the effect of rottlerin on U-87MG cells. We investigated the effect of low extracellular pH on the efficacy of rottlerin treatment. Moreover, the combination of rottlerin and the change in extracellular pH resulted in a higher efficacy of the treatment effect. These results not only confirm the potential of rottlerin, but also prove the application of pH alteration method as a way to rationalise chemotherapy.

eucys2021.com/biology-01-2020



Miroslav Cibula





Omnis: modular question answering web search engine

SLOVAKIA | COMPUTING-02 | 2021

In this project, we have created a web search engine, Omnis, capable of question answering, which utilizes for this purpose artificial intelligence for reading comprehension and information extraction. The system obtains and processes data from unstructured texts, web documents, and various knowledge bases. Additionally, the engine is based on a modular architecture, which means that anyone can freely expand it by creating and deploying their modules.

eucys2021.com/computing-02-2021



Matus Mlynar 20 years mlynar.m@gjh.sk





The dynamic effect of oxytocin treatment on autistic-like behaviors in a genetic model of autism

SLOVAKIA | MEDICINE-03 | 2021

Autism spectrum disorder (ASD) is a heterogeneous condition with no efficient treatment targeting its core symptoms available. This project aimed to investigate the dynamic changes in long-term effect of a subchronic intranasal oxytocin (0.8 IU/kg) treatment during the treatment period and after its termination in the Shank3 deficient mouse model of autism. Our results indicate prosocial and anxiolytic effects of oxytocin in both female and male Shank3(-/-) mice. Moreover, we found that termination of the subchronic treatment results in socially ambivalent behavior. Further interventional experiments are needed to fully elucidate the therapeutic potential of oxytocin in ASD.

eucys2021.com/medicine-03-2021







The effect of smoking cannabis and smoking cannabis and tobacco combined on forced vital capacity and forced expiratory volume in one second of 18-year-old males

SLOVENIA | BIOLOGY-03 | 2020

Adolescents represent a considerable percentage of cannabis users, but the effect of smoking on their pulmonary function has not yet been investigated. Therefore, I decided to compare forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) of cannabis smokers with combined cannabis and tobacco smokers and control group of non-smokers, all participants being 18-year-old males. In previous studies, several mechanisms were proposed to explain inconsistent higher values of FVC and FEV1 in long-term cannabis smokers while smoking tobacco was repeatedly found to decrease both parameters. However, results of this study showed higher FEV1 in the group of cannabis smokers while differences in FVC were statistically insignificant, presumably due to lower exposure to substances.

eucys2021.com/biology-03-2020



Aleks
Brumec
20 years
aleks.brumec@student.um.si





The effect of oxidative stress genes on the response to Anti-TNF therapy in patients with Crohns' sisease

SLOVENIA | MEDICINE-03 | 2020

Oxidative stress is defined as a disruption of the balance between production of reactive oxygen species and the body's ability to fight them off. They contribute to many autoimmune diseases, which have in the past been treated with anti-TNF therapy using inhibitors of said cytokine. So far, research has shown, that anti-TNF therapy lowers oxidative stress in patients with Crohn's disease, but little is known about the effect of oxidative stress genes in the response to anti-TNF therapy. In our study, we focused on the effect of two genes, associated with oxidative stress, SOD2 and CAT, and found, that a higher expression of these genes is linked to a better long term response to treatment with the anti-TNF drug adalimumab.

eucys2021.com/medicine-03-2020



Gal Završnik





Biomechanics of the human jaw and teeth

SLOVENIA | PHYSICS-04 | 2020

Biomechanics of the masticatory muscles in correlation with teeth have been researched. Specific measurement models and special measurement methods have been used to simplify the complexity of the human chewing process. Here the function of the masseter muscle and the lateral pterygoid muscle as the key muscles in human masticatory system has been evaluated. A three-dimensional scan of a realistic human jaw was used to develop a tool for the measurement of the maximum bite force on the front teeth. The determined forces acting in individual muscles during chewing were 341±71N and 149±64N. The results showed that the force and tension on the teeth varies according to their distribution and is highest on the front teeth with the smallest area of the dental crown.

eucys2021.com/physics-04-2020



Suhyun Lee Le 17 years



Haeun Choi 17 years hosi040605@sasa.hs.kr





Creating a biodegradable mask from lignin extracted from chestnut

SOUTH KOREA | CHEMISTRY-04 | 2021

We used hydrolyzed lignin extracted from the hard shell of chestnuts. We then combined lignin with polyvinyl alcohol(PVA) and utilized electrospinning to polymerize the solution and create a nanofiber matrix. Testing the matrix showed that the matrix could be used to create a recyclable, biodegradable facial mask. Observations under SEM allowed us to observe the nanostructure of the matrix, and test its potential as a filter. We then compared the Lignin mask with commercially available facial masks and tested the filtration efficiency and splash resistance. Further work is being done on methods to chemically treat the fabric to remove microdust and viruses, to show that the lignin mask is a commercially viable method of recycling old wood waste.

eucys2021.com/chemistry-04-2021



Hyejin Jun 16 years heyjinny127@naver.com





A study on removal of heavy metal and green algae in river using chestnut by-products

SOUTH KOREA | ENVIRONMENT-04 | 2021

This study aims to develop eco-friendly algae remover and heavy metal removal by utilizing the following two characteristics by-products of discarded chestnuts: (1) Polyphenols contained in chestnut by-products are effective in removing heavy metals. (2) The porous structure formed by carbonizing the outer shells of chestnuts may absorb algae. Using abandoning chestnut by-products can minimize the costs of raw material costs, enable mass collection, be relatively simple in making process, and be eco-friendly way to remove heavy metals. And it is expected to be fully utilized as a way to fundamentally solve the algae phenomenon that occurs on a large scale every summer as it is simple and does not cause secondary damage.

eucys2021.com/environment-04-2021



Eduardo Gabriel Guerrero Riesco

19 years

eduardoguerreroriesco@gmail.com





Transhumanism: will we still be human?

SPAIN | SOCIAL-SCIENCES-02 | 2020

This paper aims to highlight the general ignorance of transhumanism, as well as provide some key concepts to form an informed opinion about it. To this end, the fundamental aspects that concern it will be exposed and analysed and the repercussions that this philosophical approach may have in the fields closest to the human being, namely the social, ethical and anthropological fields, will be studied.

eucys2021.com/social-sciences-02-2020



Alba Serrano Garcia 16 years albaserrano



Patricia Marco Gaya 16 years





Triops cancriformis. How to survive at climate change?

SPAIN | BIOLOGY-04 | 2021

This project is a study of the Triops cancriformis egg resistance to high temperatures and the analysis of its chemical composition by thermal analysis up to 1000°C and observation with scanning electron microscope. This would explain why it has survived the great extinctions of our planet and why it is considered a living fossil retaining the same appearance as more than 200 million years ago in the Triassic period.

eucys2021.com/biology-04-2021



Carla
Caro Villanova
17 years
carlacarov@gmail.com





Formulation and implementation of a support vector machine on D-Wave's quantum annealer

SPAIN | COMPUTING-05 | 2021

The main focus is the mathematical formulation and implementation of a support vector machine (SVM) algorithm in D-Wave's quantum annealer. The first step was to formulate the problem as a quadratic unconstrained binary optimization (QUBO) problem. With some adaptations, physical limitations of the quantum computer were overcome. Finally, I coded the algorithm and executed it in the quantum annealer, along with a local simulated annealing version, and its classification performance was compared against that of the classical algorithm. Through the proposal of a QUBO formulation of an SVM algorithm, it has been proven that it is possible to solve it in a quantum annealer and when executed with two datasets, excellent classifications were obtained, while not evidencing any quantum advantage.

eucys2021.com/computing-05-2021



Milla Linnéa Astrid Glännfjord 19 years Milla.glannfjord @gmail.com



Linus Patrik
Widholm
18 years
Linus.widholm@gmail.com





Investigation of silver ions' antibacterial effect on E. Coli and B. Subtilis

SWEDEN | BIOLOGY-08 | 2021

This study investigates the antibacterial effect of silver ions on Escherichia Coli and Bacillus Subtilis. It aims to clarify the correlation between the silver ion concentration and the antibacterial effect. The well diffusion method was used in the experiment, where five different concentrations of silver ions were examined (0, 1, 5, 20 and 50 mM). Every concentration was tested 12 times on each bacterial strain and the inhibition zone was measured after 24 h. The results generally showed that higher silver ion concentrations induced a higher antibacterial effect. Moreover, the effect on Bacillus Subtilis was greater than the effect on Escherichia Coli. A tendency of a plateau-effect could also be observed. However, a clear trend could not be established.

eucys2021.com/biology-08-2021



William Daniel McGillivray



Linus Karlsson



Viktor Karl Niklas Brink





The Aerodynamics of Paper Airplanes

SWEDEN | PHYSICS-08 | 2021

How airplanes fly is one of the most important questions within the field of air- and spacecraft development. By studying how paper airplanes behave, one can develop knowledge on flight principles. The purpose of this scientific report was to gain a better understanding of how the design of a paper airplane affected the longest possible flight distance. The studies show that the models with a higher wing loading and thicker wings contributed to balancing the forces affecting the paper airplane, leading to the airplane being able to travel in a more stable trajectory in the same direction. The higher wing loading also resulted in less drag and a more even lift force. Lastly, the coanda effect depends on the angle of attack and thus also on how far the paper airplane can travel.

eucys2021.com/physics-08-2021



Cédric Emmanuel
Willemin
19 years
cedric@willemin.li





Meteor and aircraft detection

SWITZERLAND | ENGINEERING-05 | 2020

The French military radar GRAVES emits electromagnetic waves consistently at a frequency of 143.05MHz. These waves propagate in the air and are reflected by electrically conductive objects. If the object is moving, the frequency of the reflected wave will change. This effect is known as the Doppler shift. The reflected waves were received by an antenna positioned on the roof at the Gymnase de la rue des Alpes, in Biel, Switzerland. The signal was thereafter transmitted to a computer which displayed the Doppler shift graphically. Numerous concrete objects were identified in the study, from the meteorite swarm of the Perseids to the International Space Station (ISS).

eucys2021.com/engineering-05-2020



Ophélie Léna Rivière 18 years o.riviere@outlook.com





Sinking Bubbles - On the Behavior of Air Bubbles in a Vertically Oscillating Column of Liquid

SWITZERLAND | PHYSICS-06 | 2020

We are used to bubbles rising in liquids, however, when a column of liquid is oscillated vertically, it is not always the case. Experiments have been conducted to determine the critical conditions under which such a behavior occurs. In a second part of this paper, it is shown, that the experimental results are in good agreement with an equation of motion describing the air bubble's motion in a water column. Lastly, the behavior of bubbles in a vertically oscillating oil column was qualitatively explained, that is a new equation of motion was found and experiments have been conducted to verify its accuracy. After measuring the Reynolds Number of both flows, we can conclude, that due to the density and viscosity of the oil, different differential equations are needed.

eucys2021.com/physics-06-2020



Anusha Chiara Lorraine Spescha 19 years anushaspescha@icloud.com





Madmen on a journey: a comparison of Homer's Odyssey and the science fiction series Doctor Who

SWITZERLAND | SOCIAL-SCIENCES-04 | 2020

This paper proposes the comparison of two works of fiction, Homer's Odyssey and the BBC's Doctor Who, based on similarities in creation, structure, and content. A complex understanding of both works and their cultural significance is gained by methods of close readings and aspects of media archeology. The second oldest work of western fiction and the ongoing British science fiction series offer an astonishing array of comparability leading to significant insights. The ancient and the modern epics act as foils for each other, highlighting nuances whilst also driving home how many of the demands we have for popular fiction have not changed through the ages, simply because they fulfill basic human needs.

eucys2021.com/social-sciences-04-2020



Sophie Lynn Wiesmann

19 years





Temperature-dependent toxin production of the cyanobacterium Microcystis aeruginosa

SWITZERLAND | BIOLOGY-09 | 2021

In recent years, the occurrence of HABs - harmful algae blooms - in freshwater systems have become more frequent, as water temperatures are rising due to global warming. These blooms are formed by fast reproducing algae or cyanobacteria and can have serious consequences for aquatic organisms, as some bloom forming species produce toxins that inhibit the growth of other aquatic organisms. I asked myself if elevated temperatures would not only increase the growth rate but also lead to increased toxin production of the cyanobacterium Microcystis aeruginosa.

eucys2021.com/biology-09-2021



Julian Benjamin Weber 18 years





Drone-based detection of persons buried in an avalanche, system for locally autonomous search from the air

SWITZERLAND | ENGINEERING-10 | 2021

When someone gets buried in an avalanche, the likelihood of survival drastically decreases with time. This project was created to reduce the time until the victim is rescued. The idea is to relocate the search from the ground, performed by humans, into the air by an autonomous drone. Such a drone should be tiny and portable, as mountaineers would always carry it with them when operating in avalanche endangered areas. In case of an accident, it can be sent out to search immediately. Attempting to bring this vision into reality, I built a functioning prototype, which is capable of detecting an avalanche transceiver and of communicating its location to a user. The findings of this experiment are highly valuable for further development of future systems.

eucys2021.com/engineering-10-2021



André Louis Gaël Mudry 20 years andre.lg.mudry@gmail.com





Group testing protocols in higher dimensions to combat the COVID-19 pandemic

SWITZERLAND | MATHEMATICS-05 | 2021

Most nations and their healthcare systems have been overwhelmed by the COVID-19 pandemic. Mass testing is central to rapid tracing and breaking the chain of community transmission. However, corona testing can be prohibitively expensive, especially for poorer nations. We develop and present testing protocols based on the group testing technique, in which several samples are pooled and evaluated as a group using a single test. We show that by cleverly choosing overlapping groups, one can dramatically reduce the number of required tests. For example, assuming an infection rate of 0.1%, the whole Swiss population, 8'570'000, could be tested using only 302'915 tests. Using these testing protocols, large populations can be mass tested while significantly decreasing the number of required tests.

eucys2021.com/mathematics-05-2021



Mohamed
Hedi
Daimi
16 years
daymi.fsg@gmail.com



Abdelhafidh Jlali 15 years hafaa2017@gmail.com





Treatment of Methylene blue by CZTS nanoparicles for industrialization

TUNISIA | CHEMISTRY-05 | 2021

The wastewater containing Methylene Blue (MB), released by textile factories after dying Jean clothes, is significant pollution in the environment. We propose a photocatalytic protocol for MB treatment, as semiconductor photocatalysis uses sunlight to decompose organic pollutants (MB). We have used, for this, CZTS nanoparticles synthesized by the solvothermal method. The protocol shows that about 88% of MB was decreased in 260mn under visible light, efficiently. For industrialization, we propose a prototype of treating MB wastewater and obtaining a clean one automatically based on an automation system using PLC S7-1200 and a SIMATIC HMI for the supervision of this system.

eucys2021.com/chemistry-05-2021



Khalil
Terras
19 years
khalilterras0@gmail.com





DiGI BANK (Digital Customer Relationship)

TUNISIA | COMPUTING-07 | 2021

Detection of Customer visits to Bank branches using RFID technology and open CV module for service improvement, security enhancement and customer loyalty services. Customers equipped with RFID stickers on the back of payment card, or savings book will be detected at their entrance and exit to the branch. However other customers non-equipped with RFID Tags could also be recognized thanks to open CV module. These identifications will be used for different purposes such as: 1) Human resources sizing for best customer services. 2) Informing the branch manager about the visit of a VIP customer for a better and followed welcome 3) Securing transactions against all fraud of customer identity theft in saving accounts. 4) Customer loyalty through reduction and free offers from partners

eucys2021.com/computing-07-2021



Mariem
Jmal
18 years
imalmariam3@gmail.cc



Nebrass Abdallah 17 years nebrass.abdallah27 @gmail.com



Baraa Chraki 18 years





Paper sunflower seeds' shells (P3S)

TUNISIA | MATERIALS-01 | 2021

World consumption of paper has grown 400% in the last 40 years. Now nearly 35% of the total trees cut around the world are used in paper industries, which is a disaster for nature. As wood contains 40-50% of cellulose, and sunflower seeds' shell contain 48% of this material as well, which is the main component of paper making, we found out that we can reduce the use of trees by replacing it by sunflowers seeds' shell. First we soaked sunflower's seed shells in water for 6 hours to make it more easy to use. Second we boiled them and add them sodium carbonate for 30 minutes on high temperature. Then we kept pounding it to produce pulp. Finally we dried it on a hot surface.

eucys2021.com/materials-01-2021



Sila Karakusoglu



Lara Yucebas





The design of microfluidic pump for medical field

TURKEY | BIOLOGY-06 | 2020

A microfluidic pump (MFP) is designed in professional drawing program AutoCAD and produced by using 3D printer in this project. It is aimed to develop microfluidic pump which is cost-effective and has practical usage during the treatment processes of diseases such as cancer and diabetes. During the experiments we characterized our pump and examined that uniquely designed MFP has suitable flow properties as a pharmaceutical pump. Also it is anticipated to contribute to the economy with rapid manufacturing.

eucys2021.com/biology-06-2020



Olcay Oransoy





Proposal for an algorithm for finding the crossing number of a graph

TURKEY | COMPUTING-04 | 2020

The crossing number cr(G) of a graph G is the least number of edge crossings of a plane drawing of G. Determining the exact crossing number of a graph is NP-Complete. In this project, we present a highly extensible algorithm for finding the crossing number of a graph. The algorithm works incrementally, by starting with an empty graph and adding vertices one by one in order to achieve the given graph. In every increment, we do a breadth-first search over the dual graph for each face. We go through a search tree of the possible increments to find the optimal embedding. Using an implementation of this algorithm, we can experimentally confirm Guy's conjecture for small numbers of n. The crossing number problem has applications in incidence geometry and VLSI design.

eucys2021.com/computing-04-2020



Feridun Balaban





Investigation of spectral response and efficiency of boron and nitrogen doped diamond-like carbon as a top junction on multijunction solar cells

TURKEY | PHYSICS-05 | 2020

The energy consumption of the world is increasing day by day. As a result Greenhouse gases and aerosols are emitted into the atmosphere by burning fossil fuels. The emission of these gases can be easily reduced by using renewable energy sources. This project researches the usability of an amorphous carbon material called Diamond-like carbon(DLC) in solar cells. One of the most interesting property of DLC it's chemical structure, DLC contains the chemical bonds of graphite(sp2) and diamond(sp3) at the same time. Thanks to this property very interesting phenomena called "Quantum Mechanical Tunneling" occurs, which makes DLC neither conductive like graphite nor insulator like diamond, and instead behaves like a semiconductor.

eucys2021.com/physics-05-2020



Mehemet Sertaç Çeküç





Artificial antibodies: development of micro-fluidic sensors for the detection of environmental contaminants and apply to mathematical models

TURKEY | CHEMISTRY-08 | 2021

Environmental pollutants carried by water and air are one of the most important problems that destroy resources today. Herein, a proof-of-concept of a new colorimetric-fluorescent environmental-medical sensor is demonstrated by testing two hypotheses: (1) by combining artificial receptors with microfluidics, sensors based on color changes for acrolein and formaldehyde molecules can be developed, and (2) using microfluidics designed with carbon quantum dots (NH2-CQD) receptors, rapid gas-liquid diffusion can be detected instantaneously. For this purpose, imine synthesis, which enables the detection of aldehyde derivatives in liquid-gas phases, was carried out with NH2-CQDs on a sensor. These novel receptors operating more economically, sustainably, and specific than conventional methods.

eucys2021.com/chemistry-08-2021

EUCYS 2021 SALAMANCA

PROJECTS BY COUNTRY



Emirhan Kurtuluş





Deep learning based sterotactic cranial surgery planning

TURKEY | COMPUTING-13 | 2021

To improve the life expectancy and quality of a patient, early diagnosis, medical attention and accurate analysis are required. In this work, we propose a highly scalable system, with a focus on generalizability to other domains, that is capable of end-to-end cranial surgery planning, being the first study to define the surgery planning operation as an optimization problem and solving it via deep learning. The system distills the knowledge of the doctors and creates ensembles that will theoretically plan better cranial surgeries. To achieve this, four state-of-the art models: tumor classification, tumor segmentation, atlasbased segmentation, and tractography and a novel algorithm specifically designed to represent, calculate and minimize the risks involved therein are proposed.

eucys2021.com/computing-13-2021



Zeynep Parla Parmaksiz





Mathematical decision algorithms in the diagnosis, treatment and vaccine priority of COVID-19

TURKEY | MATHEMATICS-03 | 2021

This project is analyzed in three parts. In the first part, Covid-19 and winter diseases that show similar symptoms are distinguished by using fuzzy soft set matrices. In the second part, while calculating the Covid-19 follow-up treatment priority, a risk score algorithm is created with the help of six criteria: age, hypertension, cardiovascular disease, cancer, chronic kidney failure and diabetes. The severity of the disease in different individuals is compared. In the third part, Covid-19 vaccine planning is evaluated individually with a questionnaire study of 200 people and a literature review. 7 main criteria are determined as systemic disease, age, occupation, province and district, transportation preference, presence of a risk group in the immediate vicinity and Covid-19 history.

