



MASTER PROGRAM IN BIOLOGY

option GENETICS, DEVELOPMENT and EVOLUTION (GDE)

AIMS OF THE PROGRAM

The Master Program in Biology, option Genetics, Development and Evolution aims at providing an up-to-date knowledge in scientific approaches that integrate molecular and cell biology to genetics, bioinformatics and zoology. Both the experimental training and the teaching courses are designed to promote the development of problemsolving, self-educational and communication skills as well as creativity and imagination in research.

The students will have access to most recent laboratory technologies. Thanks to the feedback provided by advanced scientists, they will learn how to analyze and evaluate their experimental results, how to present their research project in a dynamic way. A strong emphasis is also given in this program on the critical discussion of primary scientific literature.

WHAT CAREERS FOR THE STUDENTS WHO OBTAIN A MASTER IN GENETICS, DEVELOPMENT AND EVOLUTION?

This program is especially appropriate for students who wish to continue their training in Academic Research with a PhD project, as in the frame of the *International PhD program in Basic and Applied Molecular Life Sciences* proposed at the University of Geneva.

But a Master in Biology, option Genetics Development and Evolution also open doors to careers in

- Education and teaching
- Health and life sciences industry
- Clinical research laboratories
- Governmental health offices
- Scientific journalism
- Scientific museums

ENTRANCE PREREQUISITES

- A BACHELOR IN BIOLOGY or degree considered as equivalent after examination of the candidate's application
- Depending on previous training some additional ECTS credits may be required
- ACCEPTANCE BY A HOST LABORATORY for the research project
- DEADLINE: September 30 of each year
- FEES: CHF 500.- / semester

ECTS CREDITS

90 ECTS, allocated as follows:

- TEACHING COURSES: **30 ECTS** (13 ECTS in Series A + at least 11 ECTS in Series B + 6 ECTS in Series B or C)
- RESEARCH PROJECT: **60 ECTS** obtained over 45 weeks of full-time work (no vacancies included). Credits are obtained after defense of the master thesis dissertation.

TEACHING LANGUAGE

Most courses are given in English; some courses are in French (see list below).

STRUCTURE OF TEACHING AND TRAINING

The programme begins with the Autumn semester, for a duration of 3 semesters.

- SEMESTERS 1 and 2: Follow the courses you have selected in agreement with your research project supervisor.
- SEMESTERS 1, 2 and 3: The Research Project is performed continuously in the same host laboratory. The evaluation is based on the Master Thesis dissertation and on the final oral presentation.



STEP 1: FIND a HOST LABORATORY for your RESEARCH PROJECT

To apply to the Master Program in Genetics, Development and Evolution (GDE), please carefully follow the steps indicated below or contact us if necessary. The first step is to register at the University of Geneva [before indicated deadlines](#), then to select the laboratories with scientific projects that stimulate your curiosity. Take the time to visit the web sites of the labs listed below, to look at their recent publications to make up your mind. You should find a host lab or propose three different labs in your online application (step 2).

13 laboratories offer master projects in GDE at the Faculty of Science. If necessary contact the group leader to get more details about his/her field of research and the projects he/she proposes.

DENIS DUBOULE: DEVELOPMENT OF VERTEBRATES

The [DUBOULE laboratory](#) uses mouse molecular genetics to study the regulation of Hox genes, a family of genes that is essential for **animal development and evolution**. Denis.Duboule@unige.ch

BRIGITTE GALLIOT: MOLECULAR AND CELLULAR BASIS OF REGENERATION

The [GALLIOT laboratory](#) uses the *Hydra* model system to identify **the molecular and cellular mechanisms that support regeneration in adult organisms**. Projects focus on the signaling that link stress response to reactivation of a developmental program. Brigitte.Galliot@unige.ch

MARCOS GONZALEZ GAITAN: BIOPHYSICS AND CELL BIOLOGY OF SIGNALING

The [GONZALEZ GAITAN laboratory](#) studies in physical and molecular terms how is the shape and final size of a tissue achieved during embryogenesis. Projects focus on (1) **growth control by morphogen gradients** and (2) **asymmetric cell division in stem cells**. Marcos.Gonzalez@unige.ch

