

## INFORMATIONS PRATIQUES

### LOCATION

Evry Université Evry-val-d'Essonne

Freiburg University of Freiburg

Paris AgroParisTech

### CONTACTS

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[www.universite-paris-saclay.fr](http://www.universite-paris-saclay.fr)

Partenaires Université Paris-Saclay



AgroParisTech



Autres partenaires

- SupBiotech
- Université de Freiburg

université  
PARIS-SACLAY

SCHOOL

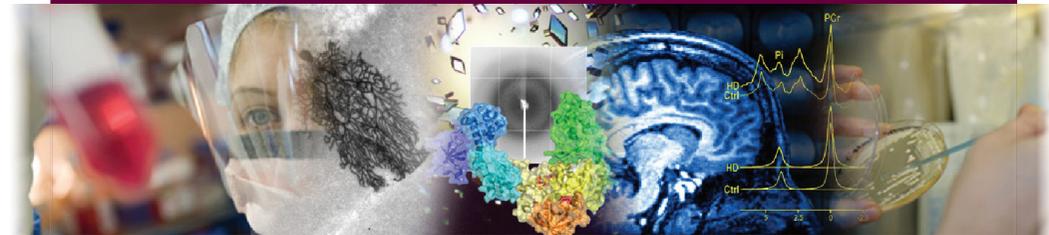
BIOLOGIE, MÉDECINE,  
PHARMACIE

MASTER

Biologie Santé

## Biologie Santé

### PARCOURS : Systems & synthetic biology (SSB)

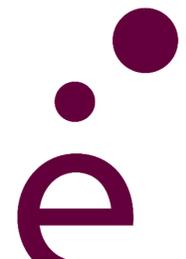


*Systems Biology is the study of biological systems and network behaviors, and in particular their dynamic aspects, which requires the utilization of mathematical modeling tightly linked to experiment. Synthetic Biology can be defined as the design and construction of new biological parts, devices and systems (that do not already exist in the natural world) or the redesign and fabrication of existing, natural biological systems for useful purposes. Its goal is to learn how to engineer and build self-organizing systems that recapitulate biological functions and show new functions with industrial applications in environment, health care, biomaterials and energy. The vigorous development of Systems and Synthetic Biology constitutes a huge challenge that must be met both from the research and education perspectives. The Master 2 in Systems & Synthetic Biology (mSSB) represents the first step towards nurturing a new brand of interdisciplinary researchers and engineers to face up to the challenge. mSSB is the first Master 2 in France dedicated to Systems and Synthetic Biology.*

### PREREQUISITES

Applicants may come from Universities or from Engineering Schools. A first year of master (M1), or an equivalent qualification, in either Biology, applied Mathematics, Computer Science, Chemistry or Physics. Bi-disciplinary cursus including biology is favoured, but highly-achieving and motivated students in any of the cited disciplines can apply. Excellent English proficiency is required.

M1 Biologie-Santé plateforme Transdisciplinaire pour la Biochimie et Les Biotechnologies



## OBJECTIVES

The aim of mSSB is to provide students from the Life Sciences, Mathematics, Engineering, Chemistry, Physical and Computer Sciences a mean to fruitfully engage in collaborative work across disciplinary boundaries, with applications in Systems and Synthetic Biology. Students undertaking the course will gain hands-on experience in experimental Biology, modeling and designing. They will also enhance transversal capacities including planning a project, giving a seminar, writing and defending a scientific report, interacting with a community, perceiving the industrial, economical and ethical issues associated with these developing fields. A six month-internship is included in the formation.

## PERSPECTIVES

Jobs opportunities after mSSB are found in the massive development of Synthetic Biology and in the orientation of the biotechnological and pharmaceutical industries to the use of predictive models and of biological systems modeling. About 70% of former mSSB students are currently pursuing PhD studies, other became researchers in private biotechnology companies.

## RESEARCH

The mSSB teachers are faculty professors and researchers with overlapping expertise working on several relevant disciplines: systems and synthetic biology, genomics, informatics, statistics, and biophysical chemistry. They are international recognized scientists from the University of Evry-Val-d'Essonne, AgroParisTech, Telecom SudParis, U. Warwick (UK), U. Freiburg (Germany), U. Pompeu Fabra (Spain), CNRS, INRA, CEA or INSERM.

The teaching of mSSB is held in a privileged environment, thanks to the presence at the University of Evry-Val-d'Essonne and at Genopole®, of many host laboratories and private biotech companies.

## ASSOCIATED LABORATORIES

- Institute of Systems & Synthetic Biology (iSSB), Genoscope, Institut Micalis
- Informatique Biologie Intégrative et Systèmes Complexes (IBISC), Laboratoire de Mathématique et Modélisation d'Evry (LaMME), Laboratoire Analyse et Modélisation pour la Biologie et l'Environnement (LAMBE), Mathematic, Computing Science and Genome (MIG), Services répartis, Architectures, MODélisation, Validation, Administration des Réseaux (SAMOVAR), BIOSS Centre for Biological Signalling Studies (Univ. Freiburg)

## PARTNERS

Social sciences included in the curricula : one of the mandatory modules addresses the ethical questions raised by synthetic biology. The mSSB program is enriched by a seminar series given by international speakers from the academy and from the industry. mSSB students may perform their internship in Biotech companies and are encouraged to participate to the international Genetically Engineered Machine (iGEM) competition every year in November. Students may prepare this annual competition at iSSB (Genopole®) over Summer, following – or sometimes during - their training period.