EUROPEAN RESEARCHERS' NIGHT

September 30, 2022

City of Arts and Sciences, Valencia.

SCHEDULE

10:00 – Opening.

11:00 – Official opening of the Garden of Science.

Dissemination workshops: from 10:00 a.m. to 1:00 p.m.

EU Corner Colloquium: 1:00 p.m. to 2:00 p.m.

Dissemination workshops: from 4:30 p.m. to 9:00 p.m.

MEDNIGHT goes to school

MEDNIGHT

Funded by the European Union

DISSEMINATION WORKSHOPS

(from 10:00 a.m. to 1:00 p.m. and from 4:30 p.m. to 9:00 p.m.)

Flying Buttress Walkway – City of Arts and Sciences

DELEGATION OF THE SPANISH NATIONAL RESEARCH COUNCIL (CSIC) IN THE VALENCIAN COMMUNITY

- ***Microplant***

Do plants have veins? Can you have a tree in a jam jar? You can discover all this and much more in the workshop of the Institute of Molecular and Cellular Biology of Plants (IBMCP, CSIC-UPV).

- ***Virus hunters***

The workshop carried out by the Institute for Integrative Systems Biology (I_2SysBio, CSIC-UV) aims to search for phages, bacteria viruses, against multi-resistant bacteria. The misuse of antibiotics has favoured the emergence of multiresistant bacteria, which today constitute a global health problem. In the absence of current treatments, it is necessary to investigate alternative therapeutic approaches that allow us to treat bacterial infections specifically and effectively. In this sense, phages, bacterial viruses, are postulated as a promising tool in the fight against multiresistant bacteria. The objective of the workshop is to raise awareness of the problem of resistant bacteria, as well as the use of phages as antimicrobial therapy. We will do a little field work in search of phages in the vicinity and we will treat the samples to isolate them.

- ***Curiosity is the fuel of science***

The Chemical Technology Institute (ITQ, CSIC-UPV) will organise a series of workshops open to the general public and families. These scientific workshops will bring to the public, in an entertaining and fun way, basic principles of chemistry that can be found in everyday life related to topics such as energy, food or new materials.

- ***How many genes does... have?***

This is an activity in which the researchers of the Valencia Institute of Biomedicine (IBV-CSIC) will explain what DNA is, its components and how the genome is organised into genes and gives rise to the language that organises genetic inheritance. Among the proposed activities, we will have games to explain the genetic diversity of living beings, the number of genes that different organisms have and it will be discovered that *Homo sapiens* is not the organism with the largest number of genes. In addition, it will be explained why people, twins and fake twins are alike (or not). We will also have an activity to quickly extract DNA from bananas with homemade materials.

- ***I gut the power: the power of food for the microbiota***

Human beings live with many microorganisms that are found in different parts of our body and that greatly influence our health. For example, we have bacteria on our skin, mouth, hands... but where we can find more bacteria is in the intestine. The set of all these microorganisms is known as the microbiota.

At the Institute of Agrochemistry and Food Technology (IATA-CSIC) we study the intestinal microbiota and how it can change according to our diet, other lifestyle factors and the state of health in which we find ourselves. We have prepared various interactive activities with which children and adults will learn what the microbiota is, the different types of bacteria that form it and the material that we use in the laboratory to study it. In addition, with these games children will learn the foods and healthy lifestyle habits that benefit the intestinal microbiota and, therefore, their health.

FISABIO

- ***Bacteriopolis***

As if it were the game of the goose, those who play Bacteriopolis become bacteria that move through a giant board until they reach the laboratories of the Fisabio Foundation. In the special boxes you learn, for example, that Lactobacillus turn milk into yoghurt or that some bacteria can be resistant to antibiotics.

- ***Create your own vaccine!***

What happens to our body when a virus like SARS-CoV-2 infects it? The participants of this workshop will be able to learn how the immune response works with the help of the Vaccine Research Area of the Fisabio Foundation. To do this, they will create a model of the coronavirus and the antibodies with clay and popsicle sticks. In addition, they will also create the vaccine that definitively ends the coronavirus!

- ***Microscopic life in streaming***

What is a microorganism? How do they coexist with each other in the same environment? Do you want to see live the tiny living beings that live in the water of the ponds in the city of Valencia? The participants of this workshop will be able to see all this through a microscope. With the help of scientists from Fisabio, they will learn a lot of things about microbiology!

- ***A laboratory on your mobile***

In this workshop, your mobile becomes a microscope! Through the screen of your phone you will be able to see the cells of the jasmine, the inside of a root, all the phases of mitosis and much more! Take advantage and capture all the images and videos you want to show off on your social networks.

- ***Professor Pupil's experiments***

Discover the power of polarisation with Professor Pupil! In this workshop on visual quality you will find all kinds of experiments, from how to activate and deactivate polarised lenses like the ones we use in sunglasses, to the creation of a bracelet that traps UV rays. Don't miss this workshop where you can even see polarised art!