THANOS HALAZONETIS: CANCER GENETICS AND DEVELOPMENT

The [HALAZONETIS laboratory](#) studies the mechanisms by which **driver and passenger mutations are acquired during cancer development**. Thanos.Halazonetis@unige.ch

FRANÇOIS KARCH: GENETICS OF THE BITHORAX COMPLEX IN DROSOPHILA

The [KARCH laboratory](#) studies in the developing *Drosophila* the importance of **the chromosomal context in the mechanisms underlying transcriptional regulation of gene expression**. François.Karch@unige.ch

ROBBIE LOEWITH: GROWTH CONTROL BY THE TOR PATHWAY IN S. CEREVISIAE

The [LOEWITH laboratory](#) uses genetic, biochemical, and chemical approaches to study the function of the medically relevant Ser/Thr kinase TOR in *Saccharomyces cerevisiae*. Projects include **the molecular characterization of novel TOR effectors**. Robbie.Loewith@unige.ch

MICHEL MILINKOVITCH: COMPLEXITY AND BIODIVERSITY IN VERTEBRATES

The [MILINKOVITCH laboratory](#) investigates natural populations in the wild and new model organisms in the lab, for understanding **the evolutionary and developmental mechanisms underlying the emergence of complexity and biodiversity**. Michel.Milinkovitch@unige.ch

EMI NAGOSHI: CIRCADIAN LOCOMOTOR BEHAVIOR AND PARKINSON'S DISEASE

The [NAGOSHI laboratory](#) is using the *Drosophila* model system to dissect the mechanisms involved in **the regulation of circadian rhythms**. Her lab also proposes projects on the mechanisms that promote **the survival of dopaminergic neurons**. Emi.Nagoshi@unige.ch

DANIEL PAULI: MECHANISMS OF SEX DETERMINATION IN DROSOPHILA

The [PAULI laboratory](#) is using *Drosophila* genetics to investigate the mechanisms of **Sex determination and early development of germinal cells**. Daniel.Pauli@unige.ch

IVAN RODRIGUEZ: PERCEPTION OF PHEROMONES IN MAMMALS

The [RODRIGUEZ laboratory](#) is using mouse genetics to dissect the organization of vertebrate neuronal systems involved in the perception of the outside world. His lab proposes projects on: **The perception of pheromones in mammals**. Ivan.Rodriguez@unige.ch



ALICIA SANCHEZ-MAZAS: EVOLUTION OF DIVERSITY IN HUMAN POPULATIONS

The **SANCHEZ-MAZAS laboratory** investigates the **genetic diversity and evolution of human populations** through the data analysis of numerous polymorphisms.

Alicia.Sanchez-Mazas@unige.ch

DAVID SHORE: TELOMERE REPLICATION AND RIBOSOME BIOGENESIS IN YEAST

The **SHORE laboratory** is using the yeast model system to understand the relationships between chromosome structure, gene regulation and

genome stability. Projects on (1) **Telomere replication and protection**; (2) **Transcriptional networks regulating ribosome biogenesis**.

David.Shore@unige.ch

FLORIAN STEINER: NUCLEOSOME ORGANIZATION AND CHROMATIN FUNCTION

The **STEINER lab** main research objective is to elucidate how nucleosome organization is related to chromatin function, namely the **organization of centromeric chromatin and the interplay between chromatin structure and gene expression** during differentiation and development.

Florian.Steiner@unige.ch

SEVERAL LABORATORIES AT THE FACULTY OF MEDICINE ALSO OFFER MASTER PROJECTS IN GENETICS, DEVELOPMENT AND EVOLUTION:

Some laboratories based in academic institutions that do not belong to the Faculty of Science also propose master projects in Genetics, Development and Evolution. In that case it is necessary to find a co-supervisor, i.e. a professor from the Biology Section of the Faculty of Science, who will be responsible for the academic level of the host institution and for the evaluation of the work. This professor should be contacted before acceptance in the program to provide his/her agreement on the proposed lab and on the scientific project (see step 4 of the procedure); he/she will co-sign the final evaluation of the master work.

