

University of Trento

Centre for Integrative Biology - **CIBIO**

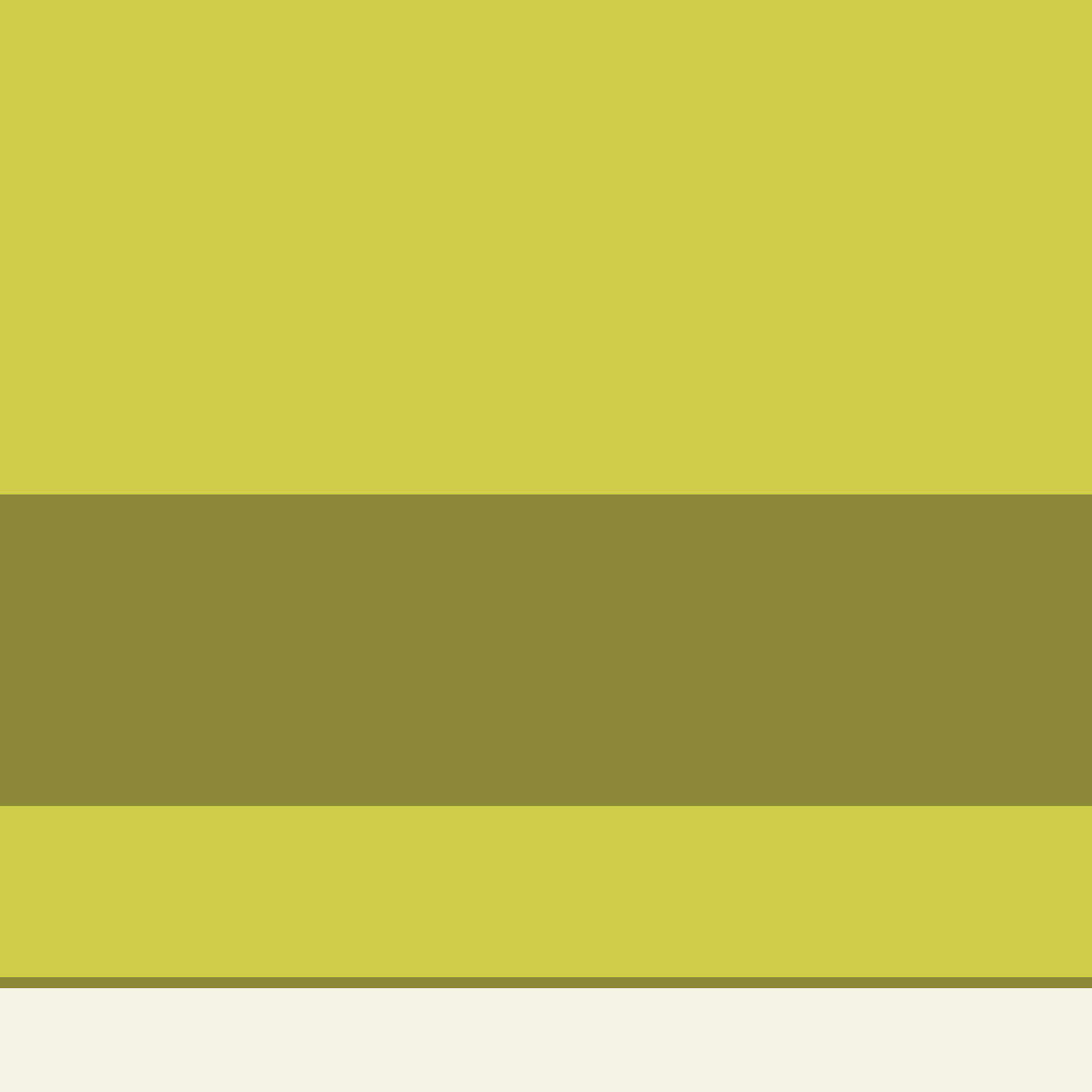
English-taught Masters

www.cibio.unitn.it



UNIVERSITY
OF TRENTO - Italy

CIBIO - Centre for Integrative Biology



The Centre for Integrative Biology - CIBIO

The last ten years have witnessed an unprecedented revolution in biology. The availability of complete and annotated genome sequences for many species and the increasing affordability of high-throughput approaches for the global monitoring of macromolecules in cells are providing the basis for the mechanistic understanding of living tissues, both in their physiology and in the determinants of their diseased state.

This understanding is starting to allow a rational reengineering of regulatory networks underlying organismal metabolism, a prediction of the onset and progression of diseases, and a systematic exploration for new and effective therapeutic principles.

