

# Biennial Event 2022

## Workshops



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(01) WorldTempus

### **Build a mechanical clock**

(02) CUI UNIGE

### **Cryptography**

This workshop presents the main principles of cryptography, with very concrete practical activities. Cryptography or encryption is a very old method that dates back to Antiquity. Digital technologies have made it possible to automate and complexify these methods to make them more and more secure. During this workshop, and according to the level of the class (from primary to secondary II), we will successively present several techniques of increasing complexity and robustness, to understand the principles of modern cryptography. This presentation will be illustrated by several practical encryption and decryption activities. Magic? Almost!

(03) CUI UNIGE

### **Machine Learning**

This workshop presents the main principles of Machine Learning, with very concrete practical activities. Machine Learning is a field of study in artificial intelligence that uses mathematical and statistical approaches to give computers the ability to "learn" from data, i.e. to improve their performance in solving tasks without being explicitly programmed for each task. These broad concepts will be illustrated by an ongoing and very practical sorting activity, performed on a computer. Dazzling!

(04) CERN

### **What is a website ?**

Participants learn about web development and its scientific applications through a presentation, a game and a tutorial using Glitch. General objectives: teach that: - Web development involves design and creativity - Web development is useful for science - It can be fun and is not too difficult. Technique: - A website is a set of code files that is hosted on a web server, sent to your computer and rendered (drawn) by the browser/computer - Code is like a language for computers - A website must be physically sent from a web server to your computer.

(05) CERN

### **Seeing the Invisible - \*\*\* FULL \*\*\***

In this workshop, you will try to make the invisible visible! To do this, you will have to roll balls (e.g. ping-pong balls) through a box without seeing inside. Depending on whether the ball passes or bounces, you will have to develop the best model to identify the invisible structure inside the box! You will learn how scientists design clever experiments and use their logic to better understand things that are not visible to the naked eye!

(06) CERN

### **Magnet challenges**

Hands-on science and education activity about magnets and their applications. What are magnets? How do they work? Can we build one ourselves? Why are magnets so important to CERN? Come play with magnets and other cool scientific gadgets and try to solve as many magnetic challenges as possible while learning something and having fun. You will be guided throughout the workshop by a CERN-trained science education tutor.

(07) Futurekids

### **Virtual reality with Futurekids - \*\*\* FULL \*\*\***

Participants will create a 3D world. They will also deepen their programming skills to animate the different elements of their scene, which they will then visualize in virtual reality. Although it is not mandatory, it is recommended that participants bring a smartphone with them.

(08) HEPIA

### **Electronic jewelry**

The idea is to create a jewel on the surface of which we will design an intelligent drawing and place an RFID chip, readable and codable by our smartphones and a specific reader.

(09) HEPIA

### **Drones for humanitarian aid**

An 11 year old African child, Kwaku, received his medicine by drone. You will program a drone's flight like the pros do and you will see it fly according to your instructions.

(10) HEPIA

### **Sismic table**

Presentation of the seismic phenomenon (videos, PPT, etc.). (approx. 15 min). Demonstration of the seismic table (approx. 15 min.). Participatory workshop around the seismic table (approx. 45 min.)

(11) HEPIA

### **Plan your territory**

How can we rethink human-made spaces? Let's look at the spatial arrangement of built-up areas, agricultural production areas and natural ecosystems: to create functional living spaces, it is necessary to understand how these different elements can combine and interact in a positive or negative way. A model presenting these different spaces serves as a support for a guided reflection by people trained in the fields of agriculture, land use planning and the environment. Each group participating in the animation is separated into three reflection teams that deal in turn with these different aspects.

(12) Agroscope

### **Fungi's limitless potential**

Fungi are everywhere (in the air, in clouds and rainwater, in the soil, in trees....) at the base of life: the carbon cycle, they allowed the transition more than 400 Mio years ago from aquatic plants to terrestrial plants. They grow on everything and in everything, they consume everything, even our fruits and jams... they are essential but they cause us serious problems. Discover in this workshop how to capture them, how to make them produce unusual molecules, how to detect them with artificial intelligence, how they will help us to clean the planet...