Find below the names of some labs that propose master projects in Genetics, Development and Evolution at the Medical School of Faculty of Medicine in Geneva (not all-comprehensive list).

STYLIANOS ANTONARAKIS: HUMAN GENOME, POLYMORPHISMS AND PATHOLOGIES

Stylianos.Antonarakis@unige.ch

MONICA GOTTA: REGULATION OF ASYMMETRIC CELL DIVISION IN THE NEMATODE EMBRYO

Monica.Gotta@unige.ch

PEDRO HERRERA: DIFFERENTIATION AND REGENERATION IN THE MAMMALIAN PANCREAS

Pedro.Herrera@unige.ch

DENIS JABAUDON: DEVELOPMENTAL NEUROBIOLOGY AND PLASTICITY

Denis.Jabaudon@unige.ch

SERGE NEF: GENETIC MECHANISMS OF SEXUAL DEVELOPMENT IN MAMMALS

Serge.nef@unige.ch

ARIEL RUIZ I ALTABA: STEM CELLS AND CANCER STEM CELLS IN MAMMALS

Ariel.RuizAltaba@unige.ch



STEP 4: DEFINITIVE ADMINISTRATIVE REGISTRATION

Download the definitive registration form and follow the guidelines: <http://gde.unige.ch/en/home>

If necessary contact the secretariat of the Department of Genetics and Evolution.

Ms Corinne MATTHEY-EBENER (corinne.matthey-ebener@unige.ch)

Secretariat Department of Genetics and Evolution

4th floor – room 4002A –

Sciences III, 4 Boulevard d'Yvoy

CH-1211 Genève 4, Switzerland

open every morning 8 – 12 am

PHONE: +41 (0)22 379 67 85

FAX: +41 (0)22 379 67 95

As soon as you get the agreement SIGNED by your supervisor and by the director of the master program (Prof. B. Galliot), you can register at the Secretariat of the Biology Section, **latest September 30.**

Ms Sandra DIETHELM (sandra.diethelm@unige.ch)

Section of Biology, 2nd floor – room 2002 –

Sciences III, 4 Boulevard d'Yvoy

CH-1211 Genève 4, Switzerland

open Mo, Tu, Th, Fr, 8 - 12 am

PHONE: +41 (0)22 379 66 65

FAX: +41 (0)22 379 67 48

Prof. B. Galliot (brigitte.galliot@unige.ch, Department of Genetics and Evolution) and

Prof. M. Gonzalez Gaitan (marcos.gonzalez@unige.ch, Department of Biochemistry) are responsible for the organization of the Master Program in Biology, option Genetics, Development and Evolution.

RESTRICTIONS to REGISTRATION

- There is no possible registration in the Biology Master Program for students who are not registered at the University of Geneva.
- To gain access to the Master's degree study programs, students who hold university degrees from foreign academic institutions must submit an application to the Section of Biology to obtain recognition of the equivalence of their certificates. Please contact sandra.diethelm@unige.ch.
- There is no possible registration in the *Development, Genetics and Evolution Biology Master Program* for students who have not found a host laboratory.
- The students who get accepted in *a host laboratory that does not belong to the Faculty of Science* need find a co-supervisor at the Section of Biology (Professor or "Maitre d'Enseignement et de Recherche"). The supervisor should suggest a potential co-supervisor and the student should contact him/her directly to get his/her formal approval (the co-supervisor acceptance form is available at the secretary of the Department of Genetics and Evolution).

Informations on Master degree in Biology at the University of Geneva

www.unige.ch/sciences/Enseignements/Formations/Masters/Biologie_en.html

www.unige.ch/sciences/biologie/etudes/formations/masterbiolo/autresmastersetorientation_en.html

www.unige.ch/sciences/biologie/etudes/formations/masterbiolo.html

www.unige.ch/sciences/biologie/etudes/formations/masterbiolo/autresmastersetorientation.html

The Faculty of Sciences has established an Excellence Master Fellowship program to support outstanding candidates. For more information, visit the relevant web page:

http://www.unige.ch/sciences/Enseignements/Formations/Masters/ExcellenceMasterFellowships_en.html