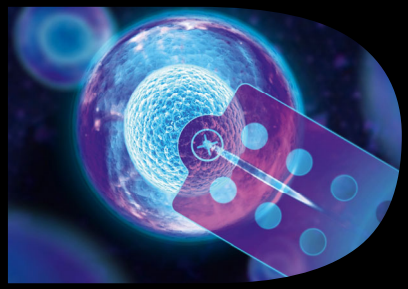
ETH zürich

Departement Biologie



The Biology Curriculum
ETH Zurich
Prof. Dr. Samuel Zeeman

ETH zürich