(13) RightsTech Women

### **Use Satellite Data to Understand Climate Change**

How can you use satellite data to understand climate change in your community? Join RightsTech Women and its partners for a training exploring this question. At this event, participants will learn how you can apply images of the Earth taken from space to understand climate change in your region and around the world. We will introduce you to satellite imagery and the process of working with this data to investigate your own questions. We'll introduce you to Google Earth Engine, a platform you can use to visualize and understand climate trends such as deforestation, temperature changes and extreme events. No experience necessary - just bring your curiosity! You'll also have a short career talk led by our technical coaches, where we'll talk about the different types of jobs you can do in STEM (science, technology, engineering and math).

(14) Chimiscope - UNIGE

### **Heavy or light?**

Let's immerse ourselves in the world of the Periodic Table of Elements -the chemists' dictionary- and try to identify, in the form of a scientific investigation, rods of unknown substances. With a few tricks and a bit of diligence, we will avoid some traps.

(15) SIB Swiss Institute of Bioinformatics - UNIGE

### **Stalk an online virus**

It is now possible to study a new virus and follow its evolution thanks to the data available online. This hands-on workshop will show how scientists track a pandemic, using SARS-CoV-2 as an example. Participants will be able to 'see' the genetic material of the virus, compare viruses from different parts of the world using freely available bioinformatics tools on the internet. They will be able to formulate hypotheses on the impact of the variants on public health or on the origin of the virus (pangolin, bat, ...). The Tracking a virus online workshop is based on <https://lightofevolution.org/chasse-aux-variants/>

(16) Equipe Anti-épidémie

### **Responding to an outbreak**

Participants will learn about the outbreak response process, including index case detection, diagnosis, laboratory analysis, disease surveillance systems and response campaigns, media awareness, official reporting mechanisms, etc.

(17) Blue Brain Project, EPFL

### **Take the Exit on the Right**

Tools to navigate the brain. Just like navigating to your next vacation destination using maps with cities, streets and house numbers, one can navigate the brain and its data. In this hands-on workshop, we invite you to come and learn more about the brain and the tools used by the EPFL's Blue Brain Project to extract, navigate and explore brain data.

(18) Mathscope - UNIGE

### **Enigmathic**

Discover mathematics as you have rarely seen it: fun and mysterious! Come and touch, play, manipulate, in short, have fun with maths!

(19) Physiscope - UNIGE

### **Mechanics: forces & motion**

Why does an apple fall? How does an elevator work? What is motion? What is inertia? What is impulse? The whole world around us is subject to the laws of mechanics. We invite you to feel and experience these universal rules, notably by flying with a unique mobile system based on superconducting levitation. Inertia, action-reaction, dynamics... welcome to Newton's world!

(20) Observatoire - UNIGE

### **Salomé - Mission exo-Terre**

What if there was a planet similar to Earth somewhere else in the universe? You probably know the 8 planets of our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune); we now offer you a journey into space to discover exoplanets, the planets that revolve around stars other than the Sun. The Geneva Observatory needs your help to analyze data on exoplanets. Step into the shoes of an astrophysicist and practice detecting new planets. Through 4 playful stands, you will analyze an exoplanet (its mass, its radius, the type of star around which it orbits, its distance to the star) to determine if it is an "exo-Earth". The workshop can be extended by reading the comic strip "Salomé: Investigating exoplanets".

(21) L'éprouvette, Laboratoire Sciences et Société de l'UNIL

### **Invisible women !**

"The Matilda Effect" or the processes of erasure of women in science. Marthe Gautier, Jocelyn Bell, Marie Dentièrre, Trotula de Salerne... do these names ring a bell? Women of science, they have contributed to advances in research in fields such as biology, astrophysics, theology and medicine. And yet, they have all been struck by the "Matilda effect": unlike their male colleagues, their names rarely appear in scientific publications or in the media, or even in awards. Through audio, video and written excerpts, you will be led to reflect and discuss the systematic erasure of women in science. This is an opportunity to explore the factors of this phenomenon, which is still present, and to promote the visibility of these women.

(22) SICPA

### **Let's play detective! - \*\*\* FULL \*\*\***

In our workshop, we will introduce the concepts of document security, forgery and forensic analysis. Participants will be provided with authentic documents and simulated forgeries for their exercise and will gain hands-on experience in recognizing visible (overt) and covert (covert) security features. They will use specialized devices to distinguish genuine from counterfeit.

(23) Objectif Science International

**The story of the Earth**

Tell us about the history of the Earth. Come and learn how to recognize fossils and minerals, and how to place them in the vast timeline of the Earth's history.