i2i 2026

Rapport sur les contributions

https://indico.ijclab.in2p3.fr/e/13262

ID de Contribution: **1** Type: **Non spécifié**

The Unix Shell

mardi 7 avril 2026 09:00 (3h 30m)

The Unix shell has been around longer than most of its users have been alive. It has survived because it's a powerful tool that allows users to perform complex and powerful tasks, often with just a few keystrokes or lines of code. It helps users automate repetitive tasks and easily combine smaller tasks into larger, more powerful workflows.
1. Introducing the Shell
2. Navigating Files and Directories
3. Working With Files and Directories
4. Pipes and Filters
5. Loops
6. Shell Scripts
7. Finding Things

If you have a Windows, machine, you should install the Bash Shell provided by Git for Windows, following the instructions at https://carpentries.github.io/workshop-template/install_instructions/#shell. For all the questions during the installation, accept the default answer.

Orateur: JOUVIN, Michel (IJCLab)

ID de Contribution: **2** Type: **Non spécifié**

Git Survival Guide

mardi 7 avril 2026 14:00 (3h 30m)

In this survival guide, we will explore how to effectively use Git to manage and access the version history of any set of text files (code, manuscripts written in LaTeX, etc.), both in the context of team an personal projects. Specifically, we will cover the following points:
- Initializing a Git repository
- Tracking changes and managing branches
- Merging and rebasing
- Resolving conflicts
- Working with remotes and forges (GitHub/GitLab)
- Version control strategies
- Best practices for collaborating with Git

In addition to the presentation attached, there will be online exercices.

Orateur: JOUVIN, Michel (IJCLab)

ID de Contribution: **3** Type: **Non spécifié**

Discovering the Paris-Saclay Mesocenter and GENCI National Supercomputers

jeudi 9 avril 2026 09:00 (3h 30m)

This course is intended for students who wish a practical initiation on the use of the Ruche supercomputer. We will cover the steps to access the Ruche supercomputer (https://mesocentre.universite-paris-saclay.fr/) and explain how to efficiently utilize its resources. An introductory section will also be dedicated to a detailed presentation of the "module" environment and the SLURM batch manager (https://slurm.schedmd.com/), essential for optimal use of the supercomputer. Additionally, an informative section will focus on the procedures for requesting resources on the various national machines provided by GENCI (https://www.genci.fr/services/moyens-de-calcul), and the main characteristics of these machines will also be presented.

Orateurs: Dr HASNAOUI, Karim (IJC Lab); Dr LEONI, marco

ID de Contribution: **4** Type: **Non spécifié**

Python Traps & Pitfalls

lundi 13 avril 2026 09:00 (3h 30m)

First, we'll take a closer look at the basic mechanisms of the Python language, beyond what can be guessed by blindly copying and pasting examples, in order to avoid the most common traps and pitfalls. Then, we'll debate the interactions with Linux. In particular, we will talk about :
- variables semantic, duck typing,
- automatic memory management,
- builtin types and collections,
- shallow and deep copy,
- functions, local and global variables,
- differences between interpreter, scripts and notebooks,
- the import and distribution of modules and packages.

Prerequisites : to have practised Python regularly, to know Linux.

Orateur: CHAMONT, David (IJCLab - IN2P3 - CNRS)

ID de Contribution: **5** Type: **Non spécifié**

Object-Oriented C++

lundi 13 avril 2026 14:00 (3h 30m)

Get familiar with the object-oriented programming with C++. The lectures and hands-on aim to prepare students to use and/or contribute to large C++-based projects, such as Geant4.
- Introduction to object-oriented methodology
- Class definition and implementation
- Class data members and member functions/methods
- Static data members, member functions/methods
- Base class and derived class
- Virtual, pure virtual functions
- C++11/17 features: auto, range for loop, ⋯

Prerequisites: basic knowledge of the C++ syntax and standard library (if, loops, functions, pointers, references, iostream, string, vector).

