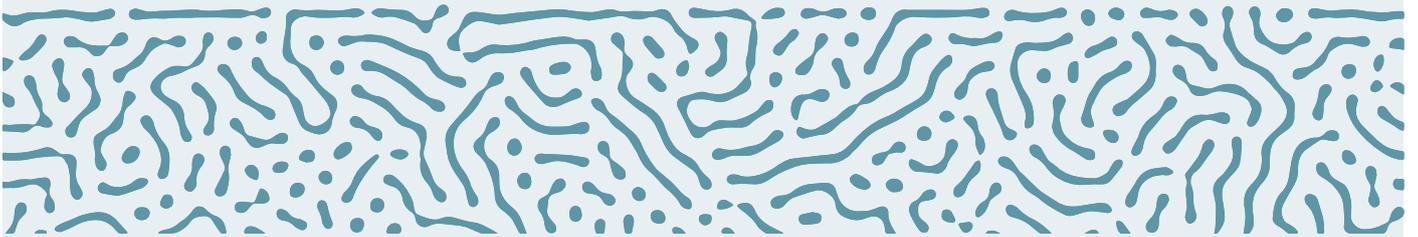# Data Weeks Part 2
Intro to Biological Data
training provided by

CENTURI

TURING CENTRE
FOR LIVING SYSTEMS

This course is the second part of the **Data Weeks course**.
Visit https://centuri-livingsystems.org/centuri-training-course/ to find details about all CENTURI Training Courses.

This training includes five different courses, extended over a week:

1. **The Python course**, taught by Léo Guignard ; Beginner Level & Advanced Level.
March 5 & 6 - HEXALAB
2. **The Data Analysis course**, taught by Thomas Vannier & Gregory Gimenez.
March 9 - CIELL 1
2. **The Machine Learning & Deep Learning Basis course**, taught by Mai Hoang & Marc-Erin Perrin.
March 10 - HEXALAB
4. **The Deep Learning Advanced course**, taught by Matthieu Gilson (INT).
March 11 - HEXALAB
5. **The Dimension Reduction course**, taught by Paul Villoutreix.
March 12 - CIELL 1

Students attending Python and Deep Learning Beginer/Basis courses must follow-up with the Advanced courses.
Students who do not require the Beginer/Basis courses can attend directly the Advanced courses.

The detailed Program is available in the next pages here.

Find all CENTURI Training Courses here: https://centuri-livingsystems.org/centuri-training-course/

The Python course *taught by Léo Guignard*
(Thursday March 5th & Friday March 6th)

Getting Comfortable with Coding:
Environment Setup: Tips for creating an efficient coding environment.
Virtual Environments: Why they're essential for managing dependencies.
Version Control (Git): Benefits of tracking code changes and collaborating.
Useful Tools: Overview of helpful coding tools.
Python Basics: Variables, Conditionals, and Loops: Introduction to Python's core building blocks.

Classes in Python: Why and When to Use Them: Understanding the importance of classes for organizing code.

Using Classes: How to implement classes effectively.

Organizing and Publishing Code:
Code Organization: Best practices for structuring code.
Local Installations: Making code "pip installable" locally.
Online Publishing: Steps to publish code as an installable package online.

March 5, 2026

09:00 - 12:00	**Python Basis** *Léo Guignard* Hexalab
12:00 - 13:30	Break
13:30 - 16:30	**Python Basis** *Léo Guignard* Hexalab

March 6, 2026

08:30 - 12:30	**Python Advance** *Léo Guignard* Hexalab
12:30 - 14:00	Break
14:00 - 17:00	**Python Advance** *Léo Guignard* Hexalab

The Data Analysis course *taught by Thomas Vannier & Gregory Gimenez*
(Monday March 9th)

During this course, we will explore the fundamentals of high-throughput sequencing and introduce the key steps of RNA-seq data analysis. We will also discuss -omics approaches more broadly and learn how to analyze these datasets while applying the FAIR data principles (Findable, Accessible, Interoperable, Reusable). Throughout the course, we will present several tools and best practices to enhance the reproducibility and transparency of your analyses.

March 9, 2026	
09:00 - 12:00	**Data Analysis** *Thomas Vannier & Gregory Gimenez* CIELL 1
12:00 - 14:00	Break
14:00 - 17:00	**Data Analysis** *Thomas Vannier & Gregory Gimenez* CIELL 1

The Machine Learning course & Deep Learning Basis course
taught by Mai Hoang & Marc-Erin Perrin
(Tuesday March 10th)

Prerequisites: basic Python skills, computer with Internet access.

Machine Learning morning:
• Supervised learning (getting to grips with sklearn, svm, random forest, etc.)
• Unsupervised: dimension reduction and clustering (pca, umap etc.)

Deep learning for beginners:
• Key concepts (definition of layers, neurons, optimization, back propagation, getting to grips with a neural network with tp on Kaggle)
• Supervised: segmentation with unet
• Getting to grips with the pytorch library

March 10, 2026	
09:00 - 12:00	**Machine Learning** *Mai Hoang & Marc-Eric Perring* Hexalab
12:00 - 13:30	Break
13:30 - 16:30	**Deep Learning Basis** *Mai Hoang & Marc-Eric Perring* Hexalab

The Deep Learning Advanced course *taught by Matthieu Gilson (INT)*
(Wednesday March 11th)

Prerequisites: pytorch (Deep learning débutant)

Advanced Deep Learning:
architectures of deep learning networks to extract information patterns
application to analysis of images and graphs

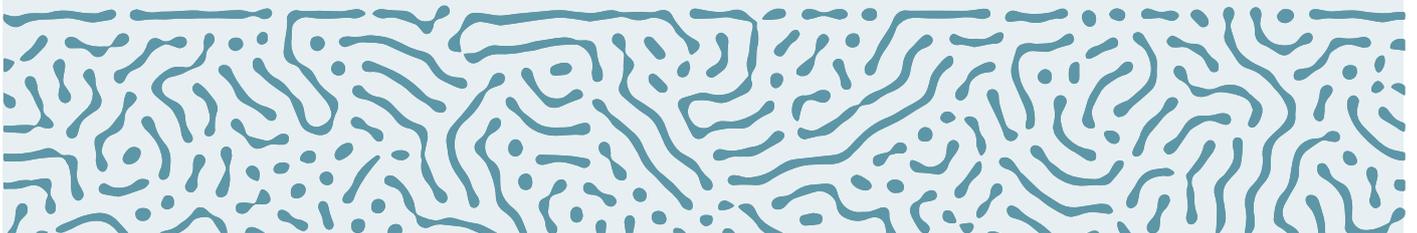| March 11, 2026	
09:00 - 12:30	**Deep Learning Advanced** *Matthieu Gilson* Hexalab
12:30 - 14:00	Break
14:00 - 17:00	**Deep Learning Advanced** *Matthieu Gilson* Hexalab

The Dimension Reduction course *taught by Paul Villoutreix*
(Thursday March 12th)

Dimensionality reduction: we will introduce core techniques such as PCA, UMAP, and t-SNE, highlighting how they uncover structure and variability in complex data.

Data integration: we will also cover strategies for data integration, including multi-omics analysis and joint matrix factorisation, which enable the combination of heterogeneous datasets into a unified representation.

Clustering: throughout, we will address practical questions on how to parameterize biological va
riation, and perform robust clustering.

March 12, 2026	
08:30- 12:30	**Dimension Reducation** *Paul Villoutreix* CIELL 1

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