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UNIVERSITAS
FRIBURGENSIS
Faculty of Science

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UNIVERSITÄT
BERN

Faculty of Science
Faculty of Medicine
Vetsuisse Faculty

## Studying in Bern and Fribourg

Nestled in breathtaking scenery at the foot of the Swiss Alps, Bern and Fribourg offer an outstanding range of outdoor activities, numerous culinary venues and a buzzing club scene. Both cities contain two of Switzerland's most picturesque old towns that were founded in the 1100s by the House of Zähringen. The collaborating universities cater to 25 000 students right in the respective city centres. Easy to reach locations enable students to merge study and everyday life.

Bern is the Swiss political capital and is one of the cities with the highest quality of life worldwide.

Fribourg hosts Switzerland's truly bilingual (French and German) university. Its cultural palette offers many opportunities to further develop your language skills on the go.

This MSc programme is a joint venture of UniBe and UniFr. Students register either at UniBe or at UniFr for the entire duration of their Master studies.

Courses are held at both locations and are coordinated to minimize travel. Frequent trains connect the two cities in 20 minutes.
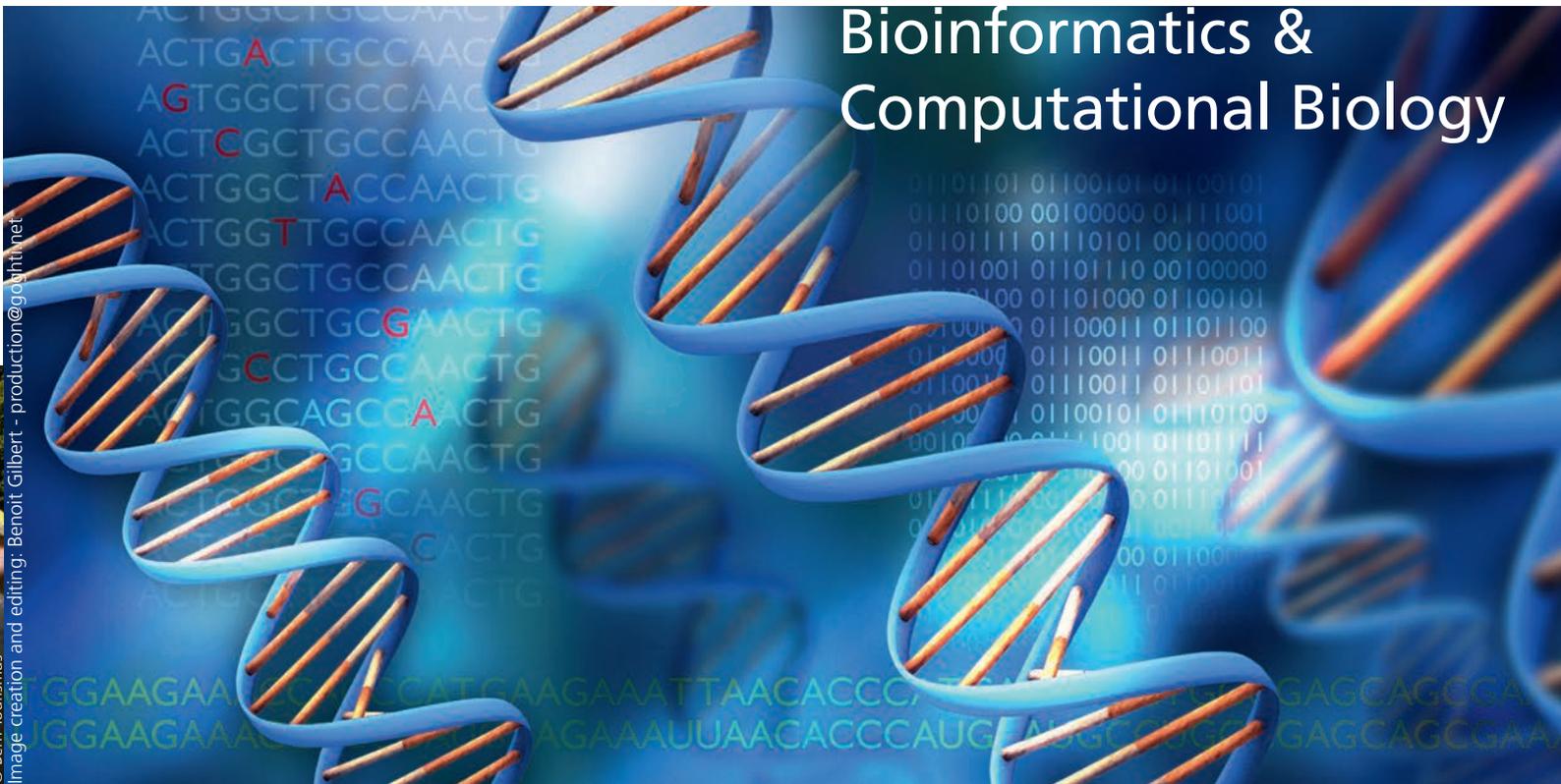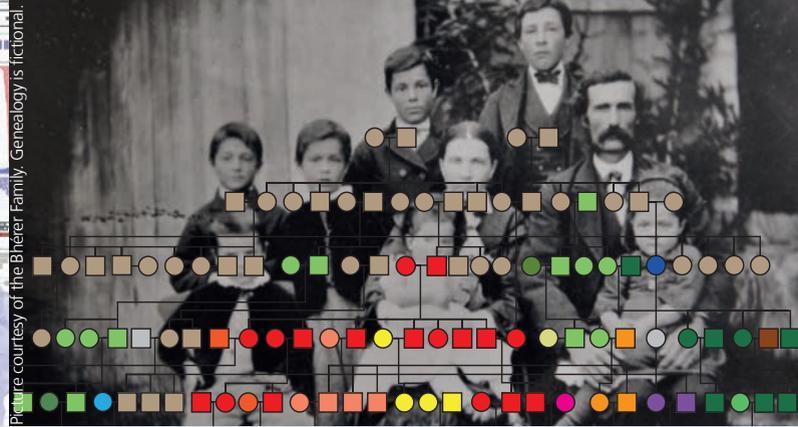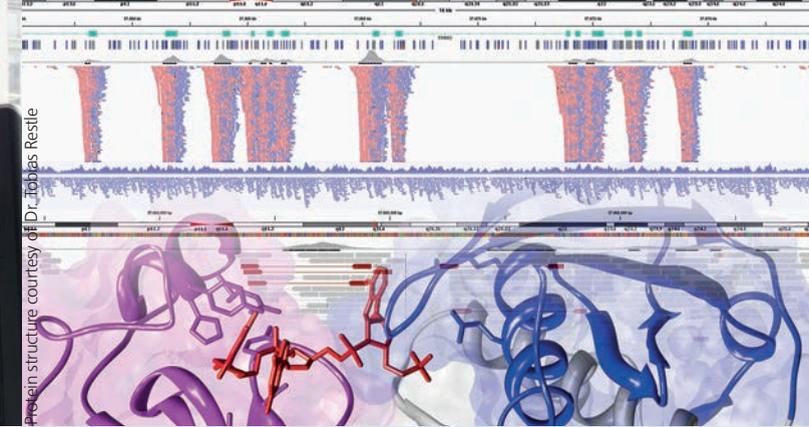
# Master of Science in Bioinformatics and Computational Biology (90 ECTS)

# Bioinformatics & Computational Biology

Protein structure courtesy of Dr. Tobias Restle

Picture courtesy of the Bhérer Family. Genealogy is fictional.

## Bioinformatics & Computational Biology

The information necessary to build and control any living organism is written in its genome and stored in the language of the genetic code. It took 13 years and 3 billion dollars to decipher the human DNA blueprint. A single decade later, sequencing a whole genome takes but a few hours on a machine that fits on a tabletop and it costs just shy of 5000 dollars. Consequently, biological and medical sciences are now collecting enormous amounts of information. This tsunami of data generates new problems: it needs to be analysed properly to unearth and retrieve the exciting knowledge it contains. And, most importantly, it also has to be made available to the scientific community in a useful way.

