



# Orientation : Science & Technology !

An offer for students in general  
and classical education



# Orientation :

I am a student of a classical or general high school. I am curious to discover some scientific and technological fields first hand! I need to choose a section, course or training!

I am a teacher or guidance officer: How do I guide students?

The Science Center, through its "Orientation: Science and Technology" programs, helps to create vocations and raise awareness of students towards future professions.

Assisted by professionals who guide them and talk about their experiences, the classes spend half a day immersed in the various worlds of technology and science. A practical experience for any training: professional, post-bac or university!

## Science in action !

By getting their hands dirty, participants discover in a spectacular and playful way how the scientific and technological concepts discussed are put into practice in the world around us: from our daily lives to our professional lives.

The workshops are usually co-facilitated by scientific mediators and professionals in the respective fields.

# Science and technology !

An offer for students in general and classical education

## PRACTICAL INFORMATION

The program is developed **for students in secondary school classes, both classical and general.**

It is **adapted to the level of each class and is offered in 4 languages** : Luxembourgish, French, German and English.

### A WORD ABOUT THE PROCESS

To optimise the experience, the maximum number of participants is limited to **12 participants per workshop.** Beyond that, several workshops can run in parallel.

### PRICE

For Luxembourg classes the participation in the "Orientation: Science and Technology" programme is free of charge, as it is financed by our partners.

### FORMULA OF THE VISIT

Every working day

Participation in one of the workshops in this programme is usually half a day. More specifically, we suggest the following schedule:

#### Suggested program :

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9h - 10h	<b>Greeting and visit of our exhibition (Exploration room)</b>
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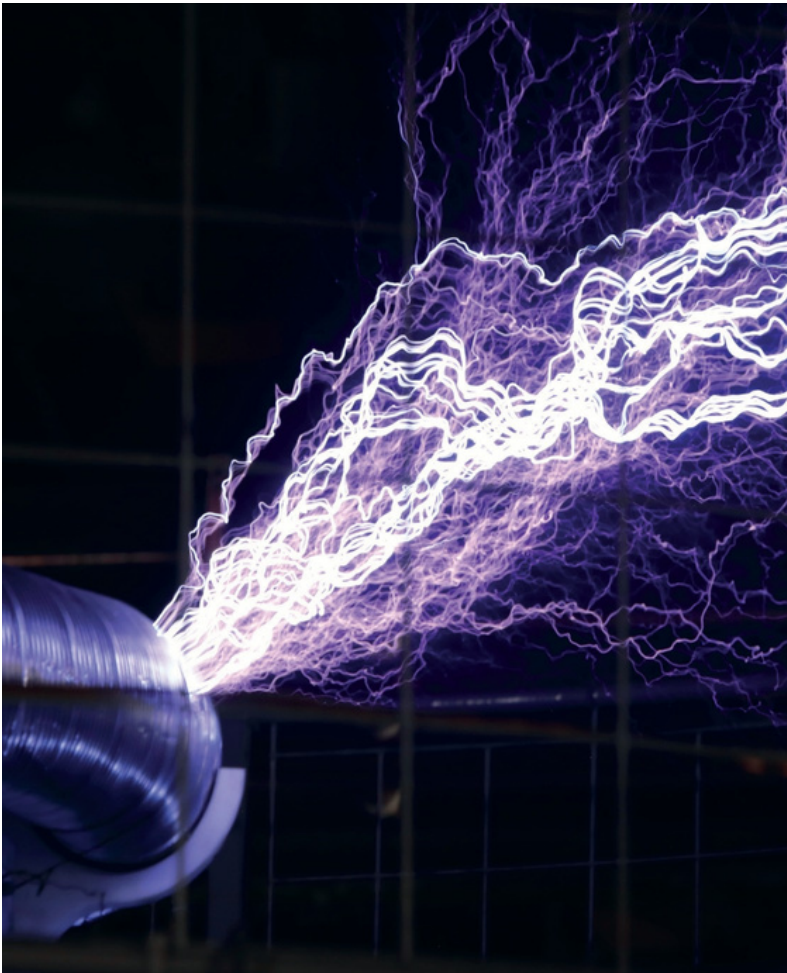
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10h - 12h30	<b>Thematic workshop</b>
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Other time options and programme adjustments are possible on request.





