



# Certificat International en Bioinformatique & Génomique 2025

*Bioinformatics in practice: learn by doing!*

📅 17 November - 12 December 2025

📍 Abidjan, Côte d'Ivoire

✉ [bioinfo@wave-center.org](mailto:bioinfo@wave-center.org)





## ➤ What is the CIBiG?

The International Certificate in Bioinformatics and Genomics (CIBiG) is an intensive training program designed for PhD students and researchers working with sequencing technologies and data. The course provides a comprehensive introduction to genomics and bioinformatics, with practical sessions focused on applying bioinformatics methods to sequencing data — particularly in the context of health and agriculture.

The program includes an online phase, followed by an on-site session in Abidjan, and ends with a practical internship/project of 2 months.

## 🎓 Our objectives

- Gain a thorough understanding of fundamental bioinformatics concepts.
- Develop practical skills in sequencing data analysis.
- Apply bioinformatics to real-world challenges in agriculture and health in Africa.
- Master Linux and bioinformatics tools to carry out your own analysis independently.
- Collaborate on practical projects to directly apply acquired skills.
- Communicate for training and knowledge transfe, both orally and in writing.
- Integrate open science and reproducibility into your work.

## ❓ Practical information

🕒 **Date:** 17 November - 12 December

📍 **Place:** WAVE Regional Center of Excellence, Univ. Félix Houphouët-Boigny  
Bingerville, Abidjan

👤 **Target audience:** Students, biologists, researchers, computer engineers in companies or public institutions.

📖 **Admission requirements:** Master's degree (or equivalent) in life or health sciences. Bachelor's degree + 5 years of experience for professionals from research institutes or technical ministries.

💰 **Fees:** 2,000,000 CFA

👥 **Application:** Open with selection — 15 places

🌐 <https://wave-centre.github.io/cibig/>

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## Key Dates

- **Applications open:** 15 May
- **Applications deadline:** 16 June
- **Acceptance notification:** 1 July
- **3-minute icebreaker video deadline:** 19 Sept.
- **Online courses:** 3 Nov. – 14 Nov. (to be confirmed)
- **On-site session:** 17 Nov. – 12 Dec.
- **Internship orientation meeting:** 26 Nov, 3 Dec, 10 Dec
- **Final restitution:** 12 Dec. at 16 pm
- **Internship period:** 15 Jan.– 15 Mar.
- **Internship restitution:** 25, 26, 27 Mar.



## Online Courses (3–14 Nov. - to be confirmed)

*8 sessions/half-days over two weeks — 4h each*

- **Microorganism Biology Overview**  
Prokaryotic cell structures, diversity and pathogenicity.
- **Eukaryotic Cell Biology Overview**  
Key cellular processes, organelles, and regulation.
- **Mendelian Genetics & Diversity**  
Principles of inheritance, alleles, population variation.
- **Genome Structure & Variation**  
Chromosomes, mutations, structural and functional elements.
- **Bioinformatics Roadmap: Concepts and Application in Genomics**  
An essential overview of bioinformatics concepts with a focus on key genomics applications.  
*- 2 half-days.*
- **Applications in Health & Environment**  
Focus on applied case studies in human health, agriculture and plant genomics.  
*2 half-days with 2 speakers per session.*



## Course Modules Overview

### Sequencing

Intro to sequencing technologies and practical session on raw data generation and quality checks.

### Biological Databases

Explore public biological databases and learn how to extract and interpret biological information.

### Linux & Markdown

Use the Linux terminal and Markdown for scripting, documentation, and data handling.

### Algorithmics

Discover algorithmic foundations like complexity and pattern matching relevant to bioinformatics.

### Programming (Python/R)

Hands-on training with Python and R for data analysis, scripting, and visualization.

### OMICS

Understand omics data types and analytical pipelines with real biological datasets.

### Project Work

Apply your skills in a mini-project on omics or programming with real data.

### Cluster Computing

Get started with HPC: run jobs on a cluster and manage computational resources.

### Reproducibility

Learn reproducible science practices including documentation and data lifecycle.

### Git

Master version control using Git and GitHub-GitLab for collaborative projects.