The pace at which these goals will be pursued, and their degree of success, depend primarily on the ability of life science researchers to foster a radically new way to carry out the investigation of biological systems. This new way should be largely integrative, strongly relying on a combination of different expertise, and strongly independent from the domain knowledge in which the expertise have been developed.

The Centre for Integrative Biology – CIBIO – at the University of Trento pursues the task of creating a suitable environment for merging classical cellular and molecular biology approaches with the new powerful tools of systems and synthetic biology, and with the contribution of chemistry, physics, informatics, mathematics, and engineering in an integrative view of basic biological processes and of their derangement in disease.

Living in Trento

The city of Trento, the provincial capital of the Trentino region, is a prominent cultural centre, and has been for centuries – and still is – a bridge between the Mediterranean and the northern Germanic culture. Trento is a versatile city, able to constantly change features and yet maintaining close links to tradition. The region offers a wide range of cultural events at all times of the year such as exhibitions, cultural meetings inside several prestigious museums, festivals, musical and theatre seasons, and many chances to enjoy a great culinary and winery tradition.

If you are keen on sports, you have a very wide range of possibilities to choose among: mountain climbing, trekking, canoeing, rafting, mountain biking, horse-riding, skiing, ice skating, speleology, fishing, windsurfing, sailing, tennis, etc.





Master of Science in Cellular and Molecular Biotechnology (CMB)

The CMB programme aims at shaping competitive biotechnologists, demanded in the medical, environmental and industrial fields. Together with high quality and dynamic teaching, CMB provides practical experience in state-of-the-art biotech laboratories. In the last semester, the students' practical training is completed with a research project performed within research groups at CIBIO (Centre for Integrative Biology, University of Trento), or in one of the collaborating laboratories in other European universities, or in companies operating in the biotechnology or pharmaceutical sector.

The CMB programme is designed to provide prospective students with knowledge and experience essential for today's biotechnologists:

- detailed knowledge of the functioning and regulation of prokaryotic and eukaryotic cells;
- methods for the structural and functional characterization of biological macromolecules and the cellular processes in which they are involved;
- detailed understanding of the pathological processes at the molecular, cellular and systemic levels;
- concepts in designing and manufacturing biotechnology products, such as biopharmaceuticals, diagnostics and vaccines.

Programme overview

Degree Awarded	Master of Science in Cellular and Molecular Biotechnology
Intake	September
Duration	2 years
Teaching Language	English
Maximum number of admitted students	60
Location	Centre for Integrative Biology (CIBIO)
Application deadlines	non-EU citizens living abroad: January/February each year EU citizens and non-EU citizens living in Italy: June each year
Admission requirements	Bachelor's degree in biotechnologies or related fields; B1 English language knowledge
Tuition fees and funding	Students may benefit from partial or total exemption from university tuition fees and grants to cover part of the living expenses
Further information	international.unitn.it/mcmb
Contacts	masterbio@unitn.it

Career opportunities

The goal of the CMB is to prepare its graduates to start a career in different areas, including:

- research and development in the biotechnology industry;
- technical-scientific information and communication.

The MCMB provides the perfect key to access PhD programs in molecular biology and biotechnology all over the world.

Admission requirements

Since admission is selective and there is intense competition for student places, prospective candidates must apply online as soon as possible in the period between December and February. Each student is asked to submit a complete online application package, which provides the university with fundamental information and allows the Admissions Committee to evaluate candidates based on their proficiency, as well as on their potential to further develop their skills.

Citizens from Italy, other EU countries and non-EU countries are equally admitted to the selection. Non EU students not residing in Italy must apply by the first deadline and proceed with the pre-enrolment procedure at the Italian Embassy or Consulate in their country between May and June.

In order to be admitted, candidates must have a first level degree (Bachelor of Science) obtained at an internationally recognized, university-level institution. Minimum requirements are basic knowledge in molecular and cellular biology, biochemistry, mathematics, statistics and physics. An English language certificate of B1 level or equivalent is required if the Bachelor's degree was not taught in English.

Language

All courses are taught in English. The University of Trento offers English courses at different levels (general and technical) for students who wish to improve their English.

Courses

Teaching activities include lectures, laboratory courses, and seminars. The master's programme includes common core courses to be attended during the first year and two specialization tracks in Cancer Biology and in Neurobiology during the first half of the second year. The master's thesis will be prepared during the second half of the second year at the Centre for Integrative Biology (www.cibio.unitn.it), or in other Italian or European universities or in the biotech/pharma industry.