eucys2021.com/mathematics-03-2021



Iryna
Bobkova
17 years
ira.bobkova28@gmail.com



ANDROID-Application with the function of automatic removing of moving objects

UKRAINE | COMPUTING-05 | 2020

The application allow you get a digital photo of a static object for amateur photography or technical documentation. The average user needs the process to be simple, to pull the device out of pocket, to press a few buttons and beautiful photos for the social network are ready. Failure is corrected just on the spot, quickly and easily – without Photoshop and working with the layer. Removing the moving of objects in the photo is not a new thing. Of course, there are programs and plug-ins for photo editors, and services, as well as regular Photoshop tools, but for Android such an additional axis does not exist.

eucys2021.com/computing-05-2020





Spring based on ring magnet

UKRAINE | PHYSICS-07 | 2020

Magnetic springs have a lot of advantages in comparison with regular steel ones: they are more durable, they save almost all of their properties and serve well for dozens of years. That means that a replacement of mechanical springs and bearings with magnetic ones will lower the consumption sufficiently, due to the larger lifespan. Consequently, it acts very positively for ecology. So, the aim of the study is to investigate auch springs and dependence of their properties on the magnets parameters. This concept of springs has a wide range of application. For example, they can improve magnetic shock absorbers features or they can be applied for the maglev trains. Also, a computer model, that helps to construct a spring with required properties was created and published.

eucys2021.com/physics-07-2020

EUCYS 2021 SALAMANCA



Illia
Nalyvaiko
17 years
ilyha.nali@gmail.com





Properties of possible counterexamples to the Seymour's Second Neighborhood Conjecture

UKRAINE | MATHEMATICS-04 | 2021

Seymour's Second Neighborhood Conjecture states that every simple digraph without loops or two-cycles contains a vertex whose second neighborhood is at least as large as its first. In this project we show that from existence of a counterexample to Second Neighborhood Conjecture it follows that there exist strongly-connected counterexamples with both low and high density (dense and sparse graph). We also show that if there is a counterexample to the conjecture, then it is possible to construct counterexample with any diameter not less than 3. Moreover, we prove that Second Neighborhood Conjecture and Vertex-Weighted Version of Second Neighborhood Conjecture are equivalent.

eucys2021.com/mathematics-04-2021



Dmytro
Zakharov
18 years
zamdmytro@gmail.com





Simulation of light propagation in an optically inhomogeneous medium

UKRAINE | PHYSICS-07 | 2021

Optical inhomogeneity plays an essential role in the observation of various objects. For example, it underlies phenomena such as astronomical refraction and mirages occurrence. It is also used in optical devices: for instance, in the Luneburg lens, which is used in the radar reflector and microwave antenna. The research aim is to construct and examine the trajectory of light in an optically inhomogeneous medium using computer simulation. We derived the analytical formula of light trajectory in case of inhomogeneity along one coordinate, described the algorithm that constructs a trajectory of a beam in case of refractive index dependence on time and two coordinates, evaluated the accuracy of this algorithm and suggested methods of its efficiency maximization.

eucys2021.com/physics-07-2021





The Jury

The contest Jury is composed of 25 highly qualified scientists and engineers with worldwide reputations in their chosen field. The jury carry out their duties at the contest as independent scientific experts and not as representatives of any institution, organisation or country. The European Commission appoints the Jury annually, basing its selection on the scientific and technological needs of the contest. They jury are selected both from academia and industry. The Commission ensures an appropriate geographical and gender balance. Jury members normally remain on the jury for up to 5 years. In exceptional circumstances the EC reserves the right to appoint Jury members for more than 5 terms.

The role of the Jury at EUCYS is of the utmost importance. The jury follow the Jury Rules and Guidelines established by the EC. The Jury assess and score the competing projects based on the written descriptions submitted by the projects and through interviews with the Contestants carried out during the Contest. Based on their assessment of the projects and on lengthy discussions with other jury members, the jury draw up the lists of winners of the core prizes and the special prizes. The decision of the jury is final.

This year the Commission is delighted to point out that two members of the jury are previous winners of the contest.

Since the European Commission took over the running of the European Union Contest for Young Scientists in 1989, the position of President of the Jury has been held by

Sir Peter Swinnerton-Dyer

Trinity College Cambridge, 1989-1991

Professor Galo Ramirez

Universidad Autonoma 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

Universite Libre de Bruxelles, 2000-2002

Dr. Ulf Merbold

ESA/ESTEC Noordwijk, 2003-2005

Professor Jane Grimson

Trinity College Dublin, 2006 and 2008

Professor Hansen Vagn Lundsgaarg Technical University of Denmark, 2007

Professor Chris Phillips

Imperial College, London, United Kingdom, 2009

Professor Hagit Messer-Yaron

The Open University of Israel, Israel, 2010

Professor Maria Ana Viana-Baptista

Lisbon Engineering Institute, 2011-2012

Dr. Henrik Aronsson

University of Gothenburg, 2013-2014

Dr. Lina Tomasella

Astronomical Observatory of Padua, 2015-2016

Dr. Attila Borics

Hungarian Academy of Sciences, 2017, 2019-2021

Professor Tony Fagan

University College Dublin, 2018

President of the Jury



Attila Borics Hungarian Academy of Sciences, Hungary

Members of the Jury



Franco Algieri Webster Vienna University, Austria



Bloodworth Siemens Gamesa Renewable Energy, Denmarck



Fagan University College



Frewen Food Drink Europe,



Horvat Jožef Stefan Institute,



Langeveld Biomass Research, The Netherlands



Morten Lennholm EUROfusion (JET),

Culham Science Centre,

United Kingdom

Luisa

Pereira

Institute of Molecular

Pathology and

mmunology, University

of Porto, Portugal

Christian

Bressler

xFEL, Hamburg,



Mariya Lyubenova **European Southern** Observatory, Munich,



Minarova Slovak University of Technology, Bratislava, Slovakia



Mossou ESRF, France



Margus Niitsoo Music Education LLC, Tartu. Estonia



Moro Sánchez Universidad Complutense Madrid, Spain



Zuzanna Szymańska University of Warsaw,

Evelyne

Cottereau

CNRS, Paris,



Van Thielen Ghent University Hospital, Belgium

Peter

Celec

Comenius University,

Bratislava, Slovakia



Zajakina Latvian Biomedical Research and Study

Henrik

Aronsson

University of

Gothenburg, Sweden

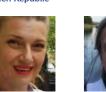


Macek Charles University, Prague. Czech Republic

University of Belgrade,



Lacaze ESRF, Grenoble, France



Karin

Tonderski University of Gothenburg, Sweden

Lidiya Matija

eucys2021.com/jury

PRESIDENT OF THE JURY



Attila Borics
HUNGARIAN ACADEMY
OF SCIENCES
HUNGARY

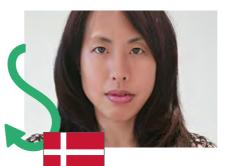
Dr. Attila Borics graduated as a chemist and a chemistry teacher from the University of Szeged in 2001, then received his PhD degree in 2005 from Creighton University (USA) for his contribution to the field of chiroptical spectroscopy and conformational analysis of peptides. Currently he is working in the Biological Research Centre of the Eötvös Loránd Research Network in Szeged (Hungary) as a senior research associate and teaching structural biology and bioinformatics at the University of Szeged. His research focuses on biomolecular structure, more specifically protein and peptide structure and interactions, conformational analysis and structure-activity studies. This includes the investigation of the three dimensional structural determinants of the biological activity of various biological compounds and drug candidates, explanation of the mechanism of action of enzymes and receptors on a structural basis and the location of interaction sites of proteins.

MEMBERS OF THE JURY



Franco Algieri
WEBSTER VIENNA UNIVERSITY,
AUSTRIA

Franco Algieri is Associate Professor of Interna onal Rela ons and Head of the Interna onal Rela ons Department at Webster Vienna Private University. Prior to that he was Director of Research at the Austrian Ins tute for European and Security Policy (AIES) and Senior Research Fellow at the Center for Applied Policy Research (C.A.P), Ludwig Maximilians University Munich. He was lecturing Poli cal Science at the Ins tut für Poli kwissenscha, Eberhard Karls University Tübingen and at the Geschwister Scholl Ins tut, Ludwig Maximilians University Munich. He was appointed Guest Professor at the School of Interna onal Studies and Senior Fellow at the Centre for European Studies, both at the Renmin University of China, Beijing. Franco Algieri studied Poli cal Science and Sinology in Freiburg, Tübingen and Taipei, and European Studies in Bruges. He received his doctorate and M.A. both from the Eberhard Karls University Tübingen, and a Diploma of Advanced European Studies from the College of Europe Bruges. His research focus covers European and Asian security issues, the European integra on process and EU-Asia rela ons, with special emphasis on EU-China rela ons.



Victoria Bloodworth SIEMENS GAMESA RENEWABLE ENERG, DENMARK

Dr. Victoria Bloodworth studied Aeronautical Engineering at Imperial College London, UK, earning her PhD in 2008, specialising in carbon fibre composite structures. She then spent the next eight years working at Aerotrope, a small and radical engineering consultancy based in Brighton, UK. During this time, she was part of the design team with a diverse project portfolio, providing design engineering for wind turbines, large scale artworks and zero carbon vehicles, which includes the current world speed sailing record holder Vestas Sailrocket 2. In 2017, she moved to Denmark to join the world's largest wind turbine manufacturer, Siemens Gamesa Renewable Energy, Blade Design department where she is now at the forefront of making the next generation of wind turbine blades a reality. A British national, currently residing in Denmark, she spent her childhood years in Singapore before moving to the UK for higher education and work.



Tony Fagan
UNIVERSITY COLLEGE
DUBLIN, IRELAND

Professor Anthony (Tony) Fagan received his PhD in Electronic Engineering from University College Dublin (UCD) in 1978. He then spent two years working on advance modem design at Marconi Research laboratories in England. On his return to UCD in 1980 he established the DSP research group there. Through this group he has helped establish a strong signal processing industry in Ireland with many companies being founded by his research graduates, especially in the area of physical-layer communications design. Well over 100 research graduates have been produced by his group. Co-operation with industry has been a distinguishing feature of his academic career with much of his funding coming directly from these contacts. In 2016 he was awarded the Parsons medal for his work with industry. He retired from full-time academic life in 2017 but continues his love of engineering by acting as consultant to various advanced communication systems design companies.



Mella Frewen FOOD DRINK EUROPE, BELGIUM

Mella Frewen is Director General of FoodDrinkEurope, representing Europe's largest manufacturing industry. She has a wide experience of relations with international institutions, with the Institutions of the European Union, and trade associations across the food chain. Ms. Frewen represents the food industry in numerous high-level Advisory and Steering Committees of the EU Commission and is Vice President of the FAO/OECD Advisory Group for Responsible Business Conduct along Agricultural Supply Chains. She is also involved in several food industry-related Boards.

She has worked in the Agri-food sector in Europe for more than 30 years. She has a Master of Science degree from the National University of Ireland and worked a post-graduate course at the University of Brussels (ULB). She also holds a Harvard certificate on Agribusiness and an INSEAD certificate on International Operations Management.



Milena Horvat

JOŽEF STEFAN INSTITUTE,

SLOVENIA

Prof. Dr. Milena Horvat is the head of the Department of Environmental Sciences www.environment.si (since 1997) at the Jožef Stefan Institute and the dean of the Jožef Stefan International Postgraduate School www.mps.si (since 2016). Her main expertise is in the field of mercury research, which is interdisciplinary and covers the fields of analytical chemistry, human health, polluted areas, the marine environment, and clean technologies and sensor development. She is the author and coauthor of over 300 articles in SCI journals and 24 book chapters. She has organized several international conferences and workshops and has been the guest editor of 16 special issues of journals, including environmental health perspectives, environmental research, analytical and bioanalytical chemistry, marine chemistry ...). She received the national Ambassador for Science Award in 2002, the national Zois Award for Research Excellence on 2014, and the international Life of Achievement Award at ICMGP in 2019. She has been a supervisor of 18 Doctoral Dissertations and several master's and diploma theses.



Hans Langeveld BIOMASS RESEARCH, THE NETHERLANDS

Hans Langeveld is a tropical agronomist with a wide experience in quantifying land use practices in agriculture and food production around the globe. He focuses on sustainable food production, food and forest residue valorization, biogas, and development of biobased production chains. Hans has been an enthusiast member of the jury since 2016. His main interest is in helping students to identify the object(s) of their passion and setting out a route to develop their skills and interest in the subject.



Morten Lennholm

EUROfusion (JET),

CULHAM SCIENCE CENTRE,

UNITED KINGDOM

Morten Lennholm has worked in the field of Nuclear Fusion Research for the last 34 years. From a microwave and control engineering education, he developed his knowledge of plasma physics and much of his work has involved a combination of engineering and plasma physics. He has published in journals such as 'Physical Review Letters' and 'Nuclear Fusion' on the control of fusion plasma, plus in 'Nature Communications' to describe the potential for control of certain plasma instabilities through 'phase space engineering'. He received his PhD degree from Eindhoven University of Technology in 2014 for his work on 'Real Time Control of the Sawtooth Instability in Fusion Plasmas with Large Fast Ion Populations'. Based at the Culham laboratories in Abingdon, England, Morten conducts, manages and coordinates work involved in the operation of the JET Tokamak (Joint European Torus), including engineering and physics studies associated with this project. His main areas of interest include: radio frequency heating employed in Tokamak fusion experiments; plus, plasma control systems, which allow the control of a number of plasma parameters including the location of the plasma itself inside the Tokamak



Mariya Lyubenova EUROPEAN SOUTHERN OBSERVATORY MUNICH, GERMANY

Mariya Lyubenova holds a doctorate in astronomy from the Ludwig-Maximilians-Universitaet after pursuing 3 years of research at the European Southern Observatory (ESO) in Munich, Germany. In her work she observes and uses the motions and chemical properties of stars in galaxies as fossil records to unravel the build-up and evolution of galaxies. Well before she started her university studies in her home country Bulgaria, she was already an active astronomy club member and editor of an astronomy magazine and a newspaper. After the completion of her PhD in 2009, Mariya took a leading role in publishing the book "An Expanded View of the Universe - Science with the European Extremely Large Telescope" where the key science cases for the ELT are summarised. Next, she worked for several years at the Max Planck Institute for Astronomy in Heidelberg, Germany, in parallel as a researcher and an equal opportunity officer. In addition, she became a parent of a daughter who (at her current stage of research) is equally passionate about the fossil record of past times, but with emphasis on dinosaurs and all the like. Then, Mariya spent 3 years as a researcher at the Kapteyn Astronomical Institute of the University of Groningen, the Netherlands. In May 2017 Mariya moved back to ESO, this time as a member of the astronomers' faculty. There she spends half of her time on research and the other half on supporting the Education and Public Outreach Department with her scientific expertise.



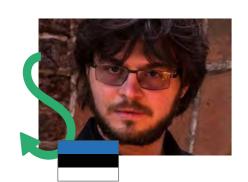
Mária Minárová SLOVAK UNIVERSITY OF TECHNOLOGY, BRATISLAVA, SLOVAKIA

Saying briefly, I am a mathematician. Both teacher and researcher. My work fascinates me. I take pleasure in teaching of mathematics, applied mathematics and biomechanics at our technical university. I supervise final theses of students, as well. Naturally, I always use math, mostly applied math, in my research. The most of my investigations are interdisciplinary, tided up with disciplines as biomechanics, biomathematics, medicine, rheology, material science, building physics, etc. Recently I deal with data mining, optimization and uncertainty modelling and its utilization in image processing. I like sports, classical music and beautiful nature.



Estelle Mossou ESRF, FRANCE

Physicist by training, I carried out my PhD on the structural characterization of biomedically and biotechnologically relevant filamentous systems, followed by a postdoctoral position at the Institut Laue Langevin (Grenoble, France) on method developments aimed at combining X-ray and neutron techniques for biological systems in terms of crystallography and fibre diffraction. I then carried on as instrument scientist responsible of a monochromatic single crystal neutron diffractometer. I am now part of the macromolecular crystallography group at the European Synchrotron Radiation Facility (ESRF) in Grenoble, working as support for user experiments on the state-of-the-art structural biology beamlines as well as developing pipelines for room-temperature data collection with microfluidic crystallization chips.



Margus Niitsoo MUSIC EDUCATION LLC, TARTU, ESTONIA

Margus Niitsoo was a competitor at EUCYS 2005 where he learned that the ability to communicate his findings is at least as important a skill as actually doing research. While studying for his degrees in mathematics and computer science in University of Tartu, he actively sought ways to also improve his skills in communication, becoming a teaching assistant in university, joining a science popularization initiative and also taking as many psychology courses as he could fit into his timetable among his own courses. However, his love of mathematics did not fade, and despite the new interests, he still managed to finish his BSc and MSc together in just 3 years instead of the usual 5, which was followed by another 3 years of PhD studies in theoretical cryptography. This briefly made him famous, as he was the youngest person to get a PhD in Estonia at just 24 years of age. Obsessed with teaching and finding ways to improve it, he was then offered the job of curriculum manager which allowed him to work not only on his own teaching but also to find better ways of organizing the curriculum and finding means to support both students and lecturers in their pursuits. He thoroughly enjoyed the work, but felt that he needed to see the world outside the academia as well and so headed for the industry. Currently, Margus is the CTO of a small music education startup that is developing a tool for automatic assessment and feedback of musical performance, which again allows him to combine his twin passions of teaching and computer science.



María Ángeles Moro Sánchez UNIVERSIDAD COMPLUTENSE MADRID, SPAIN

María Ángeles Moro is Full Professor at the Spanish Centre for Cardiovascular Research (CNIC) since November 2019, where she leads the Neurovascular Pathophysiology Group. Prof. Moro also co-leads the Neurovascular Research Unit, with sites at Universidad Complutense de Madrid (UCM, where she is Full Professor of Pharmacology) and at the Health Research Institute of "12 de Octubre" University Hospital.

Prof. Moro's group studies key questions in stroke and vascular cognitive impairment by applying different models and novel technologies, with the final aim to translate findings to patients. Her laboratory has established relevant paradigms of ischemic and hemorrhagic stroke and of the different nosological entities that account for cognitive decline driven by cardiovascular risk factors.

She participates in several consortia such as the Spanish Neurovascular Network (INVICTUS) and the Leducq Foundation Grants "Stroke-Impact" and "Circadian Effects in Stroke".

She has published extensively in the area of neuroscience and neurological sciences, especially in the neurovascular research field. Her scientific production includes more than 170 indexed papers with more than 10000 citations and an "h-index" of 60/70 (WOS/Google Scholar).



Luisa Pereira
INSTITUTE OF MOLECULAR
PATHOLOGYAND INMUNOLOGY,
UNIVERISTY OF PORTO,
PORTUGAL

Luísa Pereira has a degree in Biology and a PhD in Human Population Genetics. She is a senior researcher and group leader at i3S-IPATIMUP (Institute of Research and Innovation in Health, University of Porto-Institute of Molecular Pathology and Immunology of the University of Porto), being interested in using genetics to infer the past and evolution of human populations and to evaluate susceptibility of human populations to complex diseases. She is co-author of 138 peer-reviewed papers in international journals and a book on popular science. She has been engaged in presenting her work to the general public, including young students in high schools, and regularly collaborates with local media.



Zuzanna Szymańska UNIVERSITY OF WARSAW, POLAND

Zuzanna Szymańska, Ph.D. graduated in mathematics and computer science from the Faculty of Mathematics, Informatics and Mechanics University of Warsaw. In 2010, at the Polish Academy of Sciences, she obtained her PhD degree with distinction in biology with a specialization in biophysics. Currently, she is an Assistant Professor at the Institute of Mathematics of the Polish Academy of Sciences and the Interdisciplinary Centre for Mathematical and Computational Modelling (ICM) at the University of Warsaw. Her main area of research involves developing multi-scale mathematical models in biology and medicine, particularly for processes such as the growth and spread of cancer or wound healing.



Mira Van Thielen GHENT UNIVERSITY HOSPITAL, BELGIUM

Mira Van Thielen has a degree in pharmaceutical as well as medical sciences. At the age of 16 years she won several (inter)national prizes with her medical project. The same time she was one of the founders of the educative youth organisation at the public oberservatory MIRA (Belgium).

Nowadays, she is working as a staff member at the department of Anaesthesiology in Leuven University Hospital (Belgium). Her research interests are devoted to a combination of physics and medical sciences. Besides, she is a board member of 'Jeugd, Cultuur & Wetenschap', a scientific youth organisation in Belgium.



Anna Zajakina

LATVIAN BIOMEDICAL

RESEARCH AND STUDY CENTRE,
LATVIA

Dr. Anna Zajakina is the head of the Cancer Gene Therapy group at Latvian Biomedical Research and Study Centre. She has completed her PhD in 2005 at University of Latvia, Molecular Virology and Biochemistry Division. She raised her expertise at University of Rostock (Germany), Uppsala University (Sweden) and University of Bordeaux (France). Dr. Zajakina is the author of more than 40 papers and conference presentations related to cancer research, molecular biology and virology issues. The main research interests involve the development of novel clinically translatable methods for cancer treatment based on gene therapy vectors and immunotherapy. Currently, main research projects are focused on delivery of therapeutic genes by viral vectors into tumours for smart regulation of tumor microenvironment in combination of polyfunctional magnetic nanoparticles. Being a national coordinator of European Biotechnology Thematic Network Association, Dr. Zajakina is actively taking part in organization and hosting of international workshops, seminars and conferences, working in cooperation with students and researchers representing various organizations and universities.