As the primary source of energy for everyday life (and still growing with the transition to electric mobility), electricity and electronics is rich in innovation. This workshop introduces the fundamental principles of electricity through spectacular and entertaining demonstrations. In addition, participants learn how to harness this lightning energy through different challenges: from the traditional connection of a lamp to the switchboard to the wiring of complex circuits with sensors and programmable devices in the sense of "smart home technologies".

**This workshop was developed jointly with GGM11.**

FRICTIONAL ELECTRICITY  
VAN DE GRAAFF  
TESLA - FARADAY CAGE

DISTRIBUTION BOARD  
KNX SYSTEMS  
SMART HOME TECHNOLOGIES



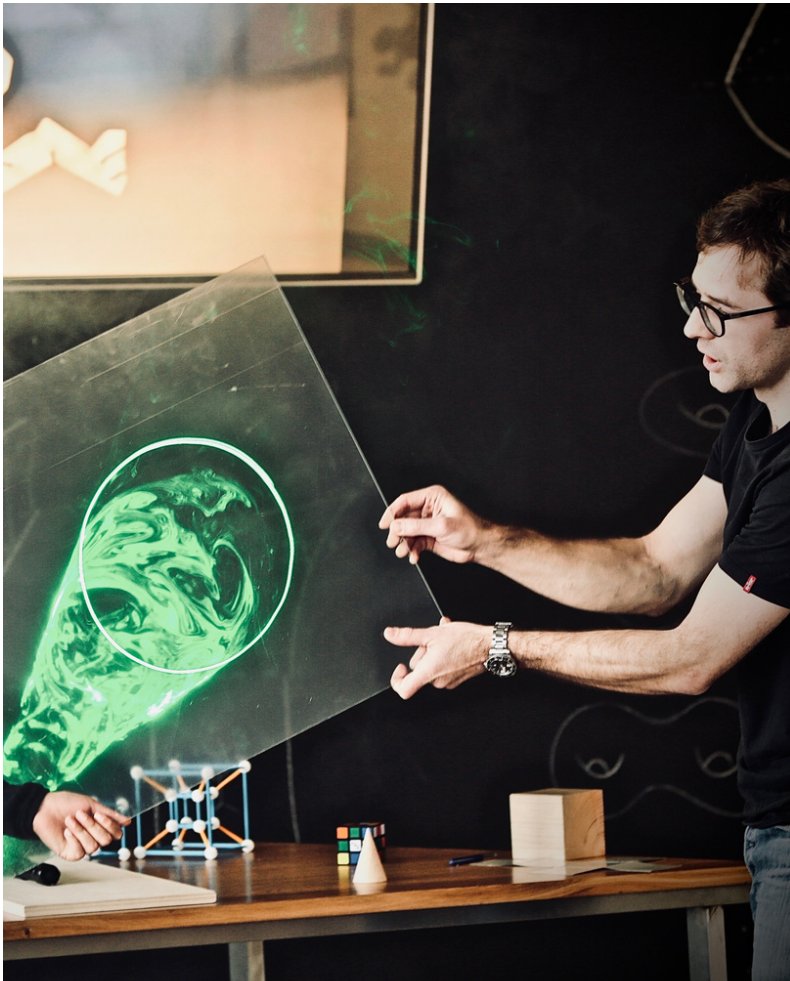


How did our ancestors exchange without digital help? What means do we have to communicate without even being face-to-face? And what does this have to do with modern data transmission? Thinner than a human hair and indispensable in telecommunications: optical fibre. Today, about 98% of all data transfers take place over these glass wires that link houses, cities and even continents together. The participants will create their own networks that will allow them to transfer all kinds of information, be it sound, visual or other signals.