INCLIVA

- ***All the same, all different***

Workshop that will show how to extract DNA from a banana. The INCLIVA Precision Medicine Platform will explain how diseases and their evolution are detected by researching DNA.

- ***Growing healthy***

Workshop to promote healthy habits and survey by the Research Group on colorectal cancer and new therapeutic developments in solid tumours.

- ***3D bioprinting in biomedical research***

Explanatory workshop on the bioprinting process from the design of the experiment to the final result.

- ***Discover what a biobank is***

Explanatory workshop on what a Biobank is with the help of crafts by the INCLIVA Biobank.

- ***Reproductive medicine***

Explanatory workshop on the birth of life by the Reproductive Medicine Research Group.

POLYTECHNIC UNIVERSITY OF VALENCIA

- ***The power of light***

In many of the photochemical reactions we study, we use lasers to be able to detect reaction intermediates that live on a microsecond scale (imperceptible to the human eye). Similarly, the voice generates a series of vibrations imperceptible to the human eye. Therefore, many times we have asked ourselves: how could we observe our voice? With the power of light and a simple system using a boat, a balloon, a mirror and a laser pointer and thanks to the vibration of the voice we will be able to draw the sounds that people emit and, in this way, be able to observe in real time the sound waves caused by our voice.

- ***Discovering virtual reality***

Virtual reality is a technology that involves real-time interaction through multiple sensory channels and aims to make the user feel that they are present in a synthetic world created by the computer. In recent years, virtual reality has made great advances due to the appearance of multiple commercial devices that have made it accessible to the general public. In this workshop, the basic components of this type of systems will be described and their operation and technical characteristics will be analysed, and key concepts such as stereoscopy, tracking and degrees of freedom will be introduced. Workshop participants will be able to try virtual reality devices first-hand.

- ***A science lab in your pocket***

The use of smartphones is present in everyday life far beyond the function of making calls. We use more and more applications (apps) that allow us to do tasks that were unthinkable until recently. Many of these applications are based on the precise and adequate use of different sensors integrated into the structure of our mobile. There is therefore a high degree of technology that makes mobile phones a good tool for scientific demonstrations. In this workshop, some simple experiments are proposed that will be developed with the most common sensors that we find in our mobiles. For example, through these sensors we can turn our smartphone into a pedometer, a compass or a microscope.

- ***How do we get home what we buy?***

Do you know how transport companies are organised to bring us the things we buy online? Every day the carriers that deliver products to our homes have to find the best routes so that everything arrives quickly and in perfect condition. In this workshop you will have to be a dealer and distribute some balls according to their colours, but you must do it in the shortest time you can. You will see that it is not easy.

- ***A 3D world***

Have you ever seen how a 3D model is made? Do you want to know your position on a map? In this workshop of the School of Cartographic and Topographic Geodesic Engineering of the Polytechnic University of Valencia (UPV) you will be able to experience it first-hand. You will be able to use a state-of-the-art laser scanner to scan objects and create three-dimensional models. You will also be able to make observations with a topographical instrument and look through its telescope. And if you like maps, we will do a walk with a GNSS to draw our position on a map with the computer.

UNIVERSITAT DE VALÈNCIA

- ***The chocolate workshop***

The objective of this workshop is to answer these questions and others, discovering the process by which cocoa beans are transformed into chocolate and the processing innovations that have occurred throughout history.

Chocolate turns out to be an ideal instrument to talk about different concepts related to biology, chemistry, materials science, archaeology and history. This allows in a playful and attractive way to relate sciences with the world around us, which undoubtedly favours their learning. Statistics say that chocolate is liked by 90% of the population and if the word *chocolate* is searched on Google, 366 million entries appear. This highlights the almost unanimous interest that exists in chocolate and that, in some cases, it can be considered a passion.

But in addition to its pleasant taste, few people know its origin, production methods, the differences between different types of chocolate or why if it is stored for a long time, its appearance changes.

In the experimental part of the workshop, products derived from cocoa (cocoa paste, cocoa butter and cocoa powder) and different types of chocolate will be tasted, to learn to appreciate all the nuances while delving into the functioning of the chemical senses (taste and smell) and in the concept of food texture. You will also be invited to participate in some experiences that allow you to observe how the flavours and aromas of cocoa develop, or to recreate the flavours of the first chocolates made with cocoa paste.

- ***Archeo-science***

The incorporation of new technologies to archaeological studies allows us to offer a new vision of the past, discover and generate data that draw a new dimension and understanding of objects related to the ancient world, in which different specialties intervene.

The objective of this workshop is to make known how archaeological materials are studied (ceramics, bone, stone, coal, seeds, etc.) and, in an entertaining way, the analysis methods used to obtain information and how the derived data are interpreted.