Milan Macek
CHARLES UNIVERISTY,
PRAGUE, CZECH REPUBLIC

Prof. Milan Macek serves as the chairman of the largest academic medical/molecular genomics institution in the country, which comprises a research/diagnostics reproductive genetics centre. He was a president of the European Society of Human Genetics (ESHG), board member of the European Society for Human Reproduction and Embryology (ESHRE) and board member of the European Cystic Fibrosis Society (ECFS). His institute is a "clearing center" for dissemination of knowledge in genomics gathered within various international European projects, such as CF Thematic Network, EuroGentest, EuroCareCF, Techgene, RD-Connect and Solve-RD to Central and Eastern Europe in the fields of rare disease genomics and reproductive genetics. Prof. Macek done his first postdoctoral research at the Institute of Human Genetics in Berlin (Germany) and continued as a postdoctoral fellow at the McKusick-Nathans Institute of Genetic Medicine - Johns Hopkins University in Baltimore (USA). During that time, he was also a fellow at Harvard School of Medicine in Boston. Prof. Macek is also the former chief advisor of the Czech EU Council Presidency under which the "EU Council recommendation on an action in the field of rare diseases" was adopted in June 2009. He is the acting president of the Czech Society of Medical Genetics, a past member of the European Union Committee of Experts on Rare Diseases (EUCERD) and current member of the EU - European Board of Member States on Rare Diseases. He also serves as external expert and project monitor for the European Commission within Marie Curie Actions.



Yannick Lacaze ESRF, GRENOBLE, FRANCE

I am a former geologist (MSc in 2004) trained in science communication (MSc in 2006). After working in science communication in different places in France, I have moved to Australia to work as an exploration geologist in 2011 and 2012.

I have been working as a public outreach officer at the ESRF - the European synchrotron (Grenoble - France) since 2013.

I am currently in charge of education, and more particularly managing the Synchrotron@School programme, designed for high school students. Through this programme, the ESRF welcomes each year more than 1500 students.



Christian Bressler xFEL, HAMBURG, GERMANY

Christian Bressler has been developing the field of ultrafast x-ray science over the past 20 years at several synchrotron and free electron laser facilities. He received his PhD from the Free University of Berlin, and spent his postdoctoral period at SRI International in Menlo Park, California. He relocated to Switzerland, where he became 2002 assistant professor for physics at the university of Lausanne and at the Ecole Polytechnique Fédérale de Lausanne (EPFL). In 2009 he moved to Hamburg as Leading Scientist and designed, implemented and inaugurated the Femtosecond X-Ray Experiments Instrument at European XFEL, while pursuing a rigorous research programme in structural dynamics research. This was accompanied by several research campaigns with his group at several FEL and SR facilities leading to an improved instrument design. He has served on several national and international advisory boards, and connected to the scientific community via more than 180 invited presentations and more than 80 publications. His current research interests include structural dynamics of functional molecular materials with an emphasis on understanding their emergent behavior and the influence of solvent molecules surrounding reacting molecules during the ongoing ultrafast reaction.



Evelyn Cottereau CNRS, PARIS, FRANCE

Evelyn Cottereau has an engineering degree from the Ecole Supérieure de Physique et Chimie Industrielles of Paris (France) and received a M.S. degree from Berkeley (USA).

Her work focused on ion implantation and transport of radioactive beams, designing, building and operating scientific apparatus.

She designed and operated the on line radioactive isotope separator PARRNe at the ALTO facility at Institut de Physique Nucléaire at Orsay. She also set up and operated a national facility based on a 3 MV electrostatic tandem along with sample preparation mainly for radiocarbon dating in different fields of application (climate studies, archaeology...). She was in charge of the Andromede facility for surface analysis designed around a 4 MV single ended electrostatic accelerator to accelerate cluster beams.



Peter Celec COMENIUS UNIVERSITY, BRATISLAVA, SLOVAKIA

Peter Celec is the head of the Institute of Molecular Biomedicine at the Comenius University in Bratislava, Slovakia. He studied medicine, molecular biology and national economy, has PhD in normal and pathological physiology, as well as DSc in molecular biology. His research focuses on extracellular DNA as a biomarker but also on its role in the pathogenesis of inflammatory diseases. Research stays in Germany (Göttingen, Aachen) and USA (Boston) enabled several important and fruitful international collaborations for his interdisciplinary research team. With an h-index of 30 Dr. Celec is one of the most successful researchers in biomedical sciences in Slovakia. His professional motto is: Science must be fun! So, he is proud of the Ig Nobel prize for the research on salivary DNA exchange during kissing.



Henrik Aronsson
UNIVERSITY
OF GOTHENBURG,
SWEDEN

Professor in Plant Molecular Biology, at the University of Gothenburg, Sweden. He pursued his PhD degree in Plant Physiology at the University of Gothenburg, and graduated in 2001. He spent the following year and a half as a postdoctoral student at Leicester University, Uniterd Kingkom. The next year he spent at Gotland University and Skövde University, Sweden as senior lecturer. He then returned to the University of Gothenburg in 2004. His current research is dedicated to molecular breeding of salt tolerant wheat where the aim is to develop new varieties in a faster and more precise way than before. These varieties can be used for cultivation on salt-contaminated unusable land in e.g. Bangladesh, to increase food production. He has expertise from working with chlorophyll and photosynthesis, protein import complex and protein transport, and lipid and vesicle transport. Moreover, he has published solely bioinformatics papers. He is the founder and owner of two SMEs within the plant biotech area. Currently he is the Head of the Department of the Biological and Environmental Sciences at the University of Gothenburg.



Lidija MatijaUNIVERSITY OF BELGRADE,
SERBIA

Lidija Matija is a professor at the University of Belgrade Faculty of Mechanical Engineering where she received her PhD in Control Engineering in 1997. She has been working in the Institute for Chemical Power Sources, Belgrade, in the field of fullerenes based materials, its production and application for battery production. In 2002 she has changed her field of research and moved to the Institute of Technical Sciences, of SASA where she investigated fullerene and carbon based materials for biomedical applications. In 2005, professor Lidija Matija moved back to the University of Belgrade Faculty of Mechanical Engineering where she joined the group for Biomedical Engineering within the department for control engineering and became the Chair of NanoLaboratory. In the period from 2008 - 2010 she was appointed as Seconded National expert (SNE) in European Commission, DG RTD where she worked as scientific officer. She is a founder of the department for Biomedical engineering at the University of Belgrade Faculty of Mechanical engineering. Her main fields of research are: Control Systems, Early Detection of Skin Cancer and Melanoma, Intelligent Materials, Fullerenes and Carbon Nanotubes, STM/AFM, Nanotechnology, Nanomedicine. Professor Matija's fields of teaching are: Control Systems, Biomedical Engineering, Nanotechnology, Nanomedicine. She was several times awarded in her country for her research achievements in the field of nanotechnology and she was the coordinator of several national research projects of which more than half had industry involvement.



Karin Tonderski
UNIVERSITY
OF GOTHENBURG,
SWEDEN

Professor Karin Tonderski received her B.Sc. in Biology and Chemistry from Uppsala University. She completed a Ph.D. studying nutrient recycling in constructed wetlands, and currently works as a lecturer and researcher at the multidiscipinary department of Management and Engineering, Linköping University. Sweden. Her research is focused on applied aspects of nitrogen and phosphorus cycling and recovery, and implications for water management issues. Examples are management of biofertilizers from biogas systems, nutrient cycling in urban agriculture and use of constructed wetlands for greywater treatment in informal urban settlements. She has worked with several research and educational projects in East and South Africa, and Vietnam, with focus on low-cost sanitation and nutrient cycling. Her scientific work has resulted in > 60 peer reviewed publications and around 35 reports and chapters in international books.



THE PRIZES

The Prizes

The participants compete for a number of core prizes on the basis of a written description of their work, their exhibited material and the interviews with the Contest Jury. In addition to this, a limited number of special donated prizes are awarded by the Jury, to offer some winners the opportunity to benefit from the specific experiences linked to these prizes. It is up to the Jury to decide whether a prize-winner can receive both a core prize and a special donated prize.

Core Prizes

The Core Prizes are the principal prizes awarded at the contest. These are cash prizes. In the case of a team winning such a prize, the amount is shared equally between the members of the team.

There are three categories of Core Prizes:

- First Prizes worth € 7,000 each;
- Second Prizes worth € 5,000 each;
- Third Prizes worth € 3,500 each.

In each of the Core Prizes categories, 2 prizes will be awarded to 2020 projects, and 4 prizes to 2021 projects.

Honorary Prizes associated with the First Prizes

There is one Honorary Prize associated with the first prizes.



LONDON INTERNATIONAL YOUTH SCIENCE FORUM (LIYSF)

Up to three contestants receive an all-expenses paid trip to London to attend the London International Youth Science Forum (LIYSF). The prize covers the travel costs from the country of origin, accommodation, meals, registration and participation in full a programme of activities. LIYSF brings together 300 science students from around 60 countries worldwide. The programme, which includes visits to industrial sites and world class research laboratories and facilities, lectures, demonstrations and seminars from leading scientists, highlights the links between individual fields of study and introduces all participants to the latest thinking across a broad range of science.

Participants are able to interact with the eminent speakers, to debate on current issues and to explore the way in which their chosen subject relates to other studies and has an impact on the world at large.

Each year's LIYSF becomes a multicultural community, and, with its busy social activities programme, provides a unique opportunity to meet and develop friendships and contacts across the world. The participants attending LIYSF are usually between the age of 17 and 21 years old.

For further information, please contact: London International Youth Science Forum,

Royal Parade Mews, Chislehurst, Kent, BR7 6TN, United Kingdom.

Tel: +44 (0)20 8295 8395. Fax: +44 (0)20 8295 8650.

Email: enquiries@liysf.org.uk Web: www.liysf.org.uk

Conference Director: Richard Myhill (Richard.myhill@liysf.org.uk)

Special Donated Prizes

The Special Donated Prizes are offered to contestants who, according to the EUCYS Jury, would benefit from the specific experience that these prizes offer. They are mostly study visits to leading scientific organisations:

EIROforum members each kindly award individual prizes as follows:

- European Organization for Nuclear Research (CERN) offers a project prize (for up to 3 people) of a week's visit to its Geneva site;
- EUROfusion offers one project a one week stay (for up to 3 people) at a EUROfusion member research facility;
- The European Molecular Biology Laboratory (EMBL) offers a project prize (for up to 3 people) of a week's placement at its premises in Heidelberg;
- The European Space Agency (ESA) offers a single prize winner the opportunity to spend a week at ESA's main technical centre, ESTEC, in The Netherlands;
- European Southern Observatory (ESO) offers a project prize (for up to 3 people) of a visit of up to one week to the ESO headquarters in Germany;
- European Synchrotron Radiation Facility (ESRF) operator of the world's most powerful synchrotron radiation source, offers up to 2 people (3 if the ESRF prize is combined with that of the ILL) of a winning project a one week visit to its site in Grenoble;
- The Institut Laue-Langevin (ILL) operator of the world's most intense neutron source, offers up to 2 people (3 if the ESRF prize is combined with that of the ILL) of a winning project a one week visit to its site in Grenoble;
- European X-Ray Free-Electron Laser Facility GmbH (European XFEL) offers one winner a one-week placement its site in Schenefeld (Hamburg metropole).

The Joint Research Centre

Kindly offers a two day stay at its Ispra site in Italy for 3 projects (up to nine students).

PRACE super computing

Kindly offers a trip to one of its supercomputing facilities in Europe.

Bulgarian National Seminar on Coding Theory "Professor Stefan Dodunekov"

One EUCYS project will be invited to participate in the next edition of NWCT (Q4 2021, Bulgaria).

International Swiss Talent Forum

Two students will be invited to attend ISTF with their individual projects.

Expo-sciences Luxembourg

Two students are invited to attend Expo-sciences Luxembourg with their individual projects.

EuChem

The European Chemical Society is pleased to offer a prize of €1000 to the best Chemistry project.

FoodDrinkEurope will offer a prize to the best food related project.

PEPSICO will offer personal computers to the best food technology project.

WOLFRAM are pleased to offer all contestants submitting projects in Mathematics a free one year licence to Mathematica and WolframAlphaPro.

The European Commission is very grateful to the organisations that offer these special prizes to the contestants.

THE PRIZES



EIROforum Prizes

The Special Donated Prizes of EIROforum are offered to contestants who, according to the EUCYS Jury, would benefit from the specific experience that these prizes offer. They consist of (up to) one-week visits to renowned scientific organisations, where the prize-winners would have unique opportunities to get acquainted with world-class facilities, experiments and cutting-edge instrumentation:

EIROforum members www.eiroforum.org each kindly award individual prizes as follows:

- European Organization for Nuclear Research (CERN) offers a project prize (for up to 3 people) of a week's visit to its Geneva site;
- EUROfusion offers one project a one week stay (for up to 3 people) at a EUROfusion member research facility;
- The European Molecular Biology Laboratory (EMBL) offers a project prize (for up to 3 people) of a week's placement at its premises in Heidelberg;
- The European Space Agency (ESA) offers a single prize winner the opportunity to spend a week at ESA's main technical centre, ESTEC, in The Netherlands;
- European Southern Observatory (ESO) offers a project prize (for up to 3 people) of a visit of up to one week to the ESO headquarters in Germany;
- European Synchrotron Radiation Facility (ESRF) operator of the world's most powerful synchrotron radiation source, offers up to 2 people (3 if the ESRF prize is combined with that of the ILL) of a winning project a one week visit to its site in Grenoble;
- The Institut Laue-Langevin (ILL) operator of the world's most intense neutron source, offers up to 2 people (3 if the ESRF prize is combined with that of the ILL) of a winning project a one week visit to its site in Grenoble:
- European X-Ray Free-Electron Laser Facility GmbH (European XFEL) offers one winner a one-week placement its site in Schenefeld (Hamburg metropole).

EIROforum is a partnership of Europe's eight largest intergovernmental research organisations. As world leaders within their respective fields of science, the member organisations of EIROforum constitute the vanguard of European science. Operating some of the largest research infrastructures in Europe, devoted to the exploration of fundamental quests of mankind such as the origin and the evolution of matter, biological life and structure of our Universe, they enable European scientists to engage in truly cutting-edge research, and be on the forefront on a global scale.

In support of the EUCYS initiative, EIROforum members are pleased to offer (up to) one-week visits/placements to their organisations.

To ensure optimum value of the experience to the prize winners, these will be offered on the basis of the relevance of the activities of the organisation to the field of interest of the nominated student. For safety and sometimes security reasons, age restrictions may apply.

EIROforum also sends experienced scientists to give a key note address to the contestants. As a curtesy to EIROforum, those students who would like to be considered for the EIROforum prizes, and their National Organisers, should endeavour to attend the EIROforum lecture during the contest.



The EIROforum organisations are:



www.cern.ch

European Organization for NuclearResearch (CERN), Geneva, Switzerland, was founded in 1954. CERN's main research area is particle physics.

Complex machines such as particle accelerators and detectors are developed and used to study the basic constituents of matter. The Large Hadron Collider (LHC), a 27-kilometre underground circular machine, began colliding particles at very high energy in 2010 giving new insights into the origin of the Universe. CERN is also famous for the invention of the World Wide Web, which was originally developed to give scientists access to data irrespective of their location. In 2013 the Nobel Prize for Physics was awarded for the theoretical discovery of the long-sought Higgs boson, which the LHC experiments confirmed experimentally in 2012.

CERN offers a prize of a week's visit for up to three students involved in the selected project. Topics should be related to a scientific or engineering field of relevance to CERN, which covers a large spectrum of projects, especially on the engineering side. *Minimum age*: 18 years.



www.euro-fusion.org

EUROfusion is a framework between EURATOM and various fusion research programmes in many EU countries. Its aim is to provide an infrastructure for fusion research. www.eurofusion.org

The European scientific programme is based on the Roadmap to the Realisation of Fusion Energy. The programme aims to pave the way for ITER, an engineering project currently being constructed in southern France, which is designed to be the first fusion reactor to release more energy than is needed to power it, and to develop concepts for the future demonstration fusion power plant, DEMO.

EUROfusion will award a one week stay at one of its member facilities for up to three persons. Topics include: plasma wall interaction, real time control of plasmas, computer modelling of plasmas, magneto hydrodynamics, engineering related topics to build tailored diagnosticts. *Minimum age*: 16 years.

EUCYS 2022 SALAMANCA THE PRIZES



EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL)

www.embl.orgt

The European Molecular Biology Laboratory (EMBL) is Europe's flagship laboratory for the life sciences. Established in 1974 as an intergovernmental organisation, EMBL is supported by over 20 member states. EMBL performs fundamental research in molecular biology, studying the story of life. The institute offers services to the scientific community; trains the next generation of scientists and strives to integrate the life sciences across Europe.

EMBL is international, innovative and interdisciplinary. Its more than 1600 staff, from over 80 countries, operate across six sites in Barcelona (Spain), Grenoble (France), Hamburg (Germany), Heidelberg (Germany), Hinxton (UK) and Rome (Italy). EMBL scientists work in independent groups and conduct research and offer services in all areas of molecular biology.

EMBL research drives the development of new technology and methods in the life sciences. The institute works to transfer this knowledge for the benefit of society.

EMBL offers a prize of a week's visit to its Heidelberg headquarters for up to three students involved in the selected project. Eligible topics should be in the field of molecular biology. Minimum age: 18 years.



esa EUROPEAN SPACE AGENCY (ESA)

www.esa.int

The European Space Agency (ESA) Paris, France. ESA is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. It is an international organisation with 22 member states, and by coordinating the financial and intellectual resources of its members, it can undertake space programmes and activities far beyond the scope of any single European country. Its programmes and missions cover astronomy, planetary, solar, and fundamental physics, human spaceflight and robotic exploration, Earth observation, launchers, navigation, telecommunications and applications, and space engineering research and development.

ESA offers a single prize winner the opportunity to spend a week at ESA's main technical centre, ESTEC, in The Netherlands.

The winner must be at least 18 and already studying at university, preferably science or engineering at the time of taking up the prize.



EUROPEAN SOUTHERN OBSERVATORY (ESO)

www.eso.org

The European Southern Observatory (ESO), Garching, near Munich, Germany, and Chile. ESO is the foremost intergovernmental astronomy organisation in Europe and the world's most productive ground-based astronomical observatory by far.

ESO is supported by 15 countries, and carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilities enabling astronomers to make important scientific discoveries. ESO also plays a leading role in promoting and organising cooperation in astronomical research. ESO operates three unique world-class observing sites in Chile - La Silla, Paranal and Chajnantor - and is presently constructing a 39-metre diameter European Extremely Large optical/near-infrared Telescope, the E-ELT, which will become "the world's biggest eye on the sky".

ESO offers a prize of a visit of up to one week to its headquarters in Garching, for up to three students. Minimum age: 18 years at the time of taking up the prize.



EUROPEAN SYNCHROTRON RADIATION FACILITY (ESRF)

www.esrf.eu

The European Synchrotron Radiation Facility (ESRF) Grenoble, France, is supported and shared by 22 countries.

The ESRF is the most powerful synchrotron radiation source in the world; it is a stadium-sized machine producing many beams of bright X-ray light. These are guided through a set of lenses and instruments called beamlines where the X-rays illuminate and interact with samples of material being studied. Here, at more than 40 specialized experimental stations, physicists work side by side with chemists and materials scientists. Biologists, medical doctors, geophysicists and archaeologists have become regular users. Companies also send researchers, notably in the fields of pharmaceuticals, cosmetics, petrochemicals and microelectronics. Each year approximately 7,000 researchers travel to Grenoble where they work in a first-class scientific environment to conduct exciting experiments at the cutting edge of modern science

ESRF will award the prize of a one week visit to the EPN Science Campus in Grenoble, for the leader(s) (maximum 2, or 3 if combined with the ILL prize) of a project in a topic related to the structural and dynamical study of condensed matter, materials and living matter using synchrotron radiation X-rays to achieve sub-nanometric resolution in both fundamental and applied research. This could be in the fields of biology, chemistry, cultural heritage, engineering, environmental sciences, materials research, medicine or physics. The visit may be undertaken in parallel with that of the winner(s) of the ILL prize.

Minimum age: 18 years at the time of taking up the prize.

THE PRIZES



INSTITUT LAUE-LANGEVIN (ILL)

www.ill.eu

The Institut Laue-Langevin (ILL), Grenoble, France, operates the most intense neutron source in the world. It is used to examine conventional and newly created materials.

The research at ILL includes the analysis of the structure of new materials for future electronic tools, the measurement of stresses in mechanical materials, and examination of the behaviour of complex molecular assemblies, particularly in a biological environment. The ILL also tackles questions relating to the fundamental properties of matter. Recent research includes the world's first magnetic soap, great developments on gamma-ray optics and potential Alzheimer treatments.

ILL will award a prize of a one week visit to the EPN Science Campus in Grenoble, for the leader(s) (maximum 2, or 3 if combined with the ESRF prize) of a project in a topic related to a scientific or engineering field of relevance to ILL. The visit could include witnessing technical developments being made in connection with the neutron beams, such as detectors and optical devices, or taking part in an experimental session. Areas covered include: neutron research and technology in the disciplines of chemistry, nuclear physics, chemistry, biology, crystallography and magnetics.

