>Key benefits

New opportunities in Healthcare and Discovery

- Learn and assess the issues of scalability, gain valuable insights and access to BioHC research that will differentiate how you, and your organization break-down BioTech and IT, to save time and money while making work more efficient.
- Engage on opportunities and challenges faced by BioTech and IT technologies in the Health sciences sector; analyze how emerging technologies can be applied effectively to address real problems while unlocking the value of data and its potential use for public health and business growth.
- Position yourself as an expert in your specialized field in worldwide collaborative networks for major emerging technologies and applications that are driving BioTech and IT revolutions in the Health sciences sector.

>Prerequisite(s)

This course is designed to be suitable for anyone with a graduate level education in the related scientific fields of interest of the BioHC Program. The Thematic Schools are designed to be valuable to both individuals enrolled, in Clinical Science and Molecular Biotechnology and in Computer Science and Applied Mathematics. The concepts delivered through this course can spark new ideas among team members and the knowledge gained can be applied to their institution's approach to R&D problems. Participants may include:

1. Researchers who need to understand the emerging technologies and concepts to apply in their work.
2. Technical managers who want to familiarize themselves with these new technologies.
3. Entrepreneurs who would like to gain perspective on trends and future capabilities of Health technology.

Register now:
www.biohealth-computing.eu

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Fundació Barcelona Respiratory Network, Parc Cientific de Barcelona (Barcelona), BioIndustry Park Silvano-Fumero (Torino), Floralis (Grenoble), Swiss Institute of BioInformatics, University Hospitals of Grenoble (CHUG), Barcelona (Clinic Hospital), Dongguk and Tongji, LyonBiopôle, Sanofi-Pasteur, bioMérieux, Mérial, SoBios, Novadiscovery, Tavarlin, Bionure Transcure Idibaps, Cosmo Company, LinkCare, BDigital, EuroClone, Biomax, Geneuro, AptaSSD Co.

This project has been funded with support from

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SCHOOL OF BIOTECHNOLOGY

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BioHealth Computing
Thematic Schools

Understanding and Computing Systems Biology for Accelerating Innovation in Clinical and Life Sciences

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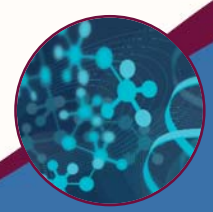

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>Presentation

Maximise your PhD and career opportunities

As research in the field of health becomes ever more complex and in the face of seemingly impermeable barriers between basic and clinical research, it is becoming increasingly difficult **to translate new knowledge from bench to bedside** – and back again to the bench. The BioHealth Computing program seeks to reverse this trend **by taking a proactive stance on the complex nature of biology and medicine to propose solutions founded on a more effective integration of computing technology.**

The BioHC program seeks to form a new generation of investigators able to exploit and further enhance **cutting-edge technologies in Systems Medecine** to control the **burden of Chronic Diseases**, a leading cause of worldwide morbidity and mortality.

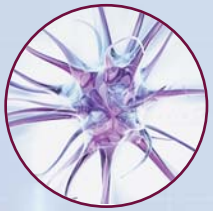
BioHC Thematic Schools **survey state-of-the art issues** in Systems Medicine, looking at data from bedside, environment, "omics" and high-throughput techniques, in view of accelerating health innovation and the development of laboratory discoveries into treatments for chronic patients.

BioHC students work on a **joint research program associating multidisciplinary approaches.** Through the use of integrated system-wide approaches, systemic modelling and simulation tools, they study biology as a whole, from molecules to cells, to organs, to organisms and to populations, while analyzing multiscale dynamics of all the forces that make up complex living systems.

BioHC thematic schools courses are **taught by a team of world experts** with backgrounds in clinical research, biotechnology, mathematical modelling, big data, multicore technology, etc. Each BioHC professor brings his/her own unique experience and expertise to the course.

Courses taught by leading experts

>BioHC Spring School



This BioHC Spring School will survey **state-of-the-art topics in Big Data**, including data collection (web, smartphones, sensors), data storage and processing (scalable relational databases, Hadoop, etc.), extracting structured from unstructured data, systems issues (security, multicore), analytics (efficient algorithms, machine learning), visualization, and a range of applications. Through the HIV Case study, the Spring School will look at some of the main sources of data and efforts to develop new tools to work with them, particularly focusing on technologies **to analyze genome-wide screens for human genes which affect HIV replication.** Tackling the challenges of Big Data for Systems Medicine is the mission of this Spring School developed by BioHC Partner institutions in collaboration with the CERN School of Computing.

Facing up to challenges posed by Big Data

>BioHC Summer School

The BioHC Summer School aims to use a systemic approach for **the study of the underlying mechanisms of CD's phenotypes associated with poor disease prognosis.** Content covers the fundamentals of physiological and clinical processes, along with core medical principles, clinical research methods, and clinical trials design, as well as basics of applied mathematics and computing. The program culminates in a **capstone design-project** in which students work in interdisciplinary teams co-advised by faculty members and investigators from industries and hospitals. The Synergy-COPD project aims to use a systemic approach to **study the underlying mechanisms of Chronic Obstructive Pulmonary Disease** (COPD) phenotypes, and the **analysis of associated determinants of co-morbid conditions**, (i.e. cardiovascular diseases, diabetes and lung cancer).

Attacking the Non-Linear nature of Chronic Diseases (CDs)

>Course Overview

The BioHC Thematic Schools aim to reduce the time from research to dissemination by (i) exposing participants to some of the most recent ideas and techniques (theory and practice); and (ii) developing networking and socialization (community building). Courses are held over two weeks, and provide the following:

A common scientific culture in Systems Medicine

- Six work-packages delivering a series of ex-cathedra lectures and hands-on exercises, with assessments to reinforce key learning concepts.
- Case study on Chronic Diseases; The hands-on component is a central part of the schools, and includes projects carried out by students on previously constructed problems, in small groups under supervision by a tutor (problem-based learning). To this end, a computing infrastructure is created on the BioHC site where students are usually organized in pairs.
- Discussion forums for participants to address thought-provoking questions in medicine, environment, technology, ethics, social media posed by the BioHC faculty, as well as to share, engage, and ideate with other participants.

The BioHC Thematic Schools are true University programs. The focus is on delivering academic knowledge rather than know-how, which can be better achieved through training at home institutes.

Students can take a final exam. Successful participants will receive the highly recognized BioHC Diploma as well as a formal Certificate of Credits awarded by Partner universities.

Community building and networking

BioHC Schools seek to foster community building for sharing additional resources, suggested readings, and related links.

A social networking program proposes activities every afternoon for those who are interested.