

# Computational Science: Bioinformatics

Department of Informatics, University of Oslo

Planned start: Fall 2018



## Why Computational Bioinformatics

If you have a Bachelor's degree with a lot of computer science and mathematics and are interested in applying your knowledge on applications within the biological and medical sciences, a Master's degree in Computational Science: Bioinformatics is for you. Here you will learn to develop and apply analysis methods on data about genomes, genes and proteins that are essential for research in molecular biology and molecular medicine.

**The Computational Bioinformatics study option.** Technological advances have enabled us to detect and measure massive amounts of biological or medical data at unprecedented speed and affordability. The sequencing of the human genome and thousands of other organisms have paved the way for the identification of genetic variation at the level of individuals or even of single cells. Sequencing the DNA or RNA of tumour cells from a cancer patient may help diagnose the disease and find the best individual therapy. This is now starting to come into clinical practice, but requires efficient and robust methodology.

Hardware developments have given us smaller, faster, cheaper and more power-efficient computers. The ever increasing number of processing cores available enables massive parallelisation but may require sophisticated programming to exploit well. We use advanced algorithms and data structures, as well as mathematical models and statistical analysis to design and implement methods and tools to process, analyse and visualise molecular data. In our aim for reproducible science we prefer to work with open source software and strive for the best software development practices.

**Study environment.** This is new program at the University of Oslo and through various activities, spanning from common meetings and field trips to various social gatherings, we will gradually build up a top learning environment where you will thrive as a student and learn to develop your scientific creativity. The University of Oslo offers a rich and active student environment with more than 200 student lead activities and organizations.

**Studies abroad.** All study options offer possibilities for stays abroad. Planning a semester or more abroad or performing parts of your thesis at a collaborating institution is something we highly recommend. As a student in this program you have a number of interesting international exchange possibilities. The involved researchers have extensive collaborations with other researchers worldwide. These exchange possibilities range from top universities in the USA, Asia and Europe as well as leading National Laboratories in the USA. Don't hesitate to get in touch with the contact person of your study option in case you plan to spend some time abroad. Studies at other institutions can be planned from the very first semester of this Master of Science program.

Students at the University of Oslo may choose to [take parts of their degrees at a university abroad](#). The University of Oslo has exchange agreements with other universities in different parts of the world. [The MN Faculty has additional exchange agreements with many universities abroad](#).

**Career prospect.** A significant aspect of this program is the ability to offer new educational opportunities that are aligned with the needs of a 21st century workforce. Many companies are seeking individuals who have knowledge of both a specific discipline and computational modeling. And candidates who are capable of modeling and understanding complicated systems in natural science, are in short supply in society. The computational methods and approaches to scientific problems that you will learn when working on your thesis project are very similar to the methods you will use in later stages of your career. To handle large numerical projects demands structured thinking and good analytical skills and a thorough understanding of the problems to be solved. This knowledge makes the students unique on the labor market.

Career opportunities are many, from research institutes, universities and university colleges and a multitude of companies. The program gives an excellent background for further studies, with a PhD as one possible goal.

The program has also a strong international element which allows students to gain important experience from international collaborations in science, with the opportunity to spend parts of the time spent on thesis work at research institutions abroad.