Detailed program and course material:
https://geant4-ed-project.pages.in2p3.fr/oo-cpp-web/

Orateur: HRIVNACOVA, Ivana

ID de Contribution: **6** Type: **Non spécifié**

C++17 Initiation

mardi 14 avril 2026 09:00 (3h 30m)

First contact with C++, in its most used version in new physics projects : aka C++17.
The course is targeted at people who have programming experience, especially with Python. In particular, we will talk about :
- builtin types, variables, functions,
- passing arguments by value and by reference,
- type inference and templates,
- returning a tuple of values,
- std::vector vs std::array,
- compilation and libraries.

Prerequisites : to have practised Python regularly.

Orateur: CHAMONT, David (IJCLab - IN2P3 - CNRS)

ID de Contribution: **7** Type: **Non spécifié**

Computations Accuracy

mercredi 15 avril 2026 14:00 (3h 30m)

When using numbers of type float or double, are you aware that 0.1+0.2 does not equal 0.3 ? Let's review the theory behind such pitfalls, and discuss some case studies :
- the quadratic equation in kinematics calculations
- variance calculations in data analysis
- calculations with complex numbers
- accurate summation in large Monte-Carlo calculations
- precision in matrix and geometry calculations (the interest of factoring)
- differential equations

Elements of numerical calculation
- solution of equations, minimisation
- scaling: combining accuracy and efficiency

Clean code for computation

Orateur: Dr LAFAGE, Vincent (IJCLab)

ID de Contribution: **8** Type: **Non spécifié**

Make Your Code More Efficient 1/2

vendredi 17 avril 2026 09:00 (3h 30m)

Most computer programs are inefficient and could serve the same purpose while using 10-1000x less resources (time, energy, memory⋯). However, achieving this result requires know-how that is not part of the typical programming curriculum. In this course, you will learn a general methodology to make any program use computing resources more efficiently:
1. Safety first
2. Set a useful benchmark
3. Identify the limiting hardware resource
4. Locate the code that most intensely uses it
5. Make the most of other people's work
6. Optimize your own code
7. Know your programming language

Prerequisites : Shell Unix/Linux (files, make⋯) + C++ basics (C-like features, std::vector, iostream, virtual) or Python+numpy. Laptop capable of connecting to a Linux server via SSH, ideally configured to use eduroam.

Orateur: GRASLAND, Hadrien (IJCLab)

ID de Contribution: **9** Type: **Non spécifié**

Make Your Code More Efficient 2/2

vendredi 17 avril 2026 14:00 (3h 30m)

Second part of “Make Your Code More Efficient”. See the contribution “Make Your Code More Efficient 1/2”.

Orateur: GRASLAND, Hadrien (IJCLab)

ID de Contribution: **10** Type: **Non spécifié**

Make Your Code More Robust 1/2

vendredi 10 avril 2026 09:00 (3h 30m)

Discovery of software engineering tools and methodologies to write more tested, documented code that is easier to understand and maintain.
- static analysis
- tests
- documentation

The examples will be based on the C++ and Python programming languages.

Prerequisites: some knowledge of C++ or Python.

Orateurs: GRASLAND, Hadrien (IJCLab); PELOTON, Julien (CNRS-IJCLab)

ID de Contribution: **11** Type: **Non spécifié**

Make Your Code More Robust 2/2

vendredi 10 avril 2026 14:00 (3h 30m)

Second part of “Make Your Code More Robust”. See the contribution “Make Your Code More Robust 1/2”.

Orateurs: GRASLAND, Hadrien (IJCLab); PELOTON, Julien (CNRS-IJCLab)

ID de Contribution: **12** Type: **Non spécifié**

CMake Survival Guide

mardi 14 avril 2026 14:00 (3h 30m)

Introduction to CMake, which is the most widely used tool for managing C/C++ projects, especially in a cross platform context. The course is targeted at people who have some programming experience with C/C++ or Fortran.
In particular, we will talk about:
- building simple binaries and libraries
- build and running tests via ctest
- integrating third party applications
- modern cmake best practices
- most useful compilation/link commands

Prerequisites: have a basic understanding of C/C++ or Fortran.