First year:

Molecular Basis of Disease
Statistical Methods for Experimental Sciences
Macromolecular Imaging
High-Throughput Technology
Gene and Cell Therapy
Molecular Pharmacology
Macromolecular Biochemistry
Genome-based Approaches in Drug Discovery

Second year: Cancer biology track

Cancer Genetics
Cancer Therapy
Cancer Genomics
Translational Control in Disease
Transcriptional Control in Cancer
Internship
Master's thesis project

Second year: Neurobiology track

Cellular and Molecular Neurobiology
Neurogenesis and Regeneration
Neurodegenerative Diseases
Development and Plasticity of the Nervous System
Functions of the Peripheral Nervous System
Internship
Master's thesis project

Students may choose elective courses from those offered in the other tracks or in:
Medicinal Chemistry



Master of Science in Quantitative and Computational Biology (QCB)

The Master of Science degree in Quantitative and Computational Biology (QCB) is a multidisciplinary degree that formally integrates quantitative sciences and applied biology, thanks to the involvement of the following organizations at the University of Trento:

- CIBIO, Centre for Integrative Biology
- Department of Physics
- Department of Mathematics
- Department of Information Engineering and Computer Science

The course focuses on a strategic area where technology and methodology enable students to face essential questions at the interface between fundamental research and clinical and pre-clinical areas, through analytical and quantitative approaches.

The course - entirely taught in English - is designed to capture the increasing need for researchers and experts able to transform the enormous amount of biological information ("big data") into knowledge, and to gain quantitative insight into the behaviour of biological systems by means of bio-mathematical and bio-physical models.

Key target areas include pharmacogenomics, biotechnology, food science, and precision medicine, which represent applied research fields where the growing availability of multidimensional data demands high interdisciplinarity.

The QCB course is designed to train **experts in biotechnology, computational biology, bioinformatics and biological data and systems biology analysis**, who will have the opportunity to learn in a multidisciplinary context, interacting with students with different experiences. Strong emphasis will be given to quantitative and computational aspects, with a focus on tools to analyse, model and understand biological systems and phenomena.

The course consists of two tracks, the "Biotechnological Track" and the "Computational Track".

Admitted students will follow one of the two tracks based on their educational background acquired in previous studies. The two different tracks offer the opportunity for students to integrate their background based on their first-level degree and individual preparation. In the first, second and third semesters, students will take different courses with a focus on biotechnological or computational topics. The fourth semester is entirely dedicated to the preparation of the thesis.

Students will have the chance to carry out research projects within the University of Trento organizations involved in the Master's Degree, at other Italian or European Universities, or in companies operating in the biotechnology, bioinformatics and computational areas.

Programme overview

Degree Awarded	Master of Science in Quantitative and Computational Biology
Intake	September
Duration	2 years
Teaching Language	English
Maximum number of admitted students	30
Location	Centre for Integrative Biology (CIBIO)
Application deadlines	non-EU citizens living abroad: January/February each year EU citizens and non-EU citizens living in Italy: June each year
Admission requirements	Bachelor's degree in biotechnologies, computer science, mathematics, physics or related fields; B1 English language knowledge
Tuition fees and funding	Students may benefit from partial or total exemption from university tuition fees and grants to cover part of the living expenses
Further information	international.unitn.it/mqcb
Contacts	masterbio@unitn.it

Career opportunities

Students of the QCB Master will be trained for the following professional profiles:

- Biotechnologist
- Computational Biologist
- Bioinformatics technician
- Biologists data and systems biology analyst

The profiles are characterized by a set of shared competences and by specific expertise in the field of biotechnology, information technology and/or mathematics and physics.

Graduates, trained for the above mentioned professions, will be able to use publicly available biological data and to work closely with biologists, clinicians, pharmacologists, engineers, epidemiologists in experimental research and pre-clinical context, in analysis/hospital laboratories, by using a common language.

Admission requirements

To be admitted to the QCB Master, students must have a first-level university degree, or another degree recognized as valid, in the fields of Biotechnology, Information Engineering, Life Sciences, Science and agro-food Technology, Sciences and Chemical Technologies, Pharmacy, Physics, Computer Science, Mathematics and have obtained at least 6 ECTS in the following area: Biology or Chemistry, Mathematics, Physics and Computer Science or Information Engineering. More details are available on the website: international.unitn.it/mqcb

An English language certificate of B1 level or equivalent is required if the Bachelor's degree courses were not taught in English. Each student must submit a complete online application package, which provides the University with fundamental information that the Admissions Committee will use to evaluate candidates on the basis of their proficiency, as well as on their potential to further develop their skills.

Language

All courses are taught in English. The University of Trento offers English courses at different levels (general and technical) for students who wish to improve their English.