The visit may be undertaken in parallel with that of the winner(s) of the ESRF prize. Students must be at least 18 at the time of taking up the prize.



EUROPEAN XFEL (XFEL.EU),

www.xfel.eu

The European XFEL (XFEL.EU), Schenefeld Hamburg metropole, Germany. European XFEL is an X-ray laser based on a linear accelerator with unique characteristics. Its operation started in September 2017.

The facility opened up new research opportunities for a whole range of scientific fields, such as medicine, pharmacy, biology, chemistry, physics, materials science, and nanotechnology.

European XFEL will award a one-week placement at its site in Schenefeld for one person presenting a project in biology, chemistry, engineering, materials research, or physics. The visit will provide insights into the process of operating a new, cutting edge international research facility.

Students must be at least 18 at the time of taking up the prize.

The EIROforum organisations constitute true **success stories** for Europe. In particular, they:

- were created by their member states as part of a long-term strategy for the future of European research;
- attract some of the best scientists and researchers from across the world, thanks to their scientific excellence and cutting-edge facilities;
- have implemented the European Research Area (ERA) concept and contribute significantly to structuring European research in their specific scientific fields;
- link European scientific communities with the rest of the world;
- develop new technologies, instrumentation and electronic infrastructures and support innovation and technology transfer for the benefit of society at large.

The EIROforum organisations have world-class research infrastructures. Notably, they:

- operate major research infrastructures unique in Europe and in some cases in the world;
- are funded by their member states, with a combined annual budget for science of around 2 400 million Furos:
- are crucial to the competitiveness of European research, providing up-to-date and continually improved facilities for European scientists;
- serve more than 25 000 scientists every year (in astronomy, particle physics, fusion, space sciences, condensed matter physics, chemistry, and the life sciences);
- are active in international, often global, research for the benefit of Europe;
- possess unique experience in building and operating research infrastructures of great value for the further development of the European Research Area.

EIROforum is also committed to promoting and supporting innovative science education in Europe, as demonstrated by its science education activities.

SCIENCE IN SCHOOL

Published and funded as a cooperative venture by the eight European research organizations of EIROforum, Science in School aims to support teachers in the delivery of their STEM curricula, by connecting them to inspiring, cutting-edge science and technology, in order to foster positive attitudes towards the science that shapes their lives, and attract students to careers in these fields.

The programme supports science teaching both across Europe and across disciplines: highlighting the best in teaching and cutting-edge research. It covers not only biology, physics and chemistry, but also earth sciences, engineering and health, focusing on interdisciplinary work.

The contents include teaching materials and projects in science education, up-to-date information on cutting-edge science, interviews with inspiring scientists and teachers, reviews of books and other resources, and many other useful resources for science teachers. The main language of publication is English, and the journal aims to provide translations when possible in other European languages.

Science in School originated as a quarterly print journal. Following a 2019 review, EIROforum decided to move to an online-only model to better reflect changing digital competencies and encourage wider take-up.

EUCYS 2022 SALAMANCA THE PRIZES



JRC THE JOINT RESEARCH CENTRE (JRC)

https://ec.europa.eu/jrc/en

THE JOINT RESEARCH CENTRE: kindly offers a two day stay at its Ispra site in Italy for 3 projects (up to nine students).

The Joint Research Centre (JRC) is the European Commission's science and knowledge service. It performs direct scientific research and provides evidence-based and independent scientific advice to European policy makers helping them to make informed decisions.

EU policies that address global and societal challenges -such as financial stability, climate change, food security, water availability or the ageing society- need to be based more and more on a solid scientific understanding. In close cooperation with international partners, the JRC elaborates models and scenarios to assess policy options while stimulating innovation through developing new methods, tools and standards.

The work of the JRC has a direct impact on the lives of European citizens. It promotes a healthy and safe environment; secure energy supplies, sustainable mobility and consumer safety, and helps improve preparedness and response to natural and man-made disasters.

Serving society, stimulating innovation, supporting legislation

The JRC's headquarters are in Brussels and its seven scientific directorates, which host specialist and unique laboratories, are located on sites in Belgium, Germany, Italy, the Netherlands and Spain.

The JRC award will allow the participants from three successful projects to spend two days at its facilities, shadowing scientists from all over Europe according to the interests of the prize winners.



www.prace-ri.eu

The Partnership for Advanced Computing in Europe (PRACE) donates the "PRACE Travel Award Voucher for the Best Computational Project". The EUCYS's Scientific Committee will select the winner out of the contestants.

The voucher has a maximum value of € 2000, to cover the following elements:

- Travel, accommodation, meals and transport of the awardee with an accompanying person, if the awardee is not yet of legal age at the time of travelling¹.
- Visit of a PRACE HPC centre in the winner's home country provided that the home country is a PRACE Member².
- The PRACE Travel Award Voucher is valid until May 2022. The Voucher is not transferable
- Costs claimed on the Travel Award Voucher need to be justified by original receipts.
- PRACE contact is Silke Lang, Communications officer: s.lang@staff.prace-ri.eu.
- ¹The organization of the travel, accommodation, meals and transport will be organized by the PRACE HPC center.
- Travel: plane tickets economic class fare or train tickets second class fare
- · Hotel accommodation until 130 € per room per night, including breakfast, and excluding any additional costs that may be incurred during the stay at the hotel.
- Taxi fare will be not reimbursed

- Meals will be reimbursed up to 70 € for each 24 hours of travel, and only in case they are not offered by the local organiser of the relevant event or meeting
- · According to the PRACE POLICY ON THE REIMBURSEMENT OF TRAVEL EXPENSES https://prace-ri.eu/wpcontent/uploads/policy_on_travel_expenses_-_prace_aisbl_v5.6-_general.pdf
- ²Subject to the respective and current Corona regulations of the winner's home country when the visit is planned.

The PRACE EUCYS Award is given to the best computational project. The winners will receive a travel prize to visit one of the Prace super computing facilities in Europe with all the costs related to the trip covered.



BULGARIAN NATIONAL SEMINAR ON CODING THEORY "PROFESSOR STEFAN DODUNEKOV" PRIZE

https://math.bas.bg

The annual National Seminar on Coding Theory (NWCT), named after Stefan Dodunekov (1945-2012) is an annual research event, held since the 1980s. Prof. Dodunekov, the founder of the Bulgarian school of coding theory, was a world-renowned scholar in the area of algebraic and combinatorial theory of error-correcting codes and its applications for data protection and information security. The seminar brings together experienced researchers and young people - university and PhD students, assistant professors, specialists from coding theory and cryptography. Special sessions are devoted to novel ideas in the field, innovative applications of algebraic and geometric coding theory and research achievements of young scientists.

One EUCYS project will be invited to participate in the next edition of NWCT (Q4 2021, Bulgaria).



INTERNATIONAL SWISS TALENT **FORUM**

Two students will be invited to attend ISTF with their individual projects.

EXPO-SCIENCES LUXEMBOURG

Two students are invited to attend Expo-sciences Luxembourg with their individual projects.



www.wolfram.com

WOLFRAM Research is donating a one-year Mathematica Student Edition license plus a free one-year subscription to WolframAlpha Pro for all contestants submitting projects in the field of mathematics, physics and computer science.

THE PRIZES

Bioeconomy Prizes



The EUCYS Bioeconomy Bio-based Industries Prize

About the bioeconomy

The bioeconomy is made up of those parts of the economy that use renewable biological resources from land and sea like crops, forests, fish, animals and micro-organisms to produce food, materials and energy.

The bioeconomy is an essential alternative to our current fossil-based economy. It can replace our current fossil fuel-based economy which is dependent on the planet's limited supply of non-renewable resources, such as petroleum and coal. It's hailed as the next wave in our economic development and should provide major opportunities for innovation, jobs and growth to help re-industrialize Europe.

In fact, the bioeconomy is already a reality. Biomass like plant material, municipal and livestock waste is converted into electricity, fuels, plastics and the basic building blocks for chemical processes. Many materials made from petrochemicals can be replaced with materials made from biomass. Sometimes, small changes to naturally occurring substances can produce useful alternatives to commonly used products such as packing or trash bags.

Using biochemicals instead of chemicals derived from petroleum can reduce pollution, increase efficiency, and limit the use of hazardous materials and chemicals in the manufacture process. Enzymes from plants and microorganisms, as well as bacteria and other microbes, can be used in industrial chemical reactions to make a number of everyday products. Enzymes help bring about and speed up chemical reactions. Enzymes are in laundry detergent to improve stain removal. They convert cellulose to sugar, bleach paper and curdle milk for cheese and yogurt.

Cups, forks, spoons, knives, plates, food storage containers, T-shirts and pillows can be made from biomass including waste and residues. These products can be made so that they are biodegradable and compostable. It is hoped that the production and use of these bio-products and materials will reduce the amount of biodegradable waste and materials going to landfills.

About the Bio-based Industries Joint Undertaking (BBI JU)

The Bio-based Industries Joint Undertaking (BBI JU) is a partnership between the European Commission and the Bio-based Industries Consortium (BIC) set up in 2014 to fund research and innovation to help to develop the bio-based economy in Europe. BBI JU's funding is meant to encourage further investment by the private sector through industry. It works by setting up multi-partner projects who work together to solve the scientific, logistic and infrastructural challenges facing the bio-based industry in Europe. Research can be in a lab or in a combination of lab, pilot plant or biorefinery.

The BBI JU programme offers enormous opportunities to tackle some major societal, environmental and economic challenges, including climate change, energy and food security and resource efficiency.

The bioeconomy EUCYS prize will be awarded by the judges to the project which they feel best uses biotechnology for the production and the conversion of biomass into non-food value-added products¹.

The winning project should reflect three key principals of the bio-based economy in using raw material of a biological origin, for example whole or parts of plants, trees, algae, marine organisms, micro-organisms, animal in a way which is:

- sustainable
- · renewable
- innovative

The winning project will also meet a fourth criteria based on the effectiveness of its overall communicability to the scientific community and the general public. The winning project should promote scientific studies, while raising environmental awareness, and promote the bioeconomy.

The prize will be awarded by BBI JU who will provide a paid 4 to 5-day trip to Brussels for the winning project including travel to/from, accommodation and daily allowance in Brussels² and participating in a tailor-made experience related to the science behind the BBI JU programme.

The prize awarded will comprise:

- a visit and introduction to the Bio-based Industries Joint Undertaking office;
- a visit to some of the key public institutions shaping European bio-based policy, including the European Parliament's visitor centre and a look behind the scenes at the European Commission's Directorate-General for Research and Innovation, as well as meetings with key EU officials;
- Two one-day visits to bio-based biorefineries and laboratory facilities selected from the following based in:
 - Bio Base Europe Pilot Plant, DSM labs (tbc) and Biotech Campus (tbc) in Gent, Belgium (subject to confirmation)
 - Biotech Pilot Plant in Delft, The Netherlands (subject to confirmation)
- the possibility to visit local tourist sites in the relevant locations, where the itinerary permits.

During each one-day excursion, a range of age-appropriate supervised activities will be organised, along with an opportunity to meet and talk to the scientists working there about their research and a career in science. There may also be an opportunity to visit a few tourist attractions during the stay.

The prize will be awarded to the winning project (up to a **maximum of three participants**) and one teacher/lecturer³ (who has made a significant & demonstrable contribution to the wining project), to be nominated by winners to accompany them. Where no teacher/lecturer is nominated, an accompanying responsible adult **must be nominated** by the winning project. The winning person or persons will remain under the responsibility & supervision of this person during their travel, activities and visits.

Special conditions

Minimum age of all project participants is 16 years at date of judges' final decision.

Eligible countries

EU Member States, Associated Countries

Insurance cover

The winner(s) must ensure they have suitable travel, medical and accident insurances and will be asked to provide evidence prior to the visit.

Prize to be taken by

BBI JU will offer a maximum of three possible dates for the winning project to participate in the award. These will be provided according to availability of the winning project in conjunction with the availability of the organisations concerned in making the award.

¹ The bio-based product must be wholly or partly derived from biomass and can be an intermediate, material, semi-finished or final product. Bio-based products include bio-chemicals, bio-plastics, pharmaceuticals, paper and paper products, textiles, 2nd generation biofuels and bioenergy and bio-based ingredients used in everyday products.

² Travel and accommodation will be provided on the same basis as for attending competition exhibition.

³ Subject to the approval of their educational institution.

THE PRIZES

The EUCYS Bioeconomy Food Industry Prizes



www.euchems.eu

The European Chemical Society (EuChemS) brings together over 40 chemical societies which together represent more than 160,000 chemists in academia, industry, government and professional organisations in over 30 countries across Europe.

Founded in 1970, EuChemS aims to provide a single voice on key science and policy issues, based on expert scientific knowledge and to promote chemistry as a provider of solutions in a changing world. EuChemS Professional Networks cover all areas of chemistry, enable networks between European scientists to thrive, and provide expert advice to EuChemS' policy positions. EuChemS organises the biennial EuChemS Chemistry Congress open to all, and has an event recognition scheme in place to promote chemistry-related events across Europe.

EuChemS is pleased to present a prize of 1,000 € for the best chemistry entry in the EU Young Scientists Contest. For more information on EuChemS please see: www.euchems.eu



THE EUROPEAN FOOD AND DRINK INDUSTRY PRIZE, AWARDED BY FoodDrinkEurope

FoodDrinkEurope, on behalf of Europe's Food and Drink Industry, is very pleased to award the winner/each member of the winning team with a check for 2,000 €, to help the young scientists in their research pursuits and provide support for their future academic or professional plans.



PepsiCo is once again delighted to support EUCYS. Owing to the continuing COVID 19 situation across Europe, PEPSICO has decided to offer a personal laptop to each member of the winning team. PepsiCo are pleased to be associated with EUCYS again this year.

Host country prizes



AWARD FROM THE MINISTRY OF UNIVERSITIES

The Ministry of Universities is pleased to present two special awards to the best multidisciplinary project, one for 2020 and another for 2021 projects.



www.iberdrola.com

IBERDROLA, THE UTILITY OF THE FUTURE

With a history of over 170 years, today Iberdrola is a global energy leader, the number-one producer of wind power and one of the world's biggest electricity utilities by market capitalisation. The group supplies energy to almost 100 million people in dozens of countries and has more than 600,000 shareholders and a workforce comprising more than 38,000 employees.

Iberdrola is leading the transition towards a sustainable energy model through investments in renewable energy, smart grids, large-scale energy storage, and digital transformation, offering the most advanced products and services to our customers.

Iberdrola wishes to promote and encourage the work of future research leaders. For this reason it sponsors The Iberdrola Prize. The winning team will be given 3,000 € with the aim of developing the scientific training of its participants.

The prize will consider Projects from the fields of **Engineering** and the **Environment** in both the 2020 and 2021 editions.

EUCYS 2022 SALAMANCA THE PRIZES





BIOINFORMATICS, INTELLIGENT SYSTEMS AND EDUCATIONAL TECHNOLOGY htt

https://bisite.usal.es/en

The Bioinformatics, Intelligent Systems, and Educational Technology (BISITE) Research Group is formed by a group of researchers whose principal interest is the development and application of intelligent computer systems to different types of problems: AI, ML, Deep Learning, Emotional Systems, Fintech, Blockchain, IoT, Industry 4.0, Smart Cities, Smart Grids, Intelligent Textiles, and Cybersecurity.

The EUCYS BISITE-USAL awards are given to the best projects addressing computer-related topics (one for both 2020 and 2021).

The award will consist of a one-week stay for each of the teams at The Bioinformatics, Intelligent Systems, and Educational Technology Research Group of the University of Salamanca. Minimum age: 18 years at the timed of the visit.



SALAMANCA CANCER RESEARCH CENTER

www.cicancer.org/about-cic

The objective of the Cancer Research Center (CIC), which was created in 1995 to promote the Institute of Molecular and Cellular Biology of Cancer (IBMCC) and is under the patronage of the Cancer Research Foundation of the University of Salamanca (FICUS), is to integrate competitive and excellent research on cancer at its basic, clinical, and applied or translational levels. This is achieved with the support of the Junta de Castilla y León, the Higher Council for Scientific Research and the Carlos III National Institute of Health.

The EUCYS CIC-USAL awards are given to the best projects addressing medical issues (one for both 2020 and 2021).

The award will consist of a one-week stay for each of the teams at the Salamanca Cancer Research Center of the University of Salamanca.

Minimum age: 18 years at the timed of the visit.



https://ciale.usal.es

The Institute for Agribiotechnology Research (CIALE) was founded in 2000 with a commitment to unite, support, and promote the research and training activities carried out in different areas related to Agriculture at the University of Salamanca. The aims of the CIALE focus on

agricultural research and development in areas such as biodiversity, genetic improvement, plant production, plant health, and water resources among others. The work carried out is multidisciplinary and encompasses a wide range of projects involving both basic and applied research.



INSTITUTE OF FUNCTIONAL BIOLOGY **AND GENOMICS**

https://ibfg.usal-csic.es/index-en.php

The Institute of Functional Biology and Genomics (IBFG) is a joint research center between the Consejo Superior de Investigaciones Científicas (CSIC) and the University of Salamanca (USAL). The Institute's main research interest is understanding the molecular mechanisms that regulate cell growth and division, cell morphogenesis, and the replication and expression of the

The IBFG was created in 1970 under the name of the Institute of Microbial Biochemistry (IMB) by Professor Julio R. Villanueva. The IMB was one of the first joint research Institutes between the CSIC and a Spanish University. The IMB was closely linked to the Department of Microbiology of the School of Biology, in the Science building. In 1993, the IMB moved to the Departmental building on the Miguel de Unamuno Campus.

EUCYS CIALE+IBFG-USAL awards are given to the best projects addressing issues related to biodiversity, agriculture, the environment, or water (one for both 2020 and 2021).

The award will consist of a one-week stay for each of the teams at the Institute for Agriboiotechnology Research and the Institute of Functional and Genomic Biology, both from the University of Salamanca.

Minimum age: 18 years at the timed of the visit.



INSTITUTE OF NEUROSCIENCES

https://institutoneurociencias.org

The Institute of Neurosciences of Castilla y León (INCYL) is working on a large number of research projects, using the most advanced methodology to understand the structure, organization and functioning of the nervous system, the mind, behaviour, and ways of becoming ill. Its laboratories investigate diseases and treatments in aspects as relevant as sensory pathology and prevalent neurological and mental diseases such as Alzheimer's disease, epilepsy, schizophrenia, pain, multiple sclerosis, Parkinson's, etc.

The EUCYS INCYL-USAL awards are given to the best projects addressing topics related to medicine (one for both 2020 and 2021).

The award will consist of a one-week stay for each of the teams at the Institute of Neurosciences of Castilla y León of the University of Salamanca.

Minimum age: 18 years at the timed of the visit.



National Organisers

The National Organisers are responsible for selecting projects, submitting applications, and for all communication with the Commission. All contestants will be accompanied in the EU Contest by their National Organiser, or by an adult escort appointed by the National Organiser. The National Organiser, as the principal contact in all participating countries, will assure liaison between the contestants and the EU Contest in all matters concerning the Contest. National Organisers and/or escort(s), together with their contestants, constitute their respective country's official delegation and are the only parties that can enjoy access to all public and private events associated with the Contest. National Organisers assume responsibility for the wellbeing and behaviour of their party. They: ensure that the latter travels with adequate health, accident and travel insurance to cover them for both travel and the duration of the Contest; to handle linguistic or other problems which may arise during the Contest or in relation to associated activities, and to ensure that they have their own measures in place to assure their behaviour remains beyond reproach.



eucys2021.com/national-organisers

Jana Breyer
AUSTRIA WIRTSCHAFTS SERVICE GMBH

Walcherstraße 11A. A-1020 Vienna, Austria Tel: +43/1/501 75 514 j.breyer@aws.at



Vesela Vasileva
MINISTRY OF EDUCATION AND SCIENCE

2A Dondukov Blvd.. 1000 Sofía, Bulgaria Tel: +359 87 623 3606 vesela.vasileva@mon.bg



Vitali Zhylko
BELARUSIAN STATE UNIVERSITY

Nezavisimosti avenue, 4. 220030 Minsk, Belarus Tel: +375 29 109-09-52 zhylko.vitali@mail.ru



Reni Alexander Barlow
YOUTH SCIENCE CANADA

PO Box 297. Pickering, ON. L1V 2R4, Canada Tel: +1 289-200-2338 reni.barlow@youthscience.ca



Liling Luo

CHILDREN AND YOUTH SCIENCE CENTER OF CAST

Room218, Bldg. C, China Hall of S & T No.3 Fuxing Rd. 100863 Beijing, China Tel: +8601068510419 *luoliling@cst.org.cn*



Katrine Bruhn Holck
YOUNG SCIENTIST DENMARK, ASTRA

Dampfærgevej 27-29, 2100 Copenhagen, Denmark Tel: +221 887 67 kbh@astra.dk



Annely Allik
ESTONIAN RESEARCH COUNCIL

Soola 8. 51004 Tartu, Estonia Tel: +372 730 0333 Annely.Allik@etag.ee



Jana Ševcová

NATIONAL PEDAGOGICAL INSTITUTE

Senovazne namesti 25. 110 00 Prague, Czech Republic Tel: +420 603 860 963 jana.sevcova@npi.cz



Yasser Eltantawy
IDEASGYM

6 Makky. 21411 Alexandria, Egypt Tel: +20 122 444 7767 yasser@ideasgym.com



Tuula Pihlajamaa

TEKNIIKAN AKATEEMISET TEK

Ratavartijankatu 2. 00520 Helsinki, Finland Tel: +358 40 5086469 tuula.pihlajamaa@tek.fi

EUCYS 2021 SALAMANCA NATIONAL ORGANISERS



Régis Drexler

SCIENCES À L'ÉCOLE - OBSERVATOIRE DE PARIS

77 avenue Denfert-Rochereau 75014 Paris, France Tel: +33 6 85 54 47 89 eucys-france.sae@obspm.fr



Sven Baszio

STIFTUNG JUGEND FORSCHT E. V.