**This workshop was developed together with the Post's training department.**

DATA TRANSMISSION  
DATA CODING  
ELECTROMAGNETIC WAVES

LIGHT PROPAGATION  
OPTICAL FIBRES  
NETWORKS



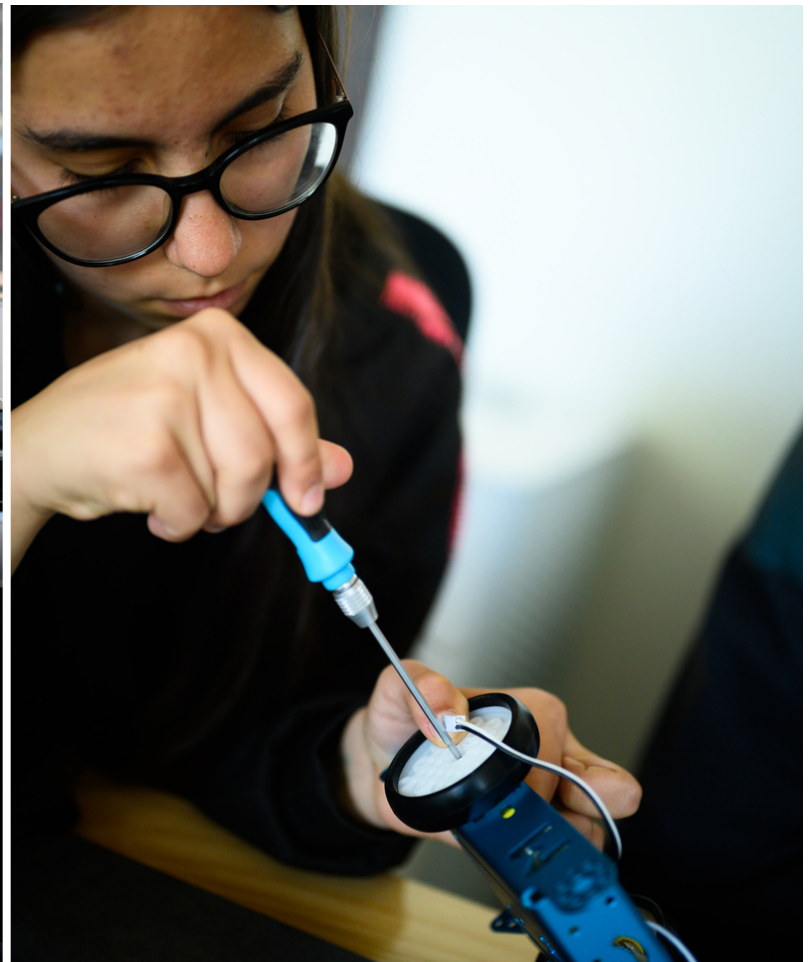
On the trail of hidden dimensions! With the help of surprising and amazing experiments, we will unveil the secrets of geometry in space and discover the field of 3D design: from virtual reality to 3D scanning. You will model objects that can be made by 3D printers or viewed through VR glasses. Along the way, we will explore trades and professions ranging from engineering to architecture.

**This workshop was developed together with PlanWERK+ Modelbau & Zeichenbüro.**

GEOMETRY IN SPACE  
PROJECTIONS AND SHADOWS  
HIGHER DIMENSIONS

3D SCANNER  
3D DRAWING  
VIRTUAL REALITY





Mechanics, electronics and programming. In this workshop, we are interested in intelligent cars driving autonomously without human intervention. After initial tests and investigations with a real car, you will assemble and program small robots equipped with various sensors to simulate real autonomous mobility situations. Welcome to the world of future mobility.

**This workshop was developed jointly with Autodistribution LOSCH.**

**AUTONOMOUS MOBILITY  
VARIOUS SENSORS**

**PROGRAMMING  
ROBOTICS**





Soft, high carbon or even hardened? What types of steel should be chosen for a given application? In this semi-professional workshop with machine tools, we will get to grips with some of the mechanical properties of irons and steels. Along the way, we will discover several ways to process metals, both cold and hot.

**This workshop was developed jointly with GGM11.**

MECHANICAL PROPERTIES OF METALS  
METAL NETWORKS  
HARDENING BY TEMPERING

ELASTIC/INELASTIC IMPACT  
SOFT IRON VS. HIGH CARBON IRON  
DUCTILE/FRAGILE



# PLASTIC AND RECYCLING

MATERIALS



Plastic is a very useful invention, but it also poses many challenges. What are the advantages and disadvantages of this synthetic material? Plastics belong to the chemical category of polymers, which are extremely long molecules. Participants are introduced to natural and synthetic polymers and can discover their properties.

Turning waste into valuable resources is the goal of efficient recycling towards a circular economy. In this workshop, participants learn how to sort different types of plastics, how to grind them and how to inject them under pressure and heat into moulds to make new objects.