Courses

Biotechnological Track

Mandatory courses

1st year: Biostatistics; Scientific Programming; Genomics; Biotechnology Engineering 1st year

English B2 level (3 credits)

Three elective courses among:

1st year: Modern Physics; Bioinformatics; Biological Networks

2nd year: Computational Biophysics; Data Mining; Mathematical Modelling; Biotechnology Management and Regulations

Computational Track

Mandatory courses:

1st year: Molecular Biology of the Cell; Chemistry and Biochemistry; Biological Networks

2nd year: Mathematical Modelling

English B2 level (3 credits)

Three elective courses among:

1st year: Modern Physics; Bioinformatics

2nd year: Computational Biophysics; Data Mining; Biotechnology Management and Regulations

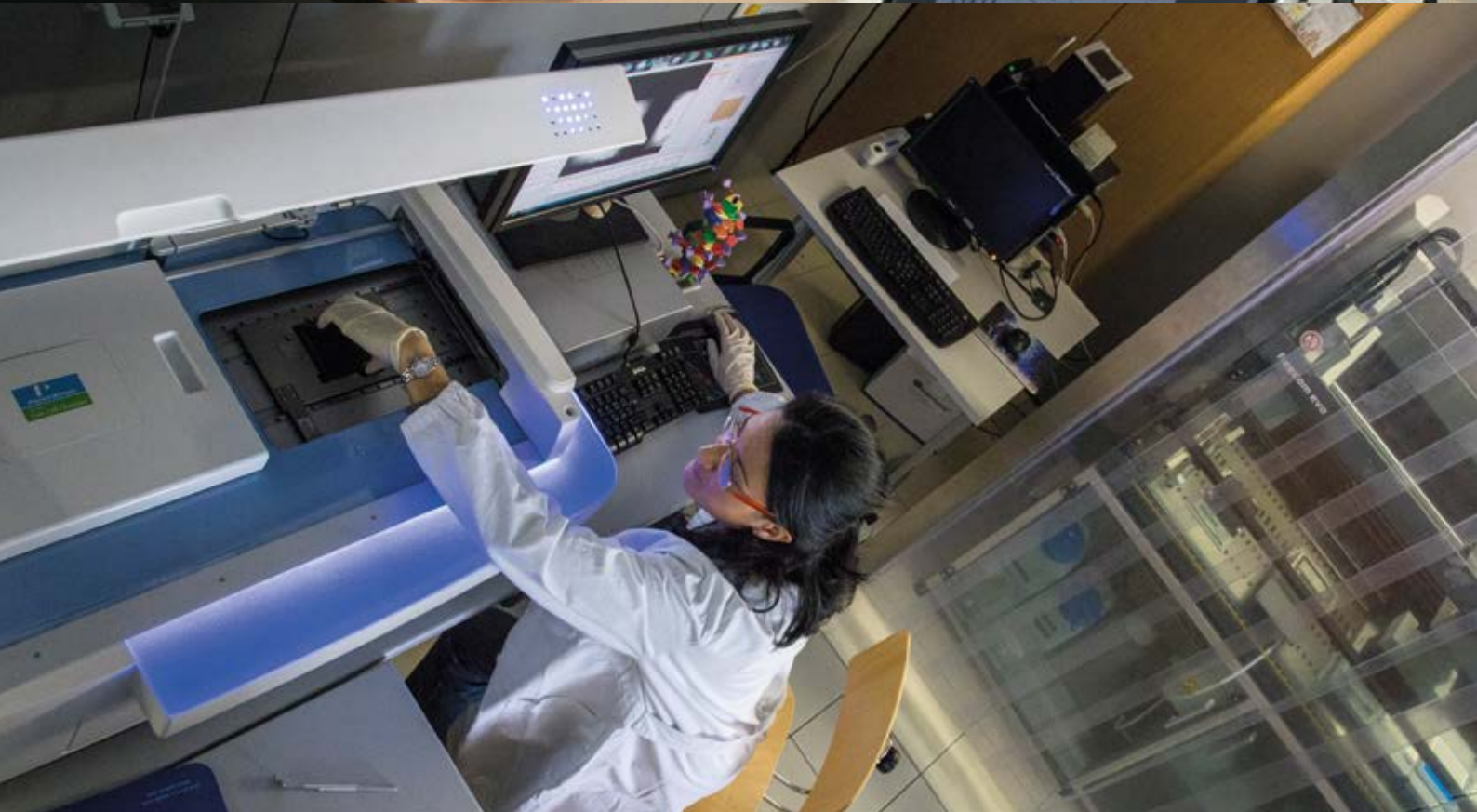
Additional credits for both tracks:

One free choice course

Traineeship

Thesis

Complete Programme 120 ECTS



ART> UniTrento

IMG> Archivio UniTrento (A. Coser, E. Bertini, fototonina.com)

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Contacts

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international.unitn.it/biomolecular-sciences