## Overview

Growing barriers between clinical and basic research, along with the ever increasing complexities involved in conducting health research, are making it more difficult to translate new knowledge to the bedside – and back again to the bench. BioHealth Computing EM aims to promote the use of systemic modelling and simulation tools to exploit biomedical databases. The students involved in the Master Program will learn to design innovative tools and to work on a joint research program associating: Clinical Research, Environmental and Animal Health, Molecular Biotechnology and Computational Mathematics.
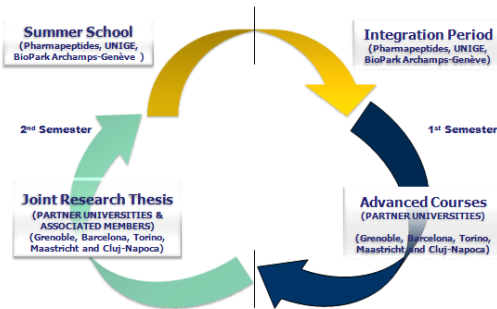
BioHealth Computing EM is a one year MSc programme, open to well motivated students who have completed one year MSc course (60 ECTS), or equivalent degree in the fields of: Clinical Research, Environmental and Animal Health, Molecular Biotechnology, and Computational Mathematics. The Master Programme is organized into 2 semesters followed at two different Partner Universities that will be both in charge of awarding credits (30:30 ECTS). Each year, the courses start and finish in the BioPark of Archamps-Genève Technopole, by an Integration Period and a Summer School gathering all the students. The students having successfully carried out a period of study in, at least, two universities of the Consortium, will be awarded a **Double Degree,** consisting of two independent national degrees, signed by the hosting universities, and an **Original Diploma "BioHealth Computing EM",** signed by all the Partner Universities.

An advanced programme to maximize your PhD opportunities…
The best laboratories to study in a fast moving environment…
Strong relationships with industry to boost your career prospect…

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• **Coordinating institution:** Université Joseph Fourier, Faculté de Médecine-Pharmacie de Grenoble. Institut Jean Roget. F-38706 La Tronche

• **Associate Partners:** Centers of excellence in biohealth, uniting scientific, academic, medical and industrial forces of Rhône-Alpes, Piemonte and Cataluna areas: BioIndustry Park Silvano-Fumero (Torino), Floralis (Grenoble), Parc Cientific of Barcelona (Barcelona) BioPark (Archamps–Genève Technopole), Center of Ecotoxicology of Rovaltain (Valence), LyonBiopôle, bioPmed and bioCAT, Sanofi-Pasteur, bioMérieux, Mérial, Pharmapeptides, Sobios, Pharmapeptides, Swiss Institute of BioInformatics, Clinic Hospital, Centre Hospitalier Universitaire de Grenoble, VetAgo Sup, etc.
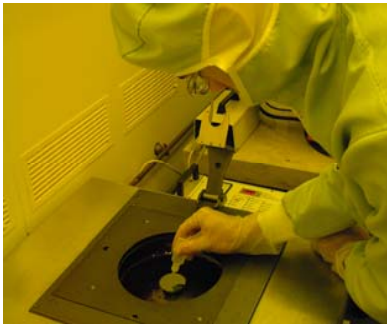

BioHealth Computing

Erasmus Mundus Master

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An educative network for accelerating health innovation

Integration Period & Summer School

At the opening of the course, in August, all BioHealth Computing EM students will attend a common Integration Period (IP) in the International BioPark Campus in Archamps-Genève Technopole (Pharmapeptides UNIGE). A two-week intensive subject provides the students with an introduction to topics ranging from BioHealth Computing to Business Management and to questions of Social Responsibility (6 ECTS). The IP focuses on problem solving through team working and is concerned with relevant problems of the issue that are linked to modern-day translational research in the field of health. The IP will provide the entering students with tools to meet challenging situations in BioHealth Computing Programme: Pluridisciplinary approach, Translational Research, Project Management and Grant Writing.

After approval of their Ms dissertation, in August, the finishing students must undergo a scientific communication in the BioHealth Computing Summer School, in Archamps-Genève Technopole, located fifteen minutes away from Geneva's International Airport, next to the French border. Organized each year under the responsibility of the Consortium Scientific Committee, the BioHealth Computing Summer School brings together scientists and medical professionals from across Europe, to present and discuss research and clinical findings in all phases of "bench to bedside" process. This Summer School is a common event open to MS and PhD students.

Advanced Courses

Advanced courses are divided into four tracks, connecting each one to basic fields of application, and to entrance requirements:

1. **Clinical Research**, 24 ECTS, Profs. J. Roca Torrent, (UB, Barcelona) & E. Wouters (UM, Maastricht);
2. **Environmental & Animal Health**, 24 ECTS, Profs. A. Maître (UJF Grenoble) & V. Cozma (USAMV Cluj-Napoca);
3. **Molecular Biotechnology**, 24 ECTS, Profs. M. Sève (UJF Grenoble), J. Badia Palacin (UB Barcelona) & F. Altruda (UNITO Torino);
4. **Computational Mathematics**, 24 ECTS, Profs. E. Bonnetier (UJF Grenoble) & J. Vives (UB Barcelona).

Each university provides a number of disciplinary and complementary related subjects, lectured in English in the field of BioHealth Computing (TOEFL 550 required). Students can choose from a large variety of subjects from each partner university to complete their personal study plan. The overview of the Application will be used to support students in making a careful selection of subjects so as to avoid a student attending similar courses at different universities. Applicants have to hold an excellent undergraduate record, with a completed Bachelor's degree (plus one Ms year), and honors, or an equivalent qualification, in one of the previous study fields.
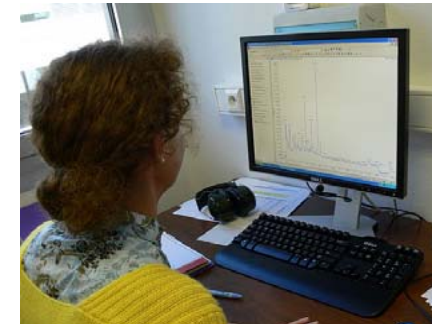
Master Thesis & Joint Research Project

The aim of the Joint Research Project is to allow the students to master concepts, methodologies and tools acquired during the previous semesters, by giving them an opportunity to develop a translational project, which requires a genuine interdisciplinary approach. This opportunity, for students to apply their knowledge in a mentored research project, is the most critical component of this Ms Programme (30 ECTS).

Rather than dissecting complex disease processes and studying the individual parts of living systems, BioHealth Computing research projects focus on understanding complete systems, underlying interactions of all the forces that make up that system. Integrated system-wide approaches, including data from bedside, environment, omics and high-throughput techniques, combined with modelling and simulation, hold great potential for understanding the biological complexity of human-aggressor-treatment-environment interactions.

Students are expected to design a research project, to write a formal research protocol, to perform the study described in it and to prepare a comprehensive scholarly scientific paper reporting the results. To complete their research project, students are required to write a scientific paper under guidance of their research supervisor, and to give an oral presentation of the research performed.