Scientists with skills in biology and in computer technology are challenged to extract the relevant information out of this phenomenal sea of data. Information technologies are essential for a proper understanding of the regulatory modalities of cells, organisms and even entire ecosystems. Developing algorithms and sound statistical tools to grasp the folding of macromolecules are the first steps on our way to model the mechanisms behind the pure DNA sequence. Ultimately, we want to understand how we work.

## Career perspectives

The curriculum prepares for a career in the life science industry, in health care, in governmental / NGO organizations, or in academia. Bioinformatics and Computational Biology have direct and highly sought applications in basic and applied research ranging from conservation biology and modelling molecular networks to epidemiology, biomedical engineering and drug design, artistic data visualization and developing human-computer interaction.

We wish to promote exchange and interaction with people from many different fields. Contacts established during the master thesis provide valuable networking opportunities that will widen your job prospects.

## Curriculum

Are you fascinated by the complexity of biological processes, data analysis, interpretation and modelling? Do you hold a BSc degree in Biology / Biochemistry / Life Sciences, or in Mathematics / Statistics / Informatics / Computational Science / Physics? Then join our new MSc programme! Specifically designed courses bring you up to speed in Bioinformatics and Computational Biology. You will acquire the tools of the trade focusing on solving current biological problems.

Our courses are taught in English. Full time students can complete the programme in 3 semesters.

### 1st semester (30 ECTS)

Complemented by courses tailored to individual needs, students with a BSc in biology learn applied informatics and statistics from the experts. Similarly, students with a non-biology BSc get hands-on experience in state-of-the-art biological methods and immerse in the essentials of biology.
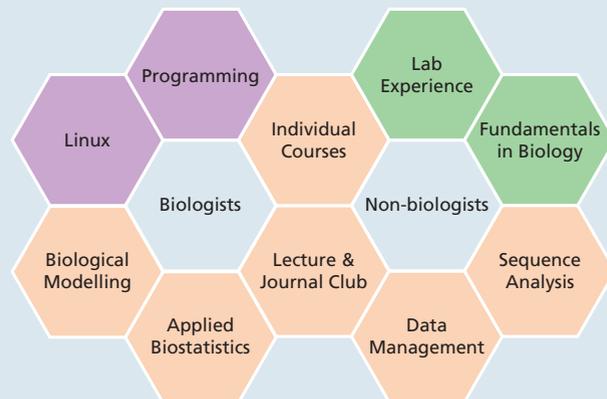


### 2nd semester (30 ECTS)

This semester focuses on three main areas of bioinformatics and computational biology and enhances application skills.
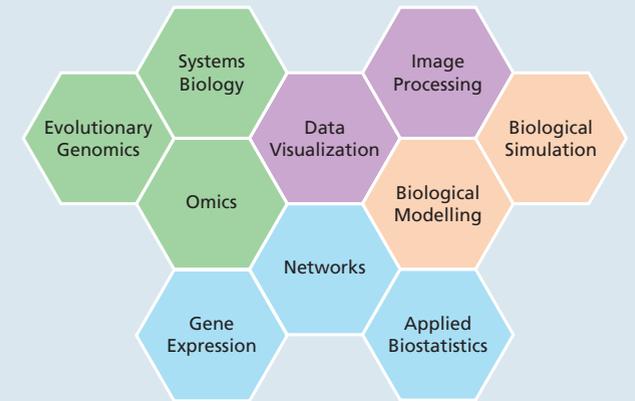


### 3rd semester (master thesis, 30 ECTS)

Each student works on an individual research thesis in one of the research groups, thus specializing in a chosen area. The master thesis can also be carried out in collaboration with one of the affiliated institutes, e.g. the Swiss Institute of Bioinformatics (SIB). Governmental and corporate institutions will also be considered as hosts.

### Admission

The admission procedure is described in detail on the programme website.

**bioinformatics.unibe.ch/msc** or **bioinformatics.unifr.ch/msc**