2024 | 2028

amU Faculté des sciences Aix Marseille Université

sciences-master-bioinfo@univ-amu.fr

Luminy (Marseille)

MASTER
BIOINFORMATICS

Training in computational biology and artificial intelligence to address scientific challenges in biology and health

TARGET AUDIENCE

Students with a bachelor's degree in Life Sciences, Life and Earth Sciences, Life Sciences and Computer Science (or Mathematics), and a professional bachelor's degree (Genomics or Bioinformatics).

PREREQUISITE

Have a solid knowledge of molecular biology, biochemistry, and genetics. An introduction to statistics and bioinformatics is also an advantage.

IN SHORT

Length of studies: 2 years

Number of credits: 120 ECTS

International Mobility

Link with research

Registration fees: 254 €*

Internship & projects

Instruction in French and English

Code RNCP : 38964

HOW TO APPLY ?

Students can apply to Master Bioinformatique using either Etudes en France campus france procedure or MonMaster procedure.

*For international students, please refer to the Faculty of Science website for registration details and different fee structures.

**Tarif pour la formation initiale en 2025. Exonération pour les boursiers et étudiants en alternance.*

OBJECTIVES

The Master's degree in Bioinformatics trains students to design, develop, and implement computational and statistical methods and tools to solve biological problems. It is an interdisciplinary program that leads to careers as bioinformaticians, developers, bioinformatics analysts, or data scientists in biology, both in academia and industry.

COMPETENCE AND KNOWLEDGE

At the end of their training, future professionals will have acquired solid skills enabling them to :

- design appropriate computer processing methods for solving biological problems;
- implement advanced and specialized uses of bioinformatics and digital tools;
- solve complex problems by applying fundamental concepts in biology and computer science;
- analyze data from biology and health experiments and develop appropriate computer methodologies in response to the biological question;
- communicate and apply knowledge transfer in French and English.

Students will also receive interdisciplinary training in biology, computer science, and statistics:

- Biological applications will include genomics, epigenomics, transcriptomics, proteomics, and polymorphics data analysis.
- IT training will be based on courses in programming, operating systems administration, software engineering, training in best practices for reproducibility of results, development of bioinformatics resources (databases, analysis tools), as well as deployment of interfaces;
- Biostatistics will cover statistical inference, multidimensional data analysis, sequence modeling, and machine learning (including artificial intelligence).

SPECIFICITIES OF EDUCATION

The specificity of the master's program lies in its "learning by doing" approach based on highly intensive practical learning, with a significant portion of the curriculum dedicated to computational biology, a wide variety of projects, and two internships completed during the program. This educational framework promotes the acquisition of IT skills and professional attitudes among graduates, providing them with solid expertise in bioinformatics, particularly in the extraction of relevant information from biological data or applications (medicine, agriculture, biotechnology); the development of reproducible procedures for analyzing big data; the development of IT tools in accordance with best practices (collaborative programming, version management, code documentation, etc.); and the independent implementation of research and a critical attitude towards the results obtained.

SERVICE COMMUNICATION UFR SCIENCES AIX-MARSEILLE UNIVERSITÉ MAJ 10.2025

CAREER PATH

• Bioinformatics Analysis and Development

This program trains students in computational biology, providing them with the necessary skills and in-depth expertise to:

- Analyze big data: Manage, process, and analyze complex, heterogeneous biological data to solve biological problems.
- Formalize and solve problems: Identify biological problems and design automated computer-based strategies to solve them.
- Learn computer and bioinformatics tools: Write and use programs, algorithms (including artificial intelligence), and software libraries to obtain results using exact or heuristic methods, then interpret them from a biological perspective.
- Visualize and communicate: Describe statistically, visualize, and represent massive biological data, then summarize the work in reports or research projects, in French or English.

• Other program: Complementary Skills in Computer Science (CCI)

The CCI program is a cross-disciplinary track available to all Master's degree programs (excluding Computer Science). It allows students who already hold a Master's degree (M2) to gain additional expertise in computer science.
Contact: sciences-master-cci@univ-amu.fr

EDUCATIONAL PROGRAM

In the first semester, the program provides students with fundamental concepts in bioinformatics, biostatistics, and genomics, as well as an introduction to programming and software engineering. In the second semester, students learn about the analysis, processing, and visualization of biological, medical, and biotechnological data, as well as algorithms, data structures, and high-performance computing. They also complete a two-month internship in a laboratory or company. In the Master 2 program, students will deepen their knowledge of genomics, programming, biostatistics, and data integration, combined with AI methods for biology, and will complete their studies with a six-month internship.

OPPORTUNITIES AND PROFESSIONAL INTEGRATION

Upon completion of the Master 2 program, students can begin a doctoral thesis in bioinformatics, or enter the workforce directly in various sectors (scientific research and development; programming, consulting, and IT activities; data processing, hosting, and related activities). The skills acquired during the Master's program are in high demand in a variety of professional environments, including academic and private bioinformatics service platforms, pharmaceutical and biotechnology companies, and public research organizations (CNRS, INSERM, INRAE, INRIA, etc.).
Future graduates may pursue careers in the following fields: Bioinformatics research engineer; Bioinformatics assistant engineer; Bioinformatics consultant; Bioinformatics and information processing research officer; Scientific and biomedical IT application developer; Database administrator; Data scientist. Current employment rate: 73% three months after graduation, 95% after two years.