### Conda

Use Conda to manage packages and environments for portable and reproducible workflows.

## Course Timetable by Week

### > week 1 : 12-23 November

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
08:00 - 09:00	Welcome	Sequencing	Sequencing	Sequencing	Biological Database	
09:00 - 10:00	Amphi	Lab TP	Lab TP	Lab TP	room 1 CM	
10:00 - 11:00	Break	Break	Break	Break	Break	
11:00 - 12:00	Seminar	Sequencing	Sequencing	Sequencing	Biological Database	
12:00 - 13:00	Amphi presentation	Lab TP	Lab TP	Lab TP	room 1 TP	
13:00 - 14:00	Lunch	Lunch	Lunch	Lunch	Lunch	
14:00 - 15:00	Sequencing Amphi Cours	Sequencing Lab TP	Sequencing Lab TP	Sequencing Lab TP	Biological Database room 1 TP	IDE setup& Markdown Intro room 1 TP
15:00 - 16:00	Break	Break	Break	Break	Break	
16:00 - 17:00	Sequencing Amphi Cours	Sequencing Lab TP	Sequencing Lab TP	Lab Session Restitution Amphi presentation	Biological Database room 1 TP	Linux envt setup room 1 TP
17:00 - 18:00						
18:00 - 19:00						

### > week 2 : 24-30 November

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
08:00 - 09:00	Biological Database	ALGO	LINUX	LINUX	CLUSTER	
09:00 - 10:00	room 1 CM	room 1 TP	room1 TP	room 1 TP	room 1 TP	
10:00 - 11:00	Break	Break	Break	Break	Break	
11:00 - 12:00	Biological Database	ALGO	LINUX	LINUX	CLUSTER	
12:00 - 13:00	room 1 TP	room 1 TP	room1 TP	room 1 TP	room 1 TP	
13:00 - 14:00	Lunch	Lunch	Lunch	Lunch	Lunch	
14:00 - 15:00	ALGO room 1	LINUX room 1 TP	review session room 1	LINUX room 1 TP	OMICS room 1 TP	Jupyter book room 1 TP
15:00 - 16:00	Break	Break	Break	Break	Break	
16:00 - 17:00	ALGO room 1	LINUX room 1	review session room 1	LINUX room 1 TP	OMICS room 1 TP	github configuration room 1 TP
17:00 - 18:00						
18:00 - 19:00						

## ➤ week 3 : 1-7 December

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
08:00 - 09:00	OMICS	OMICS	OMICS	Python R	Python R	
09:00 - 10:00	room 1 TP	room 1 TP	Room 1 TP	Room 1,2 TP	Room 1,2 TP	
10:00 - 11:00	Break	Break	Break	Break	Break	
11:00 - 12:00	OMICS	OMICS	OMICS	Python R	Python R	
12:00 - 13:00	room 1 TP	room 1 TP	Room 1 TP	Room 1,2 TP	Room 1,2 TP	
13:00 - 14:00	Lunch	Lunch	Lunch	Lunch	Lunch	
14:00 - 15:00	OMICS	OMICS	review session	Python R	Python R	OMICS project
15:00 - 16:00	room 1 TP	room 1 TP	room 1	Room 1,2 TP	Room 1,2 TP	room 1 TP
16:00 - 17:00	Break	Break	Break	Break	Break	
17:00 - 18:00	OMICS	OMICS	review session	Python R	OMICS project	OMICS project
18:00 - 19:00	room 1 TP	room 1	room 1	Room 1,2 TP	room 1,2 group	room 1 TP