**This workshop was developed together with the SuperDreckskschicht.**

STRUCTURE OF POLYMERS  
THERMOPLASTIC  
CIRCULAR ECONOMY

SORTING  
MILLING  
PRESSURE INJECTION





Most people love a fluffy muffin or an airy loaf of bread, but few know the recipe for such lightness. Through amazing interactive experiments, you will discover the role of carbon dioxide and the important difference between yeast and baking powder. One is a living organism while the other is a mixture of acid and base.

**This workshop was developed jointly with the Ecole Hôtelière et de Tourisme du Luxembourg.**

ACIDS AND BASES  
PH  
SODIUM BICARBONATE

MICRO-ORGANISMS  
FERMENTATION  
MICROSCOPY





The art of capturing the moment! How do lenses and cameras work? What are the parameters to master in order to have a quality image? Dive into the world of photography, cinematography and audiovisual with us. Find out how to produce your own multimedia content in a rather professional way: from exciting spots to informative reports. With the electronic media equipment provided and techniques such as Chroma Keying, you can let your imagination run wild and edit your own images, audio and video recordings.

**This workshop has been developed jointly with DiviDante.**

### LENSES

ISO, LENS APERTURE AND SHUTTER SPEED

VIDEO EDITING

### AUDIO RECORDING

LIGHTING

GREEN SCREEN



How to look inside a human body and which techniques to analyse it? In this medical imaging workshop, participants will have the unique opportunity to analyse their own body in several different ways.

On the one hand, blood analysis is one of the simplest, quickest and most common techniques to get an idea of the general state of health and to provide interesting clues about possible problems. On the other hand, ultrasound, a non-invasive imaging technique, is explained in detail and compared to other techniques such as X-rays.

Participants will have the opportunity to take part in ultrasound exercises in which they can examine their own blood vessels with ultrasound sensors. In addition, they will be confronted with realistic medical situations, such as a pregnant woman or the analysis of an abdomen with tumours, in exercises with medical phantoms.

**This workshop has been developed together with DeWidong asbl and partly funded by the Loutsch Weydert Foundation.**

BLOOD ANALYSIS  
ECHOGRAPHY  
ULTRASOUND

X-RAYS  
MEDICAL GHOSTS  
HEALTH





Deep learning, neural networks and Big Data! With concepts borrowed from mathematics and computer science, artificial intelligence is penetrating fields as varied as medical diagnostics, image recognition and decision support!

Is it the embodiment of science fiction dreams or an exaggerated hope? Welcome to the heart of the digital revolution!

In this workshop, participants discover the basics of programming by coding their own games using simple and intuitive programming tools. Once the basics are learned, the differences between traditional programming and AI are explained.

Finally, participants create their own AI and discover how a machine can "learn". The workshop concludes with a discussion of cutting-edge research in the field, challenges, risks and future applications.

CODING  
PROGRAMMING  
ARTIFICIAL INTELLIGENCE

# DEEP LEARNING NEURAL NETWORKS RISKS AND CHALLENGES





# Frequently asked: Questions!

PRACTICAL  
INFORMATION

## For who ?

Classes or groups of secondary school students.

Classical and general education.

## How to book ?

By email :

**reservations@science-center.lu**

## By who ?

The Luxembourg Science Center, in collaboration with the André Losch Foundation, the Chamber of Commerce, the Script, the European Social Fund, the Chambre des Métiers, the Loutsch-Weydert Foundation, SES, Creos, the OAI - Ordre des Architectes et des Ingénieurs-conseils, the Chambre des Salariés. The workshops are organised and run jointly by scientific mediators and experts working in the trade/profession.