Baumwall 3,. 20459 Hamburg, Germany Tel: +49 37470 911 sven.baszio@jugend-forscht.de



Mari Cahalane

YOUNG SCIENTIST & TECHNOLOGY OF THE YEAR LIMITED

BT, Block B, Grand Canal Plaza, Upper Grand Canal Street. Dublin D2, Ireland Tel: 353 86 834 3006 mari.cahalane@bt.com



Tamar Khulordava

INTERNATIONAL EDUCATION PROGRAMS FOUNDATION

7 Gia Abesadze St. 0105 Tbilisi, Georgia Tel: +995 557 15 18 66 tkhulordava@yahoo.com



János Pakucs

HUNGARIAN ASSOCIATION FOR INNOVATION

Fehervari ut 108-112. 1116 Budapest, Hungary Tel: +36 30 515 9036 innovacio@innovacio.hu



Maya Sara Jalevy

THE BLOOMFIELD SCIENCE MUSEUM JERUSALEM

Shderot Hamozeonim 3, 9190401 Jerusalem, Israel Tel: +0506234862 mayah@mada.org.il



Alberto Pietro Pieri

FAST

p.le r. Morandi 2. 20121 Milano, Italy Tel: +39 335 302 570 alberto.pieri@fast.mi.it



Vitktorija Kalaimaité

LITHUANIAN CENTRE OF NON-FORMAL YOUTH EDUCATION

Žirmūnų 1B. 09101 Vilnius, Lithuania Tel: +370 674 78881 viktorija.kalaimaite@lmnsc.lt



Anne Riiser

RESEARCH COUNCIL OF NORWAY

Drammensveien 288. 0283 Oslo, Norway Tel: +47 922 66 396 anr@rcn.no



Sintija Birule

NATIONAL CENTRE FOR EDUCATION

Strugu street 4. LV-1003 Riga, Latvia Tel: +37129506040 sintija.birule@832.visc.gov.lv



Carlo Hansen

FONDATION JEUNES SCIENTIFIQUES LUXEMBOURG

Boulevard Pierre Dupong 40, 1430 Luxembourg, Luxembourg Tel: +352 661 562 732 contact@fjsl.lu



Jan Ryszard Madey

KRAJOWY FUNDUSZ NA RZECZ DZIECI - POLISH CHILDREN'S FUND

ul. Pasteura 7. 02-093 Warszawa, Poland Tel: +48 602 243 302 fundusz@fundusz.org

EUCYS 2021 SALAMANCA NATIONAL ORGANISERS



Carla Mouroé FUNDAÇÃO DA JUVENTUDE

Largo de S. Domingos, 21. 4050-545 Porto, Portugal Tel: +351 22 339 3530 cmouro@fjuventude.pt



Aleksandr Olegovich Karpov RUSSIAN YOUTH ENGINEERING SOCIETY (RYES)

b. 5, 2nd Baumanskaya st. Moscow 105005, Russia Tel: +7 499 267-55-52 apfn@step-into-the-future.ru



Marija Osredkar NATIONAL CONTEST OF YOUNG RESEARCHERS OF SLOVENIA

Zaloška cesta 65. 1000 Ljubljana, Slovenia Tel: +386 31 361 345 marija@osredkar.si



Laurentiu Dan Milici
CYGNUS SCIENTIFIC SOCIETY

Lisaura, 2A. 720229 Suceava, Romania Tel: +40 741 221 406 dam@usm.ro



Jozef Ristvej

ASSOCIATION FOR YOUTH, SCIENCE AND TECHNOLOGY (AMAVET)

Hagarova 4. 83151 Bratislava, Slovakia Tel: +421 905 506 312 j.ristvej@amavet.sk



Youngmi Kim

KOREA SCIENCE SERVICE

69, Dandae-ro, Dongnam-gu 31115 Cheonan-si, Chungcheongnam-do, Korea (South) Tel: +82 10-9917-3944 drkatekim@hotmail.com



Fernando José de Hipolito MINISTERIO DE UNIVERSIDADES

Paseo de la Castellana 162. 28046 Madrid, Spain Tel: +34 916 03 80 57 fernando.hipolito@universidades.gob.es



Melanie Seiler

SWISS YOUTH IN SCIENCE

Aarbergergasse 40. 3011 Bern, Switzerland Tel: +41 31 511 52 50 svetlana.hegar@sjf.ch



Ömer Faruk Ursavaş

HIGH SCHOOL STUDENTS RESEARCH PROJECTS COMPETITION

TÜBİTAK Başkanlık Binası No: 80, Kavaklıdere. 06680 Ankara, Turkey Tel: +90 312 298 9666 taha.atakli@tubitak.gov.tr



Anna Hedlund

UNGA FORSKARE /SWEDISH FEDERATION OF YOUNG SCIENTISTS

Lilla Frescativägen 4 C 114 18 Stockholm, Sweden Tel: +46 76 109 11 23 anna.hedlund@ungaforskare.se



Alaya Bettaieb

YOUTH FOR SCIENCE FOUNDATION

Parc El Ghazala, Route de Raoued Km 3.5, 2088 Ariana, Tunisia Tel: +216 98 263 800 alaya.bettaieb@gmail.com



Olexander Romanenko

NATIONAL MEDICAL UNIVERSITY

Pobedy avenue, 34. 03680 Kiev, Ukraine Tel: +380 44 454 4992 alexrom@i.com.ua



Brussels 1989

FIRST PRIZES

Mogens Markussen

DENMARK

Eyewriter, an eye operated control unit

Stephan Schlitter

GERMANY

Conducting polymers in batteries

Grace O'Connor, Sinead Finn

IRELAND

A crop fractionation industry

Lina Tomasella

ITALY

Toxicity of colour dyes used as tracers

Nicola Kirk

UNITED KINGDOM

Walking aid for a disabled person

Jean-Pierre Wyss, Matthias Zimmermann. **Elmar Artho**

SWITZERI AND

Recognition of handwritten signs

SECOND PRIZES

Serge van der Velde, Olivier Camberlin

BELGIUM

Computer-guided solar furnace

Charles Courtin, Pierre Betsch, **Hugues Nodet**

FRANCE

A Doppler rocket

Menno Bolt, Eric Toonen. **Pascal Stevelmans**

NETHERLANDS

Wind energy project

Mark Mathieson

UNITED KINGDOM

Voice intensity feedback for speech handicapped

Halldor Fossa

NORWAY

Expert systems in cancer treatment

Anouk Thommen

SWITZERLAND

152

Comparative study of two composts

THIRD PRIZES

Samuel Delaere

BELGIUM

Electromagnetic radiation

Dimitri Hautot

BELGIUM

Studies on the Kelvin generator

Stephan Røntved, Søren Chyltoft

DENMARK

LISSI, an I. C. Test Computer

Matthias Büger

GERMANY

Axiomatic theory of mean values

Walter Georg Veeck, Jens Schneider

GERMANY

Construction of a diffusion cloud chamber

Dimitri Theocharidis, Paul Magoulas

GREECE

New Dimension 2000, an automation system with computer

Fermín Tabar, Luis Rodríguez. **Antonio Sánchez**

SPAIN

Multi-use interface applied in a greenhouse

Juan Navas, José Ortega, José Navas

Computer-based sound synthesis system

Benoît Landeos, Bertrand Dubois, **Alain Crusoe**

FRANCE

Wheelchair adapted for racing

Patrick Mora, Jean-François López

Meteorological imaging

Enrico Corsini

ITALY

Solar spots

Valerio Emma

ITALY

The rhopalocerous insect

Marc Pauly, Gérard Milmeister

LUXEMBOURG

The fantastic world of fractals

Yves Thill, Serge Remesch

LUXEMBOURG

Mapograph, a computer-aided writer

Manuel van den Bergh, Lauren Smit, Mathieu van Geffen

NETHERLANDS

CHIP, a computer hardware instruction project

Paulo Ribeiro

PORTUGAL

Diving patterns of the bottlenose dolphin

Reinhard Herzog

AUSTRIA

An electronic plotter

Stein Ringnes, Ingvar Apeland, **Jarand Felland**

NORWAY

Solar energy project

Copenhagen 1990

FIRST PRIZES

Paul Vauterin, Bruno Callens

BFI GIUM

Automated meteor observation station

Waltraud Schulze

GERMANY

The effect of assimilatory starch for the growth of Arabidopsis

Annagh Dalton (née Minchin)

IRELAND

Colpomenia Peregrina, an inmigrant alga to Europe

Donatella Manganelli

Silence, micro-organisms at work

Brian Dolan, Lee Kiera, Ann Marie Malon

UNITED KINGDOM

A study of the transition to turbulence in Reynold's experiment

Marco Ziegler

SWITZERLAND

Drinking water examination

with special consideration of corrosional aspects

SECOND PRIZES

Morten Larsen

DENMARK

Hand reader

Jan Lichtenberg

GERMANY

Unilyser, a universal computer system for chemical analysis

Stefan Scheller

GFRMANY

Computer-aided holography for optical and acoustical reconstruction

Beatriz Pías. Mercedes Pías. Ana Riveiro

SPAIN

The Atlantic brushwood as a natural resource

Gianni Insacco

ITALY

Fossil remains in vertebrates in continental Pleistocene deposits in the region of Comiso. South-East Italy

Ian Thompson, Graham Miller

UNITED KINGDOM

Investigation of oils used in soap manufacture

Geraldine Brossard

SWITZERLAND

Toxocara Canis or the "grande vadrouille" of a parasite

Zurich 1991

FIRST PRIZES

Robert Nitzschmann **GERMANY**

Development and construction of a scanning tunnelling microscope

Barry O'Doherty, Daniel Dundas

IRELAND

The dynamics of a two-well potential oscillator

Paul Hoffmann

LUXEMBOURG

Computer assisted text conversion to Braille

Angus Filshie

UNITED KINGDOM

Clearway: a mucus extractor

Christian Tost, Sabine Zangl

AUSTRIA

Catalytic converter restoration **Torkild Jensen**

NORWAY

Birdlife in Oslofjord

Hans Jacob Feder **NORWAY**

Earthquakes as a self-organised critical process

SECOND PRIZES

SOUTH THE

Tanja Hindrichs, Hussein Morsy, Axel Conrad

GERMANY

The knight's Hamiltonian path problem

Nicolas Bouche, Olivier van der Aa

BELGIUM

Flight study of a micro-rocket

Valerio Arnáiz, José Mora, Alexandre Girone

SPAIN

Astrometry: the measurement of comet positions

Henk Hoekstra, Christian Kok

NETHERLANDS

Oscillating systems of chemical reactions

Edwin Thaller, Friedrich Pfluegelmeier

AUSTRIA

Intelligent testing probe

Christof Teuscher, Flavio Stragiotti

SWITZERLAND

Aiolos II: development of a wind measuring computer system

Seville 1992

FIRST PRIZES

Hendrik Küpper, Frithjof Küpper, Martin Spiller

GERMANY

Environmental relevance of heavy metal ubstituted chlorophylls

Oliver Trapp

GERMANY

Study on the effect of a chelator on yeast

Anders Skov

DENMARK

The bent perspective

Martin Hesselsøe

DENMARK

Green toad (Bufo Viridis) in the great belt

Jean Byrne, Elizabeth Dowling

IRELAND

Population dynamics of a thistle predator: Terellia Serratulae

Dominik Zeiter, Ewald Amherd, Reinhard Fubber

SWITZERLAND

Graphtal plants varieties of trees

SECOND PRIZES

Ingolf Zies

GERMANY

New global lighting model based on radiosity

Raoul Urlings

BELGIUM

10 channel vocoder

Clement Stefanutti, Aurélie Vidal, Julie Morere

FRANCE

Palynology - Historic botany

Panagiotis Theofanidis, Nick K. Tsagourias

GREECE

Research and development of a traffic light system

Luis Bellot Rubio, Antonio Román Reche, Gustavo Román Reche

SPAIN

Analysis of visual observations of the comet Levy

Jochen Erhard, Cristoph Herbst

AUSTRIA

Electronical regeneration of FeC12/FeC13 compounds in metal etching processes with an environmental and economic focus

Berlin 1993

FIRST PRIZES

Henrik Mouritsen

DENMARK

Abiological expedition to the rainforests of the Philippines

Lars Knudsen, Peter Andersen

DENMARK

Droppy, the computer controlled intravenous drip feed

Albert Barmettler, Günther Ederer

AUSTRIA

An alarm processing system

Jan Haugland

NORWAY

The minimum overlap problem of Paul Erdös

Rodger Toner, Donal Keane

IRELAND

Mate selection by a male crustacean

María Salvany González, Antoni Camprubí I Cano, Fidel Costa Rodrígez

SPAIN

The geological mapping of a Neollithic mine

SECOND PRIZES

Jan-Cristoph Puchta

GERMANY

Fermat's last theorem

Pierre Oger

BELGIUM

Oil (hydrocarbon) recovery from water

Eleonora Bonanomi, Stefano Consonni, Mircko Signorelli

ITALY

Use of biogas in a photosynthetic culture

Daniel Morton, Tim Mullis

UNITED KINGDOM

A palletiser improvement

Peter Seidel

GERMANY

Ball lightning, an investigation

Jürgen Scherschmidt, Jochen Scherschmidt

GERMANY

A user-friendly video recorder

Luxembourg 1994

FIRST PRIZES

Oliver Krüger

GERMANY

The ecology of the common buzzard and goshawk

Eike Lau

GERMANY

Internal addresses in the Mandelbrot set

Jane Feehan

IRELAND

The Calluna Case-Carrier

Christian Krause

DENMARK

Telephone break-in security

Henrik Ström

NORWAY

An anti-boot virus program

Samuel Schaer

SWITZERLAND

Supersonic plasma rings

SECOND PRIZES

Ivan Labanca

ITALY

A diffusion cloud chamber with magnetic field

Gijs van Oort

NETHERI ANDS

A computer controlled flute

Jan Ivar Oeyulvstad

NORWAY

Flood prevention in the river Otra in Southern Norway

Nuno Alves da Silva, Hugo Macedo

PORTUGAL

Image processing using a neural network

Stefan Serefoglou

GREECE

The two-to-one way rotation converter $% \left(1\right) =\left(1\right) \left(1\right) \left$

Fernando Toro Chicano, Ricardo Peñafiel Gil, Santiago Hervás Morales

SPAIN

A new age plotter

THIRD PRIZES Amina Azami, Chemseddine Bega

BELGIUM

Bio-indicators

Kai Eberspächer, Dominik Zayer,

Andreas Gorbach
GERMANY

Computer-controlled waste-water purification

Padelis Ermilios

GREECE

Using computers in physics experiments

Vagelis Papadopoulos

GREECE

Extension of the integral calculus

Guillermo Guerrero Guerrero, Javier Villegas, Javier Rodríguez

SPAIN

Beewax recovery using solar energy

Eduardo Moling González, Ruth Morena, José Manuel Brell

SPAIN

Water rocket

Séverine Meynieux, Catherine Khamphan, Marie Montanard

FRANCE

Peat bogs fossils: unmasking the past

Nicolas Rebierre, Olivier Rebierre, Olivier Pesle

FRANCE

CONTRACT OF THE PARTY OF THE PA

Real speed

Stéphan Fidanza, Olivier Pesc

FRANCE

Space-time theory

Sara Azimonti, Elena Porazzi, Giovanni Colombo Bolle

ITALY

Asbestos: properties, manufacturing, applications, legislation

Patrick Neuberg

LUXEMBOURG

Improved cell sectioning

Necibe Gezer

NETHERLANDS

Teenage restlessness in a Dutch town

Jorgen Carling

NORWAY

Examining voting patterns

Martin Franz Waldmann, Johannes Lackner, Josef Schmidbauer

AUSTRIA

Solar energy to ecological fuel

Jürgen Hintermayer, Attila Agoston

AUSTRIA

Brain waves and artificial intelligence

Michael Schachinger, Thomas Wetzlmaier, Jürgen Zauner

AUSTRIA

Telephoning via computer networks

Paulo Alexandre Machado

PORTUGAL

A real time digital spectrograph

Ana Simoes das Neves

PORTUGAL

The pharmacology of medicinal plants

Kaarlo Vaïsanen

FINLAND

Production of fullerenes by Draetschmer-Huffman's method

Magnus Viström, Pontus Forslund, Robert Hagglund

SWEDEN

A car hand brake: a potential life saver?

Annika Nyström

SWEDEN

From Salix Alba to modern medicine

Johanna Larnhed

SWEDEN

Antifouling

Caroline Turner

UNITED KINGDOM

A time interval analyser

Samantha Haines

UNITED KINGDOM

An electornic physiotherapy aid

Rebecca Anderton, Aaron Weller, Morgan Jones

UNITED KINGDOM

Delayed failure in ultra-high strength steels

Michael P. Germeyer-Petyke, Alexander Pohl

EU SCHOOLS

Vitamin C synthesis in germinating cress seedlings

Tamas Nagy, Sandor Mezei

HUNGARY

A Braille printer and school notebook for the blind

Daniel Kiss, Agnes Majoros, Lajos Kovacs

HUNGARY

Universal clamping head for industrial robots

Robert Varga

HUNGARY

Computerised navigation

Roman Evtushenko, Evgueni Milioutine, Evgueni Chelkovo

UKRAINE

Biohumus production by the red Californian worm

Serguei Semeniouk, Alla Atepalikhina, Karim Naser

UKRAINE

The role of the thiamine in neuthrophil phagocytic activity in smokers and nonsmokers

Kenna Mills, Diego Figueroa

USA

Water detoxification using duckweed

Newcastle Upon-Tyne 1995

FIRST PRIZES

Sven Siegle

GERMANY

Natural pulping or paper from straw

Brian Fitzpatrick, Shane Markey

IRELAND

Plants can tell us when they need a drink of water

Christopher Mead, Matthew Taylor

UNITED KINGDOM

Radio waves from comet Shoemaker-Levy 9

SECOND PRIZES

Tycho van Meeuwen

NETHERLANDS

The witty wise writing writer

Nina Fraefel

SWITZERLAND

Biochemical control of salmonella in poultry feed

Oliver Hantschel, Kai Krüger, Nicole Stroh

GERMANY

Is isoguanine selectively mutagenic during virus replication?