## ➤ week 4 : 8-12 December







	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
08:00 - 09:00	Python R	OMICS project	REPRO - Git	OMICS project	OMICS project	
09:00 - 10:00	Room 1,2 TP	room 1,2 group	room 1 TP	room 1,2 group	room 1,2 group	
10:00 - 11:00	Break	Break	Break	Break	Break	
11:00 - 12:00	Python R	OMICS project	REPRO - Git	OMICS project	OMICS restitution	
12:00 - 13:00	Room 1,2 TP	room 1,2 group	room 1 TP	room 1,2 group		
13:00 - 14:00	Lunch	Lunch	Lunch	Lunch	Lunch	
14:00 - 15:00	Python R	Repro - Data Lifecycle	review session	REPRO - Conda	OMICS restitution	
15:00 - 16:00	Room 1,2 TP	room 1 TP	room 1	room 1 TP		
16:00 - 17:00	Break	Break	Break	Break	Debriefing	
17:00 - 18:00	OMICS project	Repro - Data Lifecycle	review session	review session	Wrap up	
18:00 - 19:00	room 1,2 group	room 1 TP	room 1	room 1		

## Pre-course Resources

Before attending the on-site session, participants must review the following online resources. These videos or tutorials cover key concepts and tools needed for the course. Each one has a deadline.

### Sequencing

 1 November

	Why study DNA sequencing and computational genomics?	4'30
	Sanger DNA Sequencing, From Then to Now. <i>(optional)</i>	15'
	NGS - A Step-By-Step Guide to DNA Sequencing. <i>(optional)</i>	7'40
	Overview of Illumina Sequencing	5'15
	How nanopore sequencing works	1'41
	Nanopore DNA sequencing <i>(optional)</i>	4'30





### Biological Databases

› 12 Common Bioinformatics File Types Explained

 Watch only the first 10 file formats.

### ›\_ Linux & Markdown

› Linux  before 24 Nov

	Essential unix for bioinformatics I	18'40
	Essential unix for bioinformatics II	15'40
	Unix superpowers (using pipes and ssh) <i>(optional)</i>	17'40
	The Unix Shell	-









› Markdown

	Quick Start Guide To Markdown <i>(optional)</i>	
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 Watch only up to the Markdown editor section included.

### Algorithmics

 24 November

	Un algorithme c'est quoi?	5'25
	Les variables et les types	6'45
	Les opérateurs	6'45
	Lecture et écriture	6:39
	Les chaînes de caractères	3:57
	Les conditions (Si - Sinon) - Structures conditionnelles	5:46
	Structure sélective Selon	3:12
	Boucle TantQue - Structures	6:49




## Programming (Python/R)

›Python  before 24 Nov

 Plotting and Programming in Python

 Programmation en Python pour les sciences de la vie *(optional)*


›R  before 24 Nov

 R BASICS *(optional)*

 R for Reproducible Scientific Analysis

## Cluster Computing

 1 November

 Slurm Tutorial: HPC Job Submission Systems for Beginners 11'30


 HPC Data Management for NGS Analysis 10'30

## Reproducibility

 Jupyter Notebook Complete Beginner Guide *(optional)* 25'30

 *Watch only up to the Jupyter Lab section included.*


## Git


 Version Control with Git *(optional)*

## Working Environment

 **Shared folder:** *Online course slides & evaluations*

 **Public Repository:** <https://github.com/wave-centre/training/blob/main/CIBIG>  
*Repository for on-site course teaching materials*

 **Slack Channel:** [cibig-wave.slack.com](https://cibig-wave.slack.com)  
*Slack enables real-time communication, resource sharing, and quick support among participants and instructors.*

 **Recommended Software :** (to be updated)  
Below is a list of recommended tools to install before the on-site session:

Software	Purpose
Ubuntu/Linux	Operating system or virtual machine environment
Miniconda	Package and environment manager (Python/R)
Python	General-purpose programming language
Jupyter Notebook	Interactive notebooks for coding and documentation
R / RStudio	Statistical computing and data visualization
Git	Version control and code collaboration
Spyder	Integrated development environment (IDE) for Python

*The CIBiG program is more than a training —  
it's a gateway to autonomy, collaboration, and innovation  
in bioinformatics and genomics for West and Central Africa.*

*We work hard, we learn deeply, and we laugh together —  
because science grows best in a supportive and engaging community.*

For any further questions,  
contact us at [bioinfo@wave-center.org](mailto:bioinfo@wave-center.org)  
or visit our website <https://wave-centre.github.io/cibig/>.  
We look forward to welcoming you to the CIBiG 2025 training session in Abidjan!