- ***Make your own slime and kryptonite***

The objective of this activity is to demonstrate the use of polymers and one of their multiple properties from an informative point of view and with materials for daily use. The philosophy of the demonstration is to illustrate how important crystallisation processes are to understand the physics of materials.

Slime: The activity consists of preparing a cross-linked polymer (slime), based on everyday items such as clear glue, water and borax. In addition, food colouring is used to colour the polymer and a few drops of fluorescein (organic fluorophore) can be added to give it emissive properties after illumination with ultraviolet light. Polyvinyl alcohol (PVA), a component of the transparent glue, is soluble in water, however, when mixed with borax, it forms a three-dimensional network that traps water and creates a semi-solid gel known as slime.

Kryptonite: The objective of the workshop is to illustrate how important crystallisation processes are for understanding the physics of materials. In this activity we explain the instantaneous crystallisation of sodium acetate from a supersaturated solution, that is, solutions that contain quantities of dissolved solute exceeding the limit that the solvent is capable of admitting. When these solutions come into contact with a crystallisation nucleus such as a rod or a sodium acetate crystal, they immediately crystallise exothermically (with the release of energy, in this case heat), with which massive crystals are obtained instantly. It is also intended to show the phenomenon of fluorescence by including small amounts of a fluorescent organic compound such as fluorescein in the solutions, so that under UV radiation the crystal formed from sodium acetate emits an intense green light that resembles a crystal of kryptonite.

- ***The rainbow of red cabbage***

The objective of this workshop is to show the possibility of explaining and understanding the concept of pH through a natural product such as, in our case, red cabbage.

Red cabbage contains pigments called anthocyanins that change colour when in contact with acids and bases. For this reason, red cabbage extract is used as a natural indicator, since it turns pink or red in an acidic medium and blue, green or yellow in a basic medium. Acid-base indicators or pH indicators are weak organic acids or bases; its undissociated form is different from that of its corresponding conjugate acid or base. The colour change that occurs is due to a structural change in the indicator substance induced by protonation or deprotonation of the product. Chemists use pH to accurately indicate the acidity or basicity of a substance. Normally, pH ranges from 0 (most acidic) to 14 (most basic).

Some vegetables, such as red cabbage, strawberries or red onions, have a group of substances (anthocyanins) that are very sensitive to changes in pH, so they can be used as natural indicators. Anthocyanins are a group of water-soluble pigments responsible for the red, blue or violet coloration of many flowers, fruits, vegetables, etc. Therefore, with a simple red cabbage we can qualitatively determine the pH of many everyday products at home, including certain foods and cleaning products.

- ***How to clean water with MOFs***

The objective of this workshop is to explain how we could mitigate the effects of pollution in water through MOFs, which are porous materials, act as “filters” and retain these harmful pollutants. HKUST-1 MOF is a copper-based adsorbent with simple, fast and high-yield synthesis. The first part of the workshop is the synthesis of this well-known material from two mother dilutions (metal part and organic part) and its filtering to obtain a characteristic turquoise blue powder. The second part of the workshop is the practical application. Using a similar material, already dry and activated, a “contaminated” water, previously prepared, is purified. The fluorescent yellow water is now colourless again, demonstrating the success of our materials in capturing contaminants.

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EU CORNER COLLOQUIUM

(from 1:00 p.m. to 2:00 p.m.)

Santiago Grisolía Auditorium

Príncipe Felipe Museum

City of Arts and Sciences of Valencia

The European Corner of Valencia consists of two activities this year. On the one hand, starting at 1 pm there will be a meeting between research staff with European projects and students to share how they began their scientific career and what motivated them to dedicate themselves to research. On the other hand, the European Corner will have a space dedicated to highlighting European funding for scientific and technical research led by Europe Direct in the Valencian Community.

With the participation of:

- **Iñaki Comas**, researcher at the Spanish National Research Council (CSIC) at the Valencia Institute of Biomedicine (IBV-CSIC). Tb-Reconnect project.
- **Pilar Francino**, head of the Genomics and Health Area of the Foundation for the Promotion of Health and Biomedical Research of the Valencian Community (FISABIO). Stance4Health project.
- **Marcos Latorre**, researcher at the Centre for Research and Innovation in Bioengineering (Ci2B) of the Polytechnic University of Valencia (UPV). G-CYBERHEART project.
- **Tania Fleitas**, Joan Rodés Researcher in the Research Group on colorectal cancer and new therapeutic developments in solid tumours of the INCLIVA LEGACy Project.
- **Gustau Camps-Valls**, coordinator of the Image and Signal Processing (ISP) group of the Image Processing Laboratory (IPL) of the University of Valencia. ELLIS Program in “Machine Learning for Earth and Climate Sciences”.
- **Ana Enguídanos Weyler**, Europe Direct Valencian Community.