All the workshops on video and more information here





# How to find us ?

1.rue John Ernest Dolibois / L-4573 Differdange

## BY BUS

**Line TICE 1** ESCH • BELVAUX • LAMADELAINE

Bus stop **ARBED** rue Emile Mark

**Line TICE 2** ESCH • SOLEUVRE • DIFFERDANGE

Bus stop **ARBED** rue Emile Mark

**Line RGTR 327 1** DIFFERDANGE • LASAUVAGE

Bus stop **ARBED** rue Emile Mark

**Line TICE 6** DIFFERDANGE • LASAUVAGE

Bus stop **ARBED** rue Emile Mark

**Line RGTR 325** ESCH • BELVAUX • LAMADELAINE

Bus stop **ARBED** rue Emile Mark

## BY TRAIN

**CFL STATION**

RUE EMILE MARK / J.F. KENNEDY

**Line CFL 60**

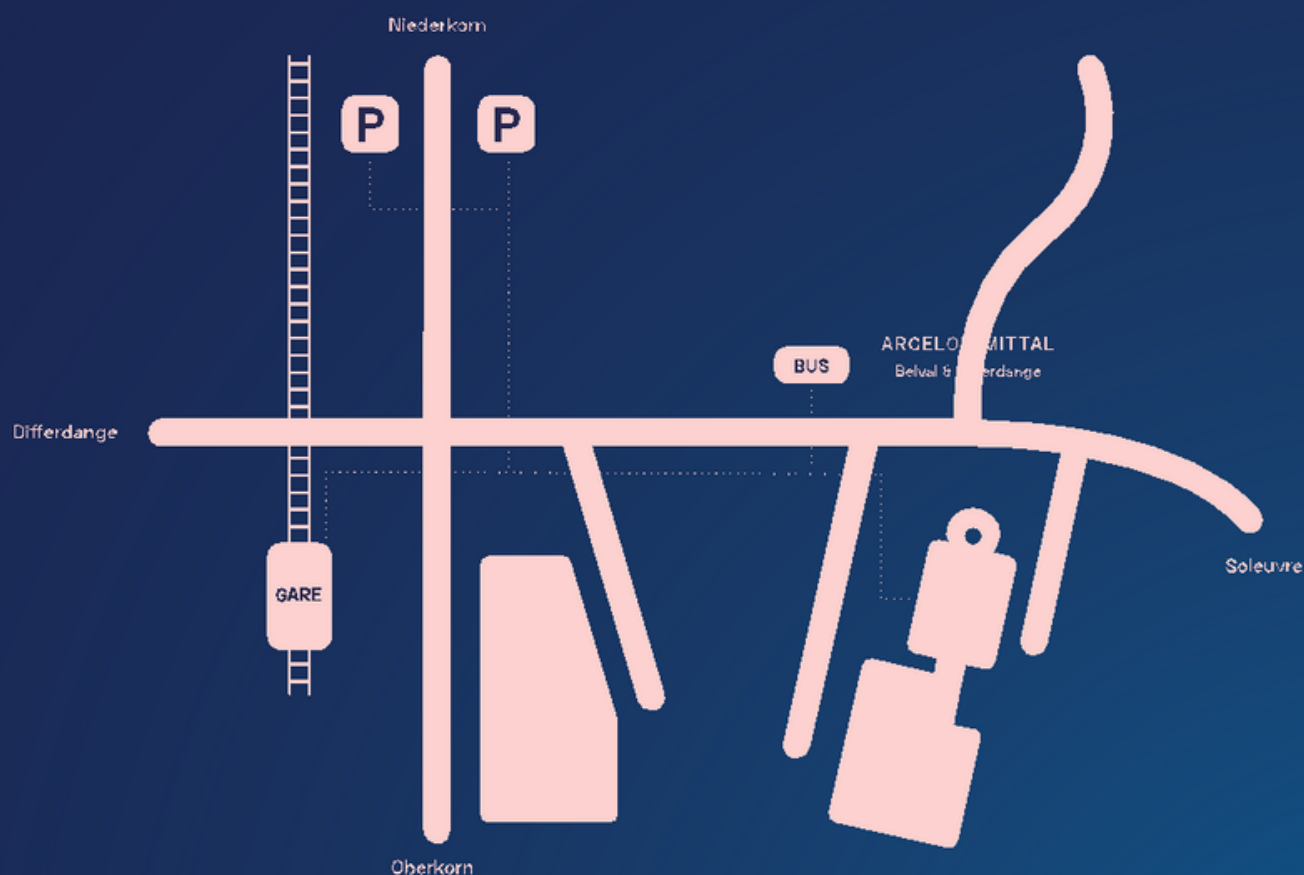
LUXEMBOURG • ESCH

PETANGE • RODANGE

## BY NAVET

**Line Diffbus 2 1** FOUSBANN

Bus stop 5 & 20 **ARBED** rue Emile Mark





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This project is co-financed by :