THIRD PRIZES

Aldis Helga Egildsdottir, Reynir Hjalmarsson

ICELAND

The Icelandic capelin: a behaviour study

Frank Ekpar, Erik Sos

HUNGARY

Mobile robots: motorless motion using shape memory alloy actuators

Klaus Mazanti Soerensen

DENMARK

Factorising factorials and Bertrand's postulate for primes 4k+3

Marcin Kowalczyk, Marcin Sawicki

POLAND

The force of a set and the Euler characteristic

Gergely Eberhardt

HUNGARY

A virus recognition programme to prevent computer infection

Michael Vorburger

SWITZERLAND

A fruity approach to memory management in C++

Roddy Vann

UNITED KINGDOM

The manufacture of closed-cage molecules in electric arcs

Alberto Lerena, Ricardo Martín, Víctor Sanz

SPAIN

A brake based on magnetically solidified fluid

Helsinki 1996

FIRST PRIZES

Tobias Kippenberg

GERMANY

A car ice-detection system based on electromagnetic waves

Yann Ollivier

FRANCE

Flexibility of an articulate lattice

Wouter Couzijn

NETHERLANDS

"Locator", a self-positioning robot

SECOND PRIZES

Emil Laslo

HUNGARY

Braille display

Maciej Kurowski, Tomasz Osman

POLAND

Common solution sets of real polynomials

David Kelnar

UNITED KINGDOM

AMES, the accessible multimedia education system

THIRD PRIZES

Andreas Derr

GERMANY

MediNet: an intelligent system for medical diagnosis

George Almpanis, Despina Scholidou

GREECE

Boundaries and stellar content of the LH52 and LH53 associations

Patricia Lyne, Rowena Mooney, Elsie O'Sullivan

IRELAND

Analysis of indigenous Irish strains of honeybee

Radoslaw Skibinski

POLAND

CO CO

The Oligocene fish: discovery and reconstitution

Thomas Bürg

SWITZERLAND

An intelligent six-legged walking machine

Justin Marston

UNITED KINGDOM

The dripping tap as a model chaotic system

Milan 1997

FIRST PRIZES

Eike Hübner

GERMANY

Permanent self-conducting polymers

Fiona Fraser, Ciara McGoldrick, Emma McQuillan

IRELAND

Unravelling the secrets of the preservation of Europe's bog bodies

Christoph Lippuner, Antoine Wüthrich

SWITZERLAND

The digestive system of carnivorous plants

SECOND PRIZES

Sebastian Hauer, Jan Nieberle

GERMANY

A circular saw active security-system

Bernardo Silva e Carmo

PORTUGAL

A control centre for school experiments

Serguei Idiatoulin

RUSSIA

The preparation of chromiferous coatings to absorb solar energy

THIRD PRIZES

Álvaro Luis Maroto Conde

SPAIN

Paravision 1.0: window access for visually impaired

Thierry Caramigeas, Vivien Moliton, Michael Pressigout

FRANCE

A microwaves controlled household management system

Gábor Ivánka

HUNGARY

MATIKA: the game to solve your mathematical problems

Erik van Alphen, Tom van Diessen

NETHERLANDS

Less waste with bricks

Anni Könönen

FINLAND

Human impact on forest vegetation

Daniel Atwood, Andrew Teesdale

UNITED KINGDOM

How ecalyptus resins can prevent seeds from germination

Porto 1998

FIRST PRIZES

Gabor Bernath

HUNGARY

ScanGuru: the 3D scanner

Paul Pak, Peter Weilenmann

AUSTRIA

The virtual blind man's cane

Robert Carney, Matthew Tomas

UNITED KINGDOM

Yellowing of alkyd-based paints in the dark

SECOND PRIZES

Karsten Weiss

GERMANY

Digi Cow: a completely new type of milking machine

Arthur Baas, Adrian de Groot, Chris Weel

NETHERLANDS

POSEIDON: the wave-motion power generator

Dasa Suput

SLOVENIA

Sea anemones

THIRD PRIZES

Enrik Eriksen

DENMARK

KOMBI-2: a novel approach soil preparation and sowing

Juliane Richter

GERMANY

The phenomenon of fluctuation in concentration

Montserrat Coll Lladó, Mariona Picart Merino

SPAIN

Commercially viable sardine anchovy fish production

Raphael Hurley

IRELAND

The mathematics of monopoly

Grzegorz Kapustka, Michael Kapustka

POLAND

Some propertioes of polygons

Maxim Sergeev

RUSSIA

A new method to process some production waste

Thessaloniki 1999

FIRST PRIZES

Sarah Flannery

IRELAND

Cryptography: a new algorithm vs. the RSA

Sverrir Gudmundsson, Pall Melsted, Tryggvi Thorgeirsson

ICELAND

The galaxy cluster MS1621 +2640

Michal Ksiazkiewicz

POLAND

Estimation of urban pollution using Epiphytic Lichens

SECOND PRIZES

Sebastian Gschwende, Michael Rödel

GERMANY

FinoPro simulates mechanical events, using finite elements

Lorraine Ruzié

FRANCE

Submarine volcano emergence forecasting device

Jure Leskovec

SLOVENIA

Detection of human bodies from a sequence of images

THIRD PRIZES

Patrick Imper, Raphael Zulliger

SWITZERLAND

Speedometer for roller blades

Arlet Bellvehi Sampera,

Joan Munich Arranz

SPAIN

Reestablishment of amphibian population despite exotic fish threat

Maciej Walczak

POLAND

Chemical synthesis of amionalkyl nucleoside phosphates

Amsterdam 2000

FIRST PRIZES

Grzegorz Niedzwiedzki

POLAND

New Finds of dinosaur tracks in the Holy Cross Mountains

Joanne Daniel, Gemma Dawson, Ally Wilkie

UNITED KINGDOM

Designing a disposable sample device

Nickoloz Tchankoshvil

GEORGIA

The monitoring and protection of bats in Georgia

SECOND PRIZES

Vaclav Rehak

CZECH REPUBLIC

Prisoners dilemma: modelling of social phenomena using cellular automata

Janez Langus

SLOVENIA

Theoretical and practical aerodynamics

Jasmin Roya Djannatian

GERMANY

Cytotoxicity of different mistletoe preparations on leukaemic cells

THIRD PRIZES

Florent Durrey

FRANCE

Globular clusters around the Milky Way

Gàbor Guta

HUNGARY

Simulator with ultra low noise

Yevgen Nazarenko

UKRAINIA

The processing of aluminous manufacture after-product

159

Travel award to the Noble Prize Ceremony

Jasmin Roya Djannatian

GERMANY

2000

Cytotoxicity of different mistletoe preparations on leukemia cells

Anastasiya Efimenko

UNITED KINGDOM

My challenge to children's mortality

Bergen 2001

FIRST PRIZES

Thomas Aumeyr, Thomas Morocutti

AUSTRIA

CURE - Controlled Ultraviolet Radiation Equipment

Sebastian Abel

GERMANY

Cloud

James Lee Mitchell

UNITED KINGDOM

Characteristics of Azole drug resistance in candida tropicalis

SECOND PRIZES

Bálint Pato

HUNGARY

Stress proteins as constituents of the Microtrabecular Lattice

Zbigniew Lech Pianowski

POLAND

New liquid crystal for holography

Marcin Wojnarski

POLAND

Neural network for solving classification problems

THIRD PRIZES

Jimi Lee Truelsen

DENMARK

A new cryptographic algorithm

Shane Browne, Michael O'Toole, Peter Taylor

IRELAND

Symmetrical shapes formed by poligons

Richard Hulme, Yan Pugh-Jones

UNITED KINGDOM

Analysing the flight of Brazilian humming birds

Vienna 2002

FIRST PRIZES

Pawel Piotrowski

GERMANY

Special wings and ground effect for efficient transportation

Martin Etzrodt, Martin von der Helm

GERMANY

The slime mold physarum as a model organism for biotesting

Lauri Kauppila

FINLAND

Comparing the Oxidiser/Fuel ratio and heat released from Rocket Fuel Combustion

SECOND PRIZES

Vincent Bougreau, Solene Broner

FRANCE

Are there germs in the highest layers of the atmosphere?

Arnhild Jacobsen

NORWAY

The Physics of a rolling soda can

David Sahrla

SLOVENIA

Chemiluminescence

THIRD PRIZES

Maarten Vanhove

BELGIUM

Morphological diversity of cladoceran resting eggs in shallow lakes

Piotr Garbacz

POLAND

Influence of direction and intensity of gravity on plant growth

Ozgur Paksoy, Aslihan Akin Nuriye

TURKEY

A general approach to the proof of inequalities

Budapest 2003

FIRST PRIZES

Jana Ivanidze

GERMANY

pH sensitive GFP mutant

Uwe Treske

GERMANY

Low-cost scanning tunneling microscope

Gábor Németh

HUNGARY

Efficiency enhancement of plasma loudspeakers

SECOND PRIZES

David Sehna

CZECH REPUBLIC

Math studio - a computer algebra system

László Nagy

HUNGARY

Phytocenology and environment protection of the central Hungarian plain

Lukasz Jaremko, Mariusz Jaremko

POLAND

Design and synthesis of two new immuno-suppressants

THIRD PRIZES

Wim Cools

NETHERLANDS

A new compact operating system

Ksenia Rogova

RUSSIA

The key to the mystery of the stone book

Johannes Keller

SWITZERLAND

The influence of the quill shape on the harpsichord sound

Dublin 2004

FIRST PRIZES

Martin Knobel, Gerhard Schony, Florian Grossbacher

ENGINEERING | AUSTRIA

Breakthrough in the manufacturing of condenser microphones

Charlotte Stranvist

CHEMISTRY | DENMARK

Improving the method of synthesizing antidepressants

Mario Chemnitz

PHYSICS | GERMANY

Ultrasonic detector for gas chromatography

SECOND PRIZES

Marcel Kolodziejcyk

MATHEMATICS | POLAND

A counterfeit coin problem

Roland Bauerschmidt

COMPUTER | GERMANY

Internet access for guests

Mehmet Halit Calayir, Mehmet Cakan

PHYSICS | TURKEY

Construction of a seismograph

THIRD PRIZES

Ocan Sankur

COMPUTER | TURKEY

N-gram based language classification

Artur Lewandowski

BIOLOGY | POLAND

Ants learning process

Laurynas Pliuskys

ENVIRONMENT | LITHUANIA

Hydrochemical analysis of the lakes of Trakai

Moscow 2005

FIRST PRIZES

Igor Gotlibovitch, Renate Landig

PHYSICS | GERMANY

Corners in water - unexpected symmetry breaking in fluid dynamics

Javier Lopez Martinez Fortun, Eliecer Perez Robaina, Carlos Machado Carvajal

BIOLOGY | SPAIN

Sonchus leptacaulis: a new species consolidation in Gran Canaria

Silvana Konermann

MEDICINE | SWITZERLAND

Development of a system for the local prevention of catheter associated urinary tract infection

SECOND PRIZES

Zdenek Janovosky

ENVIRONMENT | CZECH REPUBLIC

Vegetation dynamics of the small forest and open landscape ponds and its historical causes

Stephen Schulz

CHEMISTRY | GERMANY

Lab on the chip - new perspectives with electrons as universal reagent

Patrick Collison

COMPUTER | IRELAND

Croma: a new dialect of lisp

THIRD PRIZES

Gitte Ahlquist Jonsson

MEDICINE | DENMARK

Aid for putting on and taking off stockings for handicapped persons

Margus Niitsoo

MATHEMATICS | ESTONIA

Generalizations of the Fibonacci sequence

Eric Deele, Pierre Haas

BIOLOGY | LUXEMBOURG

Cartography of galls

Stockholm 2006

FIRST PRIZES

Michael Kaiser, Johannes Kienl

ENGINEERING | AUSTRIA

Development of a completely new electro-thermo-mechanical De-Icing system for aircraft

Johannes Burkart, Alexander Joos

PHYSICS | GERMANY

Flight curves of table tennis balls

Tomasz Wdowik

CHEMISTRY | POLAND

Synthesis of a potential (beta)-blocker

SECOND PRIZES

Thomas Gigl

EARTH SCIENCE | GERMANY

Radial velocity measurement of spectroscopic binaries

Michael Marcinkowski

MATHEMATICS | POLAND

On a geometric transformation relating the Euler and Nagel lines

Zoltan Tarjanyi, Csaba Vass

BIOLOGY | HUNGARY

New diagnostic method to define the errors of the apoptosis program

THIRD PRIZES

Georgi Dyankov

PHYSICS | BULGARIA

A method of measurement of refractive indices, birefringence and thickness of a thin anisotropic layer

Aisling Judge

BIOLOGY | IRELAND

The development and evaluation of a biological food spoilage indicator

Valencia 2007

FIRST PRIZES

Florian Ostermaier, Henrike Wilms

PHYSICS | GERMANY

Flashing Water Drops

Márton Spohn

CHEMISTRY | HUNGARY

Examination of Plants' Self-Defence Against Pests

Abdusalam Abubakar

MATHEMATICS | IRELAND

An Extension of Wiener's Attack on RSA Encryption

SECOND PRIZES

Martina Hafner

ENVIRONMENT | AUSTRIA

Energy from maize straw

Anne-Laure Delaye, Aude Latrive, Astrid Verpeaux

PHYSICS | FRANCE

Can we walk on water?

Yael Amarilyo

BIOLOGY | ISRAEL

Molecular Identification and Characterization of Phytoplasma Bacteria in Grapevines – Another Milestone Saving the Wine Industry

THIRD PRIZES

Julian Glechner, Werner Pollhammer, David Stockinger

ENGINEERING | AUSTRIA

Latent heat storage system (Salt crystal as a new energy storage technology)

Eva Černohorská

MATHEMATICS | CZECH REPUBLIC

Generalization of method of tiling in triangular and hexagonal grid

Florian Schnös

ENGINEERING | GERMANY

SmartCam - Development of a universal 3D-Camera

Copenhagen 2008

FIRST PRIZES

Magdalena Bojarska

MATHEMATICS | POLAND

Hamiltonian cycles in generalized

Halin grap, Martin Tkáč

ENGINEERING | SLOVAK REPUBLIC

Tilting of bulk materials based on gravitation principle in cargo railway transport

Elisabeth Muller

EARTH SCIENCE | UNITED KINGDOM

From Microcosm to Magma Oceans: A Lunar Meteorite Perspective

SECOND PRIZES

Michael Mikát

BIOLOGY | CZECH REPUBLIC

Ecology and Ethology of family Lestidae (Insecta: Odonata)

David Wittkowski

PHYSICS | GERMANY

Polygonal structures on rotating fluid surfaces

Émer Jones

ENGINEERING | IRELAND

Research and Development of Emergency Sandbag Shelters

THIRD PRIZES

Aliaksandr Minets

MATHEMATICS | BELARUS

Orbital origamis and stabilizers of stair origamis

Etienne Lalique, Axel Talon

PHYSICS | FRANCE

Phaethon, the solar balloon

Eriks Zaharans, Janis Zaharans

PHYSICS | LATVIA

 $Monitoring\ of\ cardiovas cular\ system$

Paris 2009

FIRST PRIZES

Liam McCarthy, John D. O'Callaghan

BIOLOGY | IRELAND

The Development of a Convenient Test Method for Somatic Cell Count and it's Importanc in Milk Production

Fabian Gafner

PHYSICS | SWITZERLAND

Dikranos – the airplane with reverse gear

Aleksander Kubica, Wiktor Pilewski

PHYSICS | POLAND
Spiral Zone Plates

SECOND PRIZES

Elodie Aubanel, Jérémy Dargent, Arnaud De Richecour

PHYSICS | FRANCE

Pick Up a Cosmic Wink

Philip Cardona

ENGINEERING | MALTA

Cappucino Logo Printer

Sara Vima Grau

EARTH SCIENCE | SPAIN

From mineral to Romanesque altarpiece: Identification of mineral pigments and reproduction of a Catalan Romanesque altarpiece

THIRD PRIZES

Áron Hunyadi

ENGINEERING | HUNGARY

Walking through (a piece of) time with a timepiece

Stefan Strobel

COMPUTING | GERMANY

Development of a near-infrared vein imaging system

Omri Lesser

PHYSICS | ISRAEL

The Complex Potential and Its Application to the Planning of Dams

Lisbon 2010

FIRST PRIZES

Miroslav Rapcak

PHYSICS | CZECH REPUBLIC

Complete Phase Diagram Of CO2 Nanoclusters

David Pegrimek, Lukasz Sokolowski

BIOLOGY | POLAND

Foraging Strategy Of The Ant Formica Cinerea

Dávid Horváth, Márton Balassi

SOCIAL SCIENCES | HUNGARY

Nature On Your Screen - Computer Based Modeling And Local Area Network In The Education Of Ecology

SECOND PRIZES

Justyna Slowiak

BIOLOGY | POLAND

Biodiversity, Palaeoecology And Taxonomical Position Of Vertebrates In The Middle Triassic Sea Ecosystem In Silesia (sw Poland)

Simon Schuldt

ENGINEERING | GERMANY

Aircraft Of The Future - A Practise based School

Luca Banszerus, Michael Schmitz

PHYSICS | GERMANY

Production And Charaterization Of Graphene Devices

THIRD PRIZES

Aleksejs Sazonovs

COMPUTING | LATVIA

Applying Image Recognition Methods
For Classification Of Astronomical Images

Davide Giacinto Lucarelli, Niccolò Pozzi, Stefano Sanfilippo

MATHEMATICS | ITALY

An Analysis of the Network

Inês Alexandra, Costa Kristoffer de Sá Høg

ENVIRONMENT | PORTUGAL

Rocks Of The Southwest - The Mysteries Written
On The Stone

Helsinki 2011

FIRST PRIZES

Alexander Amini

COMPUTING | IRELAND

Tennis Sensor Data Analysis: An Automated System for Macro Motion Refinement

Pius Markus Theiler

ENGINEERING | SWITZERLAND

pi Cam - The Development of a Camming Device for Climbing

Povilas Kavaliauskas

MEDICINE | LITHUANIA

The Role of Houseflies (Musca domestica) in Spreading Antibiotic Resistant Bacteria

SECOND PRIZES

Benjamin Walter

PHYSICS | GERMANY

Scanning Tunnelling Microscopy of Coronene Molecules on Germanium (111)

Natalie Mitchell

PHYSICS | UNITED KINGDOM

Auto Focusing Methods for Digital Microscopy

Georgi Atanasov, Georgi Georgiev, Kalina Petrova

COMPUTING | BULGARIA

DriveFreeZ - Driving Simulator

THIRD PRIZES

Alex Bergsåker

SOCIAL SCIENCES | NORWAY

Guanxi – the Significance of Relations and Social Networks in Chinese Business

Michal Miskiewicz

MATHEMATICS | POLAND

The Charm of the 'mi' Set

Holly Rees

BIOLOGY | UNITED KINGDOM

Investigation into Embryonic Stem Cell Differentiation

Bratislava 2012

FIRST PRIZES

Mark James Kelly, Eric Doyle

PHYSICS | IRELAND

Simulation accuracy in the gravitational many-body problem

Jakub Nagrodzki

CHEMISTRY | POLAND

Development of molecular patches therapy: trimethylguanosine cap analogues synthesis

Philip Huprich, Manuel Scheipner, Daniel Zind

ENGINEERING | AUSTRIA

Cam Guard

SECOND PRIZES

Nevzet Khasanov

PHYSICS | SWITZERLAND

Diffusion cloud chamber: the visible radioactivity

Jan Michael Rapp, Timo Schmetzer

COMPUTING | GERMANY

Information technology for a feedback control

Asbjørn Christian Nordentoft

MATHEMATICS | DENMARK

Applications of Dirichlet series

THIRD PRIZES

Anna Maria Punab

SOCIAL SCIENCES | ESTONIA

The relationships between academic achievements and happiness among students in secondary education

Anna Julia Kuśnierczak

BIOLOGY | POLAND

Alternative pollination: influence of different ecosystems on the reproduction of red mason bee (Osmia rufa L.) on the example of a meadow, an orchard, a forest and an arboretum

Pavel Litvinka

COMPUTING | BELARUS

Development of hardware and software complex for the formation of threedimensional image

Prague 2013

FIRST PRIZES

Perttu Pölönen

SOCIAL SCIENCES | FINLAND

Music A'Clock

Ciara Judge, Emer Hickey, Sophie Healy-Thow

BIOLOGY | IRELAND

A statistical investigation of the effects of diazotroph bacteria on plant germination

Frederick Turner

ENGINEERING | UNITED KINGDOM

Genetics at home: Building a PCR machine and other equipment for setting up a home genetics lab

SECOND PRIZES

Thomas Steinlechner, Dominik Kovacs, Yuki Trippel

ENGINEERING | AUSTRIA

Anastomose Robot Tool - ART

Lennart Kleinwort

COMPUTING | GERMANY

FreeGeo – the world's first dynamic Android mathematics system app

Jasmin Allenspach

MATHEMATICS | SWITZERLAND

LSLLSLSLLSLS - Modern Mathematics in Islamic Mosaics

THIRD PRIZES

Balázs Zsombori

COMPUTING | HUNGARY

PiktoVerb – Giving Everyone a Voice

Daniel Pflueger

PHYSICS | GERMANY

Measuring water waves

Maksim Bezrukov, Aliaksandr Stadolni

MATHEMATICS | BELARUS

Percolation games on Cayley graphs of groups

Warsaw 2014

FIRST PRIZES

Luboš Vozdecký

PHYSICS | CZECH REPUBLIC

Rolling Friction

Mariana de Pinho Garcia, Matilde Gonçalves Moreira da Silva

BIOLOGY | PORTUGAL

Smart Snails

João Pedro Estácio Gaspar, Gonçalves de Araújo

MATHEMATIC | PORTUGAL

A natural characterization of semilattices of rectangular bands and groups of exponent two

SECOND PRIZES

Paul Clarke

MATHEMATICS | IRELAND

Contributions to cyclic graph theory

Aleš Zupančič

CHEMISTRY | SLOVENIA

Self-cleaning fabrics based on nanocovers

Petar Milkov Gaydarov

MATHEMATICS | BULGARIA

Hamming Distance of Polynomials over GF(2)

THIRD PRIZES

ACC.

Philipp Mandler, Anselm Bernhard PeterDewald, Robin Braun

ENGINEERING | GERMANY

Hexapod - Construction and Programming of a six-legged exploration robot

Matas Navickas

BIOLOGY | LITHUANIA

Flowering Apple Tree "Malus baccata x Malus prunifolia" in vitro

Ameeta Kumar, Aneeta Kumar

MEDICINE | UNITED KINGDOM pHLIP? Beacon of hope

Milan 2015

FIRST PRIZES

Sanath Kumar Devalapurkar

MATHEMATICS | UNITED STATES

On the Stability and Algebraicity of Algebraic K-theory

Michał Bączyk, Paweł Piotr Czyż

PHYSICS | POLAND

The studies of behaviour of single and coupled on-off type oscillators on the example of bottle oscillators

Lukas Stockner

COMPUTING | GERMANY

Statistical modeling of volumescattered light

SECOND PRIZES

Michael Bayrhammer, Florian Thaller

MEDICINE | AUSTRIA

Tendon Tissue Engineering - Development of a Novel Tissue Bioreactor for Culturing Tendons

Polina Vladislavovna Ledkova

ENVIRONMENT | RUSSIA

Successions of vegetation and recultivation of the anthropogenically changed landscapes in neighborhoods of the Krasnoye settlement and in the Nenets state nature reserve, 2013- 2014

Dominika Katarzyna Bakalarz, Joanna Michalina Jurek

MEDICINE | POLAND

Origami BioBandage - mathematically described multipotential bioimplant based on polymeric nanomaterial modified by hydroxyapatite and stem cells

THIRD PRIZES

Timothy Matthew Logan

ENVIRONMENT | NEW ZEALAND

To Graze or Not to Graze?

Anselm von Wangenheim

PHYSICS | GERMANY

Monopod - Physics at the tipping point

Katariina Kisand

CHEMISTRY | ESTONIA

Synthesis and biochemical characterization of covalent fluorescent probes targeting mitotic protein kinase Aurora A

Brussels 2016

FIRST PRIZES

Ane Kristine Espeseth, Torstein Vik

MATHEMATICS | NORWAY

Motivic Symbols and Classical Multiplicative Functions

Valerio Pagliarino

COMPUTING | ITALY

LaserWAN: laser broadband internet connection

River Connell Grace

BIOLOGY | USA

Shining a Light on the Blind: Evolutionary Regression and Adaptive Progression in the Micro-vertebrate Ramphotyphlops braminus, a Model for Understanding Brain Organization and Complex Neurological Disorders

SECOND PRIZES

Tassilo Constantin Schwarz

COMPUTING | GERMANY

Drone detection system: Detection, tracking and classification of potentially dangerous flight objects for multicopter defence

Kayley Noelle Ting

MEDICINE | CANADA

Analysis of Electrodermal Activity to Quantify Stress Levels in Autism

Ivo Zell

PHYSICS | GERMANY

A wing is enough: An improved flying wing based on a bell-shaped lift distribution

THIRD PRIZES

Tomáš Heger

MEDICINE | CZECH REPUBLIC

Biological activity of essential oils and extracts from narrow-leaved lavender (Lavandula angustifolia Mill.) flower

Mari Louise Fufezan, Diana Bura

ENVIRONMENT | IRELAND

An Investigation into the Effects of Enzymes used in Animal Feed Additives on the Lifespan of Caenorhabditis Elegans

Yunji Seo, Yongchan Hong

ENVIRONMENT | SOUTH KOREA

Agricultural application of halobacteria and their compatible solutes in enhancing plant salinity endurance

Honorary awards

LONDON INTERNATIONAL YOUTH SCIENCE FORUM 2016

Torstein Vik

MATHEMATICS | NORWAY

Motivic Symbols and Classical Multiplicative Functions

Valerio Pagliarino

COMPUTING | ITALY

LaserWAN: laser broadband internet connection

STOCKHOLM INTERNATIONAL YOUTH SCIENCE SEMINAR 2016

Ane Kristine Espeseth

MATHEMATICS | NORWAY

Motivic Symbols and Classical Multiplicative Functions

Tomáš Heger

MEDICINE | CZECH REPUBLIC

Biological activity of essential oils and extracts from narrow-leaved lavender (Lavandula angustifolia Mill.) flower

Ivo Zell

PHYSICS | GERMANY

A wing is enough: An improved flying wing based on a bell-shaped lift distribution

Special prizes

THE EUROPEAN SPACE AGENCY (ESA)

Kristjan Kongas

COMPUTING | ESTONIA

Simulation of the collision of binary white dwarfs using a cubic grid - stability analysis by variation of diffusion constant and resolution

THE EUROPEAN LABORATORY FOR PARTICLE PHYSICS (CERN)

Uladzislau Hadalau

COMPUTING | BELARUS

Geneces – Cloud EcoSystem EUROFusion - JET

Jaime Redondo Yuste

PHYSICS | SPAIN

A study of the interaction between a magnetic field and electrolytic ions

THE EUROPEAN SYNCHROTRON RADIATION FACILITY (ESRF)

FACILITY (ESKF)

Eliška Bršlicová

ENVIRONMENT | CZECH REPUBLIC

Subvolcanic intrusions in South Bohemia

THE EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL)

Rūta Prakapaitė

MEDICINE | LITHUANIA

Antimicrobial bacteriophage dressing in chronic wound treatment

THE EUROPEAN SOUTHERN OBSERVATORY (ESO)

Tassilo Constantin Schwarz

COMPUTING | GERMANY

Drone detection system: Detection, tracking and classification of potentially dangerous flight objects for multicopter defence

THE INSTITUTE LAUELANGEVIN (ILL)

Balduin Dettling

ENGINEERING | SWITZERLAND

Development of a 3D Display

EUROPEAN X-RAY FREEELECTRON LASER FACILITY (XFEL)

Péter Udvardi

PHYSICS | HUNGARY

Microelectromechanical structure for sensing of low frequency sounds and vibrations

THE JOINT RESEARCH CENTRE (JRC)

Daniel Andreas Höllerer, Jonathan Reisinger

ENGINEERING | AUSTRIA
Slackline Tensioning System

Luc Régis Baudinaud, Florent Alexis Baubet, Alexis Nabil Bossard

PHYSICS | FRANCE

Diffusion compensation by anticipation

Sahar Roxanne El-Hady

CHEMISTRY | UNITED KINGDOM

How extreme was climate change in South Wales at the end of the last glacial period?

Sponsors' prizes

ACC.

THE INTEL ISEF 2016 PRIZES

Amalya Ben Asher, Yuval Feldman, Tal Cohen

MEDICINE | ISRAEL

Aggregated Drip Infusion System

Naama Schor

SOCIAL SCIENCES | ISRAEL

The morality of larks and owls: relationship between the biological clock and morality in decision making

Zane Grēta Grants,

Daniela Gods-Romanovska

ENGINEERING | LATVIA

The textile-based tensoresistive sensors' operation and their usage in the innovative technologies

EUCHEMS

Christian Schärf, Paul Rathke, Friedrich Wanierke

CHEMISTRY | GERMANY

Alpha-aluminium oxide-based gemstones: Development of a chemical synthesis process prompted by current mining conditions

BB

Modestas Gudauskas

BIOLOGY | LITHUANIA

Acetobacter spp. bacteria producing biopolymers simultaneously

FOODDRINKEUROPE

Daniel Vasilica Copil, Sofia Onorato

BIOLOGY | ITALY

Natural antimicrobial extracted from medicinal plants

DUPONT

Mari Louise Fufezan, Diana Bura

ENVIRONMENT | IRELAND

An Investigation into the Effects of Enzymes used in Animal Feed Additives on the Lifespan of Caenorhabditis Elegans

FERRERO

Adam Andor Urmos

CHEMISTRY | EUROPEANSCHOOLS

Multifunctional application of natural sensor arrays

NESTLE

Ana Milovanović, Ana Halužan Vasle

BIOLOGY | SLOVENIA

Designing Synthetic Gene Regulatory Networks

INNOVATION IN FOOD AND AGRICULTURE

Ivan Hristov Ivanov.

Vasilen Rosenov Tsvetkov

ENGINEERING | BULGARIA

Intelligent Planting

SALVETTI FOUNDATION

Ethan Lee Dunbar-Baker, Po Yin Chau, Rogan Colin Michael McGilp

ENGINEERING | UNITED KINGDOM

David's Wheels; a disability accessible and driveable hot rod for social and physical mobility

PRACE

Eero Valkama, Iiro Kumpulainen

COMPUTING | FINLAND

Digitalization of Chess Games using Computer Vision

Tallinn 2017

FIRST PRIZES

Karina Movsesjan

BIOLOGY | CZECH REPUBLIC

The role of RAD51 mutations in cancer development

Adam Jan Alexander Ohnesorge

SOCIAL SCIENCES | SWITZERLAND

The forgotten prisoners – Civilian prisoners of the Great War in Corsica

Danish Mahmood

ENGINEERING | CANADA

W.I.N.I.T.S. (Wireless Interconnected Non-Invasive Triage System)

SECOND PRIZES

Kamil Humański

ENVIRONMENT | POLAND

Taxonomic diversity of the Middle Ordovician – early Silurian echinoderms from Siljansringen, Sweden

Yana Zhabura

ENGINEERING | UKRAINE

Enhancement of technical capabilities of delta robot

Colette Benko

MEDICINE | CANADA

Novel Pediatric Cancer Therapy: Targeting Epigenetics to Induce Differentiation

THIRD PRIZES

Florian Cäsar, Michael Plainer

MATHEMATICS | AUSTRIA

Sigma – Learning how computers learn

Chavdar Tsvetanov Lalov

MATHEMATICS | BULGARIA

The structure of self-avoiding walks and the connective constant

Arne Jakob Geipel, Matthias Paul Grützner, Julian Egbert

PHYSICS | GERMANY

Liquid stream hits rough surfaces – showing an extraordinary and stable wave pattern

Honorary awards

STOCKHOLM INTERNATIONAL YOUTH SCIENCE SEMINAR 2017

Kamil Humański

ENVIRONMENT | POLAND

Taxonomic diversity of the Middle Ordovician – early Silurian echinoderms from Siliansringen. Sweden

Yana Zhabur

ENGINEERING | UKRAINE

Enhancement of technical capabilities of delta robot

LONDON INTERNATIONAL YOUTH SCIENCE FORUM 2018

Karina Movsesian

BIOLOGY | CZECH REPUBLIC

The role of RAD51 mutations in cancer development

Adam Jan Alexander Ohnesorge

SOCIAL SCIENCES | SWITZERLAND

The forgotten prisoners – Civilian prisoners of the Great War in Corsica

Chavdar Tsvetanov Lalov

MATHEMATICS | BULGARIA

The structure of self-avoiding walks and the connective constant

Special donated prizes

THE JOINT RESEARCH CENTRE (JRC)

Domen Kulovec, Uroš Prešern, Tristan Kovačič

MEDICINE | SLOVENIA

Active targeting of cysteine cathepsins with liposomes conjugated with cystatin C

Aleksander Paweł Kostrzewa

BIOLOGY | POLAND

A comparison of primates' memory and learnig skills, with use of an interactive platform in the Warsaw Zoological Garden

Solène Noémie Dumas-Grollier, Emma Marie-Christine Josette, Jacqueline Robin

PHYSICS | FRANCE

Les mystères de la Tasse (A mysterious cup)

THE INTEL ISEF 2018 PRIZES

Juan Sánchez Mateos, Claudia Rodríguez Rodríguez

BIOLOGY | SPAIN

On the structure and mechanics in vivo of the ostial cells and the aortic valve of the Drosophila melanogaster larva heart by analyzing high resolution microscopic images

Gabriel Silva Silva, Eduardo Teixeira Rocha Nogueira, Francisca Santos Martins

ENVIRONMENT | PORTUGAL

ShealS - Sea Heals Soil

Áron Molnár

ENGINEERING | HUNGARY

New high accuracy tilt sensor

Special donated prizes by The Eiroforum

THE EUROPEAN LABORATORY FOR PARTICLE PHYSICS (CERN)

Florian Cäsar, Michael Plainer

MATHEMATICS | AUSTRIA

Sigma – Learning how computers learn

EUROFUSION (JET)

Arne Jakob Geipel, Matthias Paul Grützner, Julian Egbert

PHYSICS | GERMANY

Liquid stream hits rough surfaces – showing an extraordinary and stable wave pattern

THE EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL)

Nina Chiara Kathe

MEDICINE | SWITZERLAND

Small non-coding RNA induced gene silencing of tetracycline resistance gene in E. coli

THE EUROPEAN SOUTHERN OBSERVATORY (ESO)

Can Pak

PHYSICS | TURKEY

Measuring the surface vibration frequency with laser diode

THE EUROPEAN SPACE AGENCY (ESA)

Dávid Puskás

MATERIALS | HUNGARY

3D printed Moonbase

THE EUROPEAN SYNCHROTRON RADIATION FACILITY (ESRF)

Johannes Nicolas Waller, Philipp Nikolas Kessler

CHEMISTRY | GERMANY

Fehling's solution - Do we need a new interpretation?

THE INSTITUTE LAUELANGEVIN (ILL)

Miroslav Kurka

TEG

PHYSICS | SLOVAKIA

Dynamic magnetization behavior in soft magnetic alloys of different structure

THE EUROPEAN X-RAY FREE-ELECTRON LASER FACILITY (XFEL)

Mykola Veremchuk

PHYSICS | UKRAINE

The investigation of the distribution of the density in gases using the Schlieren photography

Bioeconomy prizes

BBI JU

Gal Levy

ENVIRONMENT | ISRAEL

Production of biodiesel from organic wastes cby the "black-soldier" fly larvae

EUROPEAN FOOD AND DRINK INDUSTRY

Matas Aliuškevičius

ENGINEERING | LITHUANIA

Honeybee Colony Sounds Reveal Secrets of Life in Hives

DANONE

Kendra Zhang

ENVIRONMENT | USA

A paper-based microbial fuel cell for self-powered glucose monitoring in saliva

DSM

Camilla Hurst

MATERIALS | EUROPEAN SCHOOLS

The role of materials and surfaces in the transmission of bacteria in public places

PEPSICO

Ayumi Rie Mayer, Olivia Linnea Rygaard-Hjalsted

ENVIRONMENT | DENMARK

Sound PoliSea

EUROPEAN ASSOCIATION FOR CHEMICAL AND MOLECULAR SCIENCES (EUCHEMS)

Songrui Zhao

CHEMISTRY | CHINA

A Research on Synthesis, Characterization and CO2 Absorptive Character of Pyridinium-based Ionic Liquids

SWISS INTERNATIONAL TALENT FORUM

Alexandr Jankov

MATHEMATICS | CZECH REPUBLIC

The Basel problem

WOLFRAM RESEARCH

Andrei Shvedau, Nikolay Sheshko

MATHEMATICS | BELARUS

Any Heron Set can be Embedded in Z2

Andrei Shvedau, Nikolay Sheshko

MATHEMATICS | BELARUS

The Basel problem

Aleksandrs Jakovlevs, Edvards Janis Recickis

MATHEMATICS | LATVIA

Magic Polyiamonds

Alena Igorevna Teselkina

MATHEMATICS | RUSSIA

Centered figurate numbers

Tjaš Božič, Miha Torkar, Sara Maraž

MATHEMATICS | SLOVENIA

Origamics: Mathematical exploration of the equilateral triangle through paper folding

Adam Piotr Klukowski

MATHEMATICS | POLAND

The floor-polynomials

Gustav Møller Grimberg

MATHEMATICS | DENMARK

Use of comparative entropy analyses for dating and quantifying historical divergences between languages

Florian Cäsar, Michael Plainer

MATHEMATICS | AUSTRIA

Sigma – Learning how computers learn

Barry Philip Owiti

MATHEMATICS | FINLAND

An Application of Queuing Theory On Relief Systems

Chavdar Tsvetanov Lalov

MATHEMATICS | BULGARIA

The structure of self-avoiding walks and the connective constant

Special donated prizes

SALVETTI FOUNDATION

Philipp Sinnewe

ENGINEERING | GERMANY

A more energy-efficient aeroplane engine

PRACE

Adomas Paulauskas

COMPUTING | LITHUANIA

Virtual Reality Games for Rehabilitation

Host country awards

THE TALLINN CITY GOVERNMENT

Luís Miguel Afonso Pinto, Beatriz Sampaio Bastião, Olavo Filipe Estima Saraiva

ENGINEERING | PORTUGAL

EasyPark

MINISTRY OF EDUCATION AND RESEARCH

Gustav Møller Grimberg

MATHEMATICS | DENMARK

EasyPark Use of comparative entropy analyses for dating and quantifying historical divergences between languages

Dublin 2018

FIRST PRIZES

Adrian Fleck, Anna Amelie Fleck

MATERIALS | GERMANY

FleckProtec - Body Protec on Made From Starch

Nicolas Fedrigo

MEDICINE | CANADA

Improving Spinal Fusions: Redesigning the Pedicle Probe to Prevent Vertebral Breaches

Brendon Matusch

ENGINEERING | CANADA

Development of a Level 2 Autonomous Vehicle Using Convolutional Neural Networks and Reinforcement Learning

SECOND PRIZES

Alexandru Liviu Bratosin, Petru Molla, Mihnea Vlad Bojian

BIOLOGY | FRANCE

DNAdrive

Karl Hendrik Tamkivi

BIOLOGY | ESTONIA

Positioning of bat maternity roosts in relation to surrounding landscape complex in Western Saaremaa

Francisco Miguel Araújo

MATHEMATHICS | PORTUGAL

Commuta vity theorems for groups and semigroups

THIRD PRIZES

Marina Gudzhabidze, Dea Ilarionova, Shorena Gudzhabidze

PHYSICS | GEORGIA

Hand-Held Detector With Retroreflective Mosaic Screens To Visualize Optical Inhomogeneities

Kyuhee Jo, Chaeyoung Lee

COMPUTING | SOUTH KOREA

Building a robust classifica on model for speech-based Parkinson's Disease diagnosis

Sijia Zhang

SOCIAL SCIENCES | CHINA

Investigation into the Verbal Conflict Problem in Middle School Students' Families

Honorary awards

STOCHHOLM INTERNATIONAL YOUTH SCIENCE SEMINAR 2018

Adrian Fleck

MATERIALS | GERMANY

FleckProtec - Body Protec on Made From Starch

Francisco Miguel Araújo

MATHEMATHICS | PORTUGAL

Commutativity theorems for groups and semigroups

LONDON INTERNATIONAL YOUTH SCIENCE FORUM 2019

Anna Amelie Fleck

MATERIALS | GERMANY

FleckProtec - Body Protec on Made From Starch

Karl Hendrik Tamkivi

BIOLOGY | ESTONIA

Positioning of bat maternity roosts in relation to surrounding landscape complex in Western Saaremaa

Special donated prizes

JRC-JOINT RESEARCH CENTRE

3 prizes: two-day stays at the JRC's Institutes in Ispra, Italy

Aleksandar Kostadinov Shopov, Atanas Konstantinov Stefanov

PHYSICS | BULGARIA

Colour relations in young stellar objects

Lisa Battistini, Thomas Boissin, Léo-Nils Boissier

ENGINEERING | FRANCE

Eyeprint, give relief to your senses

Stefan Gruber-Hofer, Johannes Ortner, Michael Eder

ENGINEERING

Development of a sampler for solid recycled materials

INTEL ISEF 2019 Prizes 3 prizes: participate at Intel ISEF 2019, Phoenix (AZ), USA

Ivaylo Malinov Zhelev
COMPUTING | BULGARIA

Digital image denosing based on sphereconstrained total variation optimization with an additional noise component

Ginés Marín Martínez

Teg .

SOCIAL SCIENCES | SPAIN

Collaborative economy supended, The Legal Challenge of Uber and BlaBlaCar: Job Precarity? **Unfair Competition?**

Tobia Simon Ochsner

COMPUTING | SWITZERLAND

Creating playlists with artificial intelligence

Special donated prizes by The Eiroforum

EIROFORUM PRIZES

CERN - THE EUROPEAN LABORATORY FOR PARTICLE PHYSICS

One week stay in Geneva, Switzerland

Kasper Fredenslund

PHYSICS | DENMARK

Neural Networks for Detecting Elementary Particles

EUROFUSION - JET

One week stay at Culham, United Kingdom

Paraskevi-Marina Kandreli, Nikolaos-Panagiotis Kalampokis, Konstantinos Lolos

ENGINEERING | GREECE

Algorithm Guided Modular Probe (AGMP)

EMBL - THE EUROPEAN MOLECULAR BIOLOGY LABORATORY

One week in Heidelberg, Germany

Janka Motešická

MEDICINE | SLOVAKIA

Influence of PKC regulators on photodynamic therapy efficacy

ESO - THE EUROPEAN SOUTHERN OBSERVATORY

Visit to ESO site in Chile

Sébastien Christophe Garmier

PHYSICS | SWITZERLAND

cuRRay: CUDA ray tracer for light rays in relativistic Kerr-Newman spacetime

ESA - THE EUROPEAN SPACE AGENCY

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

Max von Wolff

PHYSICS | GERMANY

A method for particulate raindrop analysis contributing to more accurate weather forecasts

ESRF - THE EUROPEAN SYNCHROTRON RADIATION FACILITY

One week stay in Grenoble, France

Emily Shao Ting Xu

CHEMISTRY | UNITED KINGDOM

Chiral separation of racemic mixtures using liquid phase separation techniques with homochrical metal organic frameworks

ILL - THE INSTITUTE LAUELANGEVIN

One week stay in Grenoble, France

Ittai Eden

PHYSICS | ISRAEL

Paleomagnetic Dating of a Mud Brick Wall in Tel Megiddo

XFEL - THE EUROPEAN X-RAY FREEELECTRON LASER FACILITY

One week stay in Hamburg, Germany

Joshua Luke Mitchell

ENGINEERING | UNITED KINGDOM

The PlyBot - A Low-Cost Flatpack SCARA 3D Printer

Bioeconomy prizes

BBI JU

Study trip to Belgium

Gabija Imbrasaitė

MATERIALS | LITHUANIA

Bioplastic film with Penicillium roqueforti for pear preservation

THE EUROPEAN FOOD AND DRINK INDUSTRY

loanna Karaiskaki, Anna Maria Agathokleous, Pavlos Makrides

ENVIRONMENT | CYPRUS

Platics in the marine environment of Cyprus:

monitoring and potential bioremediation strategies

CARGILL

Visit to its state of the art R&D centre at Vilvoorde, Belgium

João Maria Pinto Leite. Mário Jorge Queirós Ribeiro. Catarina Isabel Fonseca Brandão

ENVIRONMENT | PORTUGAL

ENTOFARM.PT

Visitt back to Dublin for winning team

Blanka Novák

BIOLOGY | HUNGARY

Innovative approach to the an bacterial and prebiotic Lycium barbarum extract

TATE&LYLE

Visit to either France or Germany laboratories

Kārlis Emīls Vītols, Annija Kotova

The research of the feed base of Riga State German Grammar School's bee colonies

Leandra Marie Viktoria Zinke, Katarina Juhart, Sofia Quitter

CHEMISTRY | EUROPEAN SCHOOLS

Anti-Bacterial Silvernanoparticle Coating

SWISS INTERNATIONAL TALENT FORUM

Ivavlo Malinov Zhelev

COMPUTING | BULGARIA

Digital image denosing based on sphereconstrained total variation optimization with an additional noise component

SALVETTI FOUNDATION

Mariia Andreevna Solov

CHEMISTRY | RUSSIA

Protection of metal from destructive corrosion

PRACE

Visit to supercomputing center

Filip Kučerák

COMPUTING | SLOVAKIA

Trevo: Trees as a result of an algorithm

BULGARIAN MATHEMATICS SUMMER SCHOOL

Visit to Summer School in Bulgaria

Tobia Simon Ochsner

COMPUTING | SWITZERLAND

Creating playlists with artificial intelligence

EXPO SCIENCES LUXEMBOURG

Visit to Expo Sciences Luxembourg

against Staphylococcus aureus

Simon Meehan BIOLOGY | IRELAND

Investiga on of an microbial effects of both aerial and sections parts of selected plants

WOLFRAM RESEARCH

All Mathematics, Physics and Computing projects receive a one year licence to Mathematica and WolframAlphaPro

Host Orfanizer prizest

SCIENCE FOUNDATION IRELAND (SFI)

Qingyang Wang

PHYSICS | CHINA

The Study of Carbon Dots Synthesis and Fluorescence with Assistance of Mihcroplasma Processing

IRISH RESEARCH COUNCIL

Dahyeon Choi

ENGINEERING | SOUTH KOREA

Development of an interactive and dynamic artificial intelligence storytelling system based on neural conversation models and speech recognition

INSTITUTE OF PHYSICS

Daniel Zion Kang

MATERIALS | USA

Paintable Electronics - Novel Graphene Acrylic Thin Film

Sofia 2019

FIRST PRIZES

Leo Li Takemaru, Poojan Pandya

BIOLOGY | USA

Investigating the Role of the Novel ESCRT-III Recruiter CCDC11 in HIV Budding: Identifying a Potential Target for Antiviral Therapy

Adam Kelly

COMPUTING | IRELAND

Optimised Simulation of General Quantum Circuits

Alex Korocencev, Felix Sewing

ENGINEERING | GERMANY

Hoverboard - a Magnetically Levitated Vehicle

Magnus Quaade Oddershed

ENGINEERING | DENMARK

The wingtip's influence on the efficiency of airplane wings

SECOND PRIZES

Saba Gogichaishvili, Nia Gogokhia

CHEMISTRY | GEORGIA

Novel Biodegradable Polymer for Pharmaceutical Applications

Olli Järviniemi

MATHEMATICS | FINLAND

On the Common Prime Divisors of Polynomials

Jaehyun Lee

PHYSICS | SOUTH KOREA

Introduction of a Novel Diodicity Evaluation Criteria and 1-D Approximate Model for Multistaged NMP (No-Moving-Parts) Check Valves and Methods for Valve Stage Optimization

Claudia Lídia Pubill Quintillà

SOCIAL SCIENCES | SPAIN

With Death at His Heels. Chronicle of an Escape and Two Wars

THIRD PRIZES

Antoni Ignacy Lis - Poland

CHEMISTRY | POLAND

Nanoparticles in antitumor therapy

Noah Scheiring, Andreas Ladner, **Tobias Schauer**

ENGINEERING | SWITZERLAND Diffrec PRO

Océane Zofia Adrienne Patiny

ENGINEERING | CHINA Remote Controlled Cylinder

EUCYS 2021 SALAMANCA WINNERS 1989-2019

Aliaksandr Piachonkin

MATHEMATICS | BELARUS

On the number of points on an algebraic curve in a ring of residues

Honorary awards

LONDON INTERNATIONAL YOUTH SCIENCE FORUM (LIYSF)

All-expenses paid trip to London to attend the London International Youth Science Forum (LIYSF)

Adam Kelly

COMPUTING | IRELAND

Optimised Simulation of General Quantum Circuits

Magnus Quaade Oddershede

ENGINEERING | DENMARK

The wingtip's influence on the efficiency of airplane wings

Olli Järviniemi

MATHEMATICS | FINLAND

On the Common Prime Divisors of Polynomials

STOCKHOLM INTERNATIONAL YOUTH SCIENCE SEMINAR (SIYSS)

All-expenses paid trip to Stockholm to attend the Stockholm International Youth Science Seminar (SIYSS) and the Nobel Prize Ceremony

Alex Korocencev, Felix Sewing

ENGINEERING | GERMANY

Hoverboard - a Magnetically Levitated Vehicle

Special awards

THE EUROPEAN SPACE AGENCY (ESA)

Attend a major space science conference in Europe or to spend a week at ESA's main technical centre, ESTEC, in The Netherlands

Océane Zofia Adrienne Patiny

ENGINEERING | SWITZERLAND

Remote Controlled Cylinder

EUROPEAN ORGANIZATION FOR NUCLEAR

RESEARCH (CERN)

A week's visit to CERN Geneva site

Mateusz Mazurkiewicz, Łukasz Gałecki, Jan Struzińsk

ENGINEERING | POLAND

High Altitude Micro Air Vehicle

EUROFUSION (JET)

One week stay at their Culham, Oxfordshire, UK site

Manning Whitby

ENGINEERING | CANADA

An Interpretation of Life Through Vibration Motors

EUROPEAN SYNCHROTRON RADIATION FACILITY

One week visit to ESRF site in Grenoble

Alexandr Zarivnij

MEDICINE | CZECHIA

Inhibition of glutamate excitotoxicity in glaucoma by liposomes

THE EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL)

A week's placement at EMBL premises in Heidelberg, Germany

Mattias Akke, Elsa Axby

CHEMISTRY | SWEDEN

Catching the Bad Guys: Capturing Oligomers of the Amyloid-beta Peptides

EUROPEAN SOUTHERN OBSERVATORY (ESO)

A visit to ESO facilities in Chile including trips to the Paranal Observatory and ESO's Scientific Centre in Santiago, Chile

Ségolène Mosser, Louise Richard, Hugo Montan

PHYSICS | FRANCE

Advanced ARAGO, a "gravitational wave" detector

THE INSTITUT LAUE-LANGEVIN (ILL)

One week visit to their Grenoble site

Nadia Brzostowicz

PHYSICS | SPAIN

Acoustic levitation. Building and analyzing two different acoustic levitators based on piezoelectric transducers, and exploring its current and possible future applications using simple physical and chemical experiments

EUROPEAN X-RAY FREE-ELECTRON LASER FACILITY GMBH (XFEL.EU)

One week placement at their site near Hamburg, Germany

Roman Rouba

PHYSICS | BELARUS

Investigation of the Prince Rupert's drop properties

Sponsor' awards

EUROPEAN ASSOCIATION FOR CHEMICAL

AND MOLECULAR SCIENCES (EUCHEMS)
A prize of €1000

Zeyad Bady

CHEMISTRY | EGYPT

High particulate matter filtration efficiency Nano-fibrous membrane

EUCYS BIOECONOMY BIO-BASED INDUSTRIES

A paid 5-day trip to Brussels for the winning project including travel to/from, accommodation and daily allowance in Brussels and participating in a tailor-made experience related to the science behind the BBI JU programme

Ronja Holopainen

MATERIALS | FINLAND

EcoMe: a reusable, ecological and affordable menstrual hygiene product for developing regions

EUROPEAN FOOD AND DRINK INDUSTRY

A check for 2,000 euros

Emma Nielsen

ENVIRONMENT | DENMARK

MOOSIC: a mean for productivity optimisation

UNILEVER

A two-day mini-internship, he will get to experience how products from brands like Knorr, Hellmann's and Lipton are being developed

Miklós Zsigó

ENGINEERING | HUNGARY

Moth.NET

PEPSICO

A day at our Beaumont Park R&D centre in the UK, following a range of different activities with our R&D team

Hannah Schatz, Yasemin Gedik

ENVIRONMENT | AUSTRIA

Microplastic on our doorstep

EXPO-SCIENCES LUXEMBOURG

Present his project alongside our national participants

Zvezdin Besarabov

COMPUTING | BULGARIA

Distributed creation of Machine learning agents for Blockchain analysis

INTERNATIONAL SWISS TALENT FORUM (ISTF)

Participate at The International Swiss Talent Forum
– February 5th – 8th 2020

Elisa Seghetti

SOCIAL SCIENCES | ITALY

OnMind: an IoT wearable biofeedback system for the treatment of psychosomatic disorders

JOINT RESEARCH CENTRE (JRC)

A two day stay at its Ispra site in Italy

María Bouso Posada, Xiana Rego Fernández, Ana Rubal Sánchez

BIOLOGY | SPAIN

O da la miúda. Distribution, ethology and phenology of the Iberian wolf

Jannik Wyss

BIOLOGY | SWITZERLAND

Gene regulation during development: The roles of the genes xbp1, creb3l1 and creb3l2 in axial mesoderm differentiation

Andrey Gizdov

MEDICINE | BULGARIA

A novel method for skeletal age estimation based on cranial suture analysis

Elias Elias

MEDICINE | ISRAEL

The effect of the E12 antibody on multiple sclerosis

Host country awards

INTERNATIONAL STUDENTS

OF HISTORY ASSOCIATION (ISHA)
Parcipate in a relevant conference and present their results

Claudia Lídia Pubill Quintillà

SOCIAL SCIENCES | SPAIN

With Death at His Heels. Chronicle of an Escape and Two Wars

BULGARIAN SUMMER RESEARCH SCHOOL

Participate in the Summer Research School of the Bulgarian High School Students Institute of Mathematics and Informatics

Aalia Sellar, Brendan Miralles, Grace Lord

COMPUTING | UNITED KINGDOM

Alexander Alexandrovich Sokko

ENGINEERING | RUSSIA

Next generation of solid-fuel rocket engines

NATIONAL WORKSHOP ON CODING THEORY "PROFFESSOR STEFAN DODUNEKOV"

Parcipate in the next edition of NWCT (November 2019, Chiflika, Bulgaria)

Ján Varga

COMPUTING | SLOVAKIA

Prevention of Cheating in eSports

Constantin Schott

MATHEMATICS | GERMANY

Neural Network application to key-point-detection in radiographs





European Union Initiatives for Research and Youth

Nurturing a new generation of highly qualified scientists is essential to ensure knowledge and growth, and to stimulate sustainable competitiveness and welfare in Europe.

For more than two decades, the European Union, via its Framework Programmes for research and technological development, has had a policy of supporting science and technology aimed essentially at fostering European research activities with those carried out at the level of the Member States. The Framework Programmes have played a lead role in multidisciplinary research and cooperative activities in Europe and beyond.

At present, Horizon 2020 which is the biggest Research and Innovation programme ever, has a budget of nearly €80 billion available to research during the period 2014 – 2020. The EU Framework Programme for Research and Innovation will be complemented further by the existence of the European Research Area. These measures endeavour to break down barriers to create a genuine single market for knowledge, research and innovation. The European Union also recognises the need to start the process of integration at grass roots level. The Commission is actively promoting European cooperation in the fields of science education, training and careers, as well as in trying to stimulate young people's interest in science outside formal education.

In addition to the EU Contest for Young Scientists, the Directorate- General for Research has introduced several other initiatives to encourage young people to consider careers in science.

Marie Curie actions

The Marie Curie Actions provide research training, career development and mobility schemes allowing researchers to be truly mobile both internationally and between commercial and non-commercial sectors. There are opportunities for researchers at any career stage and of any nationality.

In particular, the Initial Training Networks (ITN) offer early-stage researchers the opportunity to broaden their scientific and generic skills, including those related to technology transfer and entrepreneurship, to join established research teams and enhance their career prospects in both public and private sectors, thereby making research careers more attractive to young people. This is being achieved through a transnational networking mechanism, aimed at structuring the existing high quality initial research training capacity throughout EU Member States and Associated Countries. Calls for ITN proposals are announced on the Research & Innovation Participant Portal.

Web site: http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020

Furthermore, the Marie Curie Intra-European Fellowships (IEF) are open to researchers holding a doctoral degree or with at least four years' research experience. The purpose is to give them the financial means to undertake advanced training through research or to acquire complementary skills at a European organisation most suited to their professional needs. These fellowships are to encourage young researchers to spend time outside their own country to acquire new research skills or experience working in other sectors.

More information about Marie Curie Actions can be found at: http://ec.europa.eu/research/mariecurieactions

EURAXESS

Researchers in Motion

The European Commission has launched a user-friendly web portal for researchers called "EURAXESS – Researchers in Motion" with the aim of improving career development and mobility of researchers. The objective of the portal is to provide a single access point to information and support services which help researchers and their families when moving to and pursuing careers in another country.

EURAXESS hosts the following four initiatives:

- EURAXESS Jobs (formerly European Researcher's Mobility Portal) is a recruitment tool with constantly updated job vacancies for researchers throughout Europe;
- EURAXESS Services (formerly ERA-MORE Network) is a network created to assist researchers and their families in organizing their stay in another country;
- EURAXESS Rights (European Charter for Researchers & Code of Conduct for the Recruitment of Researchers) sets out the rights and obligations of researchers and their employers;
- EURAXESS Links (formerly ERA-Link) is a networking tool for European researchers working in the US or Japan.

EURAXESS portal address: http://ec.europa.eu/euraxess

ERC Starting Grants

The European Research Council (ERC) is a special funding component of Horizon 2020 which promotes investigator-driven frontier research. Its main aim is to stimulate scientific excellence in Europe by supporting and encouraging the very best, truly creative scientists, scholars and engineers to go beyond established frontiers of knowledge and the boundaries of disciplines. ERC grants are awarded through open competition to projects in any field of research.

The ERC has launched a Starting Independent Researcher Grant scheme (ERC Starting Grants) with the objective to support excellent researchers with leadership potential, located in or moving to the EU and Associated Countries, who are about to establish their first research team or to start conducting an independent research programme.

The calls for proposals are published annually. Full information, including the Guide for Applicants, can be found at: http://erc.europa.eu

Other initiatives for students and young people

In a more general sense, the European Commission provides information, training, non-formal education and mobility opportunities for young people through a variety of programmes and activities.

The European Youth Portal was developed as a direct result of the European Commission's 2001 White Paper "A new impetus for European Youth", and is a means of giving access to information specifically targeted at young people who are living, learning and working in Europe.

The portal is a gateway to European and national information on 33 countries in 27 languages. It allows young people to have their views heard through online discussion forums, and their questions answered through the Eurodesk Network.

The web address of the Portal is: http://europa.eu/youth

The original Youth in Action was a 2007-2013 EU Programme for young people aged 15-28 (in some cases 13-30). It aimed to inspire a sense of active citizenship, solidarity and tolerance among young Europeans and to involve them in shaping the Union's future. It promoted mobility within and beyond the EU borders, nonformal learning and intercultural dialogue, and encouraged the inclusion of all young people, regardless of their educational, social and cultural background.

The activities of the Youth in Action programme will continue under the new Erasmus+ programme, scheduled to last from 2014-2020.

Moreover, the European Commission has integrated its various educational and training initiatives under a single umbrella entitled the Lifelong Learning Programme. The programme enables individuals at all stages of their lives to pursue stimulating learning opportunities across Europe. There are four sub-programmes focusing on different stages of education and training and continuing previous programmes:

- Comenius for schools
- Erasmus for higher education
- Leonardo da Vinci for vocational education and training
- Grundtvig for adult education.

A cross cutting programme aims to ensure that they achieve the best results possible via four key activities: policy co-operation, languages, information and communication technologies, and effective dissemination and exploitation of project results. In addition, the Jean Monnet Programme aims for a geographical reach beyond Europe's borders by stimulating teaching, reflection and debate on the European integration process at higher education institutions worldwide.

Traineeships in the European Institutions

In-service trainings are organised each year to provide young university graduates with a unique first-hand practical experience and knowledge of the day-to-day work in the EU Institutions. The European Parliament, the Council, the Commission, Court of Justice, the Social and Economic Committee, the Committee of the Regions and the European Ombudsman offer such traineeships, each lasting from 3 to 5 months. The trainings also aim to provide an understanding of the objectives and goals of the EU integration processes and policies. It is an opportunity to work in a multicultural and multilingual environment, contributing to the development of mutual understanding, trust and tolerance.

Details for each institution can be found at: http://europa.eu/epso/discover/useful_links

General 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 World War II, and was launched on 18 April 1951 with the signing of the Paris Treaty which established the European Coal and Steel Community (ECSC) involving six countries: Belgium, France, Germany, Italy, Luxembourg and the Netherlands. On 25 March 1957, the Treaty of Rome was signed to establish the European Economic Community (EEC) in order to promote the free movement of people, goods and services, and capital. A major revision of the Treaty of Rome was signed on 17 February 2003 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 followed in 1981, and Spain and Portugal, in 1986. In 1995, Austria, Finland and Sweden brought the membership up to 15 Member States. The entry of eight central and eastern European countries together with Cyprus and Malta into the European Union on 1 May 2004 was a historic achievement, ending centuries of East-West division. More recently, the number of members has grown to 28 with the entry of Bulgaria and Romania in 2007 and of Croatia in 2013.

The European Union is based on the rules of law and democracy. It is neither a new State replacing existing ones nor is it comparable to other international organizations. 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.

The 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

To know more about the EU, please visit the EUROPA portal at: http://europa.eu

For Schools

The European Commission supports formal and informal science education in schools as well as science centres and museums, through the Science in Society programme. Several projects have been supported via EU funding in this area through collaborative and coordination and support actions. During the last few years, special attention has been paid with respect to research on the use and development of formative and summative assessment methodologies and their role in teaching STEM, including Inquiry Based Science

EUCYS 2029 SALAMANCA

Education techniques, and disseminating results to the society as a whole. The overall aim is to raise the interest of both youth and young people in science and mathematics. Projects such as S-TEAM, FIBONACCI, PRIMAS, ESTABLISH, SAILS, INQUIRE, KidsINNscience, contribute to this purpose.

As part of the dissemination strategy and with the aim to improve, through the results and materials produced by the projects, the European Commission launched SCIENTIX - the Community for Science Education in Europe (www.scientix.eu). SCIENTIX is a web-based community for Science Education targeted not only to teachers and researchers, but also to policy makers, parents and anyone interested in science education. It has been created to provide a user-friendly information platform to encourage dialogue and facilitate sharing of progress, know-how and best practices in science education across EU Member States and Associated Countries.

The European Commission also supports research projects on science education as well as initiatives for reinforcing the link between science education and S&T careers in the private sector through reinforcing the partnership between industry and education.

Providing members of the European educational community, current and future scientists, researchers and innovators with the necessary knowledge and tools, as well as skills and qualifications is a main priority of the European Commission. This shall contribute to having science literate and responsible citizens and stimulating young people to embark on research careers. Science education is the vehicle to meet current and future societal challenges.



LEIDEN 2022 European City of Science

leiden2022.nl









European Capital of Science will host EUCYS2022

In 2022, Leiden will be the European City of Science. A year in which Leiden is the stage for European knowledge and a year in which Leiden will show that she is a true City of Science. Leiden has been a university city since 1575 and while the University of Salamanca is almost twice as old and one of the oldest universities of Europe, Leiden houses the oldest university of the Netherlands: Leiden University. With numerous university buildings 'scattered' across the historic city centre at walking distance, a high number of (international) students and many scientific discoveries attributed to it, the city affirms its status as 'City of Discoveries'. The unique combination and carrying the title of European City of Science 2022, provides the perfect opportunity to host EUCYS2022.

One of the main goals of Leiden2022 is to put young scientists in the spotlight and involve them in the City of Science year. Because young scientists are the future, Leiden2022 will innovate EUCYS and highlight careers of young talented scientists in and outside the academic context. Moreover, to make EUCYS2022 as attractive and unique as possible, Leiden2022 will organise EUCYS2022 during the **ArtScienceWeek**. This interdisciplinary week combines art and science and provides the best opportunity for young scientists to explore the European capital of science. With inspiring theatrical and cinematic experiences, workshops, and events such as the **Night of Discoveries and the Brave New World Conference**, the young scientists can explore and celebrate the entanglement of science and art and watch as the city of Leiden transforms into a world of discovery.

As the European City of Science in 2022, apart from inviting over EUCYS, Leiden2022 will also host Europe's largest interdisciplinary science convention, **EuroScience Open Forum (ESOF)**. Moreover, Leiden2022 will organise the first everyearlong City of Science Event, with all 365 days revolving around science, knowledge, arts, and expertise.

Have you become intrigued, interested, and curious about the next EUCYS edition and want to stay up to date? Follow Leiden2022 on twitter and linkedin (leiden2022) or Instagram (2022leiden). Or check the website leiden2022.nl

ORGANISERS







INSTITUTIONAL SPONSORS









