

Master Bioinformatics and Systems Biology



Bioinformatics and Systems Biology in Amsterdam

Do you want to discover which biomolecules make the difference between health and disease? Are you up for the challenge of unravelling this by using machine learning, sequence analysis, computational models and/or systematic experiments? Then the joint degree Master's programme Bioinformatics and Systems Biology offers a specialism suited for you.

Cracking the code of living systems

The Master's programme

Bioinformatics and Systems Biology teaches you to combine molecular and cell biology, computer science and mathematical modelling to integrate vast amounts of biological data into a fundamental understanding of life at the molecular level.

The Master's programme is a joint degree of VU Amsterdam and the University of Amsterdam. Courses are taught at locations of both universities. UvA and VU jointly issue a degree certificate in Bioinformatics and Systems Biology to graduates. As a Bioinformatics and Systems Biology student in Amsterdam, you benefit from the expertise, networks and research projects at both universities and affiliated research institutes.

Study programme

During the programme, you will develop skills in scientific research and a high level of abstraction and quantitative thinking. You will learn to apply and combine rapid developments in different research fields and obtain

an interdisciplinary mindset with many transferrable skills.

The Master's is a two-year programme taught in English. The programme offers two thematic specialisations:

- Bioinformatics
- Systems Biology

Understand life and health at a molecular level

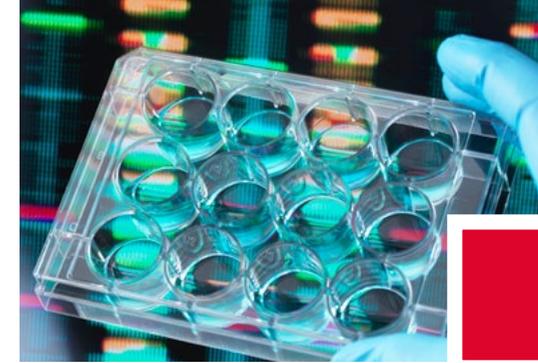
The programme prepares you to communicate effectively with your colleagues, irrespective of your focus on experimental or computational disciplines. Besides teaching you the fundamentals of Bioinformatics and Systems Biology, you will also get a basic introduction to molecular cell biology, biomathematics, biostatistics, programming and machine learning. The programme has an excellent international reputation. Research groups with extensive experience in a broad range of experimental and theoretical research lead the programme.

Integrated programme

The programme truly integrates a Bioinformatics and Systems Biology perspective. Your compulsory courses will tackle research problems within both fields. You may opt to take elective courses with an in-depth focus on a single discipline, such as molecular biology or machine learning.

You will study current issues, challenges and opportunities in both topics. There are ample opportunities for interesting and challenging internships, in hospitals (such as in oncology and clinical genetics), at biotech companies, at seed breeding companies, in the pharmaceutical industry, in data science and, of course, at bioinformatics and systems biology groups at universities.

During the Master's programme, you can choose between two specialisations, Bioinformatics or Systems Biology, or choose both.



Bioinformatics

Bioinformatics deals with large-scale data analysis, like DNA-sequencing experiments. Programming, algorithms and machine learning are important elements. Bioinformatics is extensively used within the field of biomedicine, but also in many other areas of molecular biology.



Danne Elbers, Informatics Core Director

“During my Bachelor's programme in Betagamma-Neuroscience I came into contact with Mathematica and MatLab and the value of programming algorithms in research. I found this very interesting and the Master's programme Bioinformatics and Systems Biology seemed like a good fit. I found the study programme itself challenging, especially because the step to programming and higher mathematics was quite big for me. I learned a lot from it and am still glad that I did take this step.”



Systems Biology

Systems Biology encompasses modelling large biological networks, in combination with experiments to probe the system. Mathematical modelling, structured large-scale experiments and statistical analysis are important elements in the specialisation. Systems Biology is extensively used in bioengineering and the food industry.

Career prospects

If you successfully complete the programme, you will be in high demand. Choose to work in the field of bioinformatics and systems biology like 60 percent of our graduates do. Or, find a suitable job in closely related areas, such as biotechnology, data science, healthcare or finance. More than half of our students continue in scientific research as a Ph.D. student. The field is moving very rapidly, with ever improving methods and high-throughput technologies, which makes jobs in the field exciting and means that research skills are very important in the field of Bioinformatics and Systems Biology.

Application and admission

Entry requirements

For admission to the Bioinformatics and Systems Biology Master's programme it is required to hold at least a Bachelor's degree from an accredited research university, with at least three full years of academic study amounting to a minimum of 180 ECTS or equivalent. The programme is aimed at science bachelor graduates (chemistry, biology, biotechnology, biomedical sciences, artificial intelligence, computer science, mathematics, physics or similar) with a strong interest in biological research topics and computational (quantitative) methods.

Pre-Master's programme

Whether you are directly admissible to the Master's programme depends on your previous education, background knowledge in molecular biology, programming and calculus, and your GPA. If you do not quite meet the requirements yet, you will be directed to our pre-Master's programme Bioinformatics and Systems Biology.

Application

To apply, follow the online application procedure at vu.nl/bioinformatics