Orateur: DEEGAN, Philip (https://www.lpp.polytechnique.fr/?lang=en)

ID de Contribution: **13** Type: **Non spécifié**

Introduction to Machine Learning

jeudi 16 avril 2026 09:00 (3h 30m)

We will describe the main concepts of Machine Learning (ML) and give some clues to address a problem of ML. In particular, we will talk about :
- the concepts of AI/Machine Learning/Deep Learning,
- supervised/unsupervised learning,
- the preprocessing of the data,
- the general principle of the algorithm,
- the main pitfalls,
- the evaluation of the training and the outcomes.
Some exercises will be provided to understand the basic concepts of standard ML methods.

Prerequisites: practice of Python and main libraries (numpy, pandas, matplotlib).

Orateur: BOUVET, Francoise (IJCLab - CNRS - UPsay)

ID de Contribution: **14** Type: **Non spécifié**

Introduction to Deep Learning

jeudi 16 avril 2026 14:00 (3h 30m)

We will describe the main concepts of Deep Learning (DL). We will focus on Multilayer Neural Network (MLP) and Convolution Neural Network (CNN).
In particular, we will talk about :
- artificial neuron,
- MLP : structure and how it works,
- CNN : structure and how it works,
- a brief review of other NN structures.

Some exercises will be provided to program simple MLP and CNN in Python with Keras.

Prerequisites:
- Practice of Python and main libraries (numpy, pandas, matplotlib).
- Priority will be given to the attendees of « Initiation to Machine Learning ».

Orateur: BOUVET, Francoise (IJCLab - CNRS - UPsay)

ID de Contribution: **16** Type: **Non spécifié**

Open Data and Free/libre Software

jeudi 9 avril 2026 14:00 (3h 30m)

Research is based on reproducibility and an incremental improvement process. Open Science movement has been developed to facilitate this work and relies on 3 legs: open access to publications, open data and libre software.
Topics:
• open data: organization, conditions of their publication and reuse, valorization ;
• free/libre software: software licences,valorization ;
• data management plan (DMP) : associated tools, lifecycle.

Orateur: Dr GAURON, Philippe (IJCLab/CNRS-Université Paris-Saclay)

ID de Contribution: **17** Type: **Non spécifié**

GitLab Projects and Continuous Integration

mercredi 8 avril 2026 14:00 (3h 30m)

This course is NOT ABOUT GIT; we will focus on using GitLab for software project management. You will learn to leverage GitLab's features to facilitate collaborative development, automate your tests, and publish code releases. Specifically, we will cover the following points:
- Creating a project in GitLab
- Managing members and permissions
- Working with issues: labels, milestones, templates
- Team collaboration: Branches and Merge requests
- Task automation through GitLab CI/CD: creating pipelines and jobs
- Managing environment variables and secrets
- Publishing packages and deploying documentation

Prerequisites: be able to communicate with a remote repository via Git (clone, fetch, push) and know how to manage branches.

Orateur: ROUVREAU, Vincent (INRIA)

ID de Contribution: **18** Type: **Non spécifié**

Data Basics

mercredi 15 avril 2026 09:00 (3h 30m)

Contenu surprise…

Orateur: Dr LAFAGE, Vincent (IJCLab)

ID de Contribution: **19** Type: **Non spécifié**

Containers

mercredi 8 avril 2026 09:00 (3h 30m)

This training aims to give a taste of Docker with a hands-on experience. Docker concepts and its architecture will be explained in their basics. The main objective of this training is to show a complete workflow that could be useful to everyone.

By the end of the course, participants should have a basic understanding of the concepts and some experience with the basic Docker commands that would enable them to assess possible use cases for their own work. More in-depth reading is left to the participants.

Apptainer may be mentioned (subject to confirmation).

Prerequisites: Docker must be installed and configured. Docker Engine is only available for Linux platforms. For Windows and Mac, Docker can be used through Docker Desktop. Commercial use of Docker Desktop requires paid subscription under certain conditions. This training will not cover Docker Desktop.

Orateur: ROUVREAU, Vincent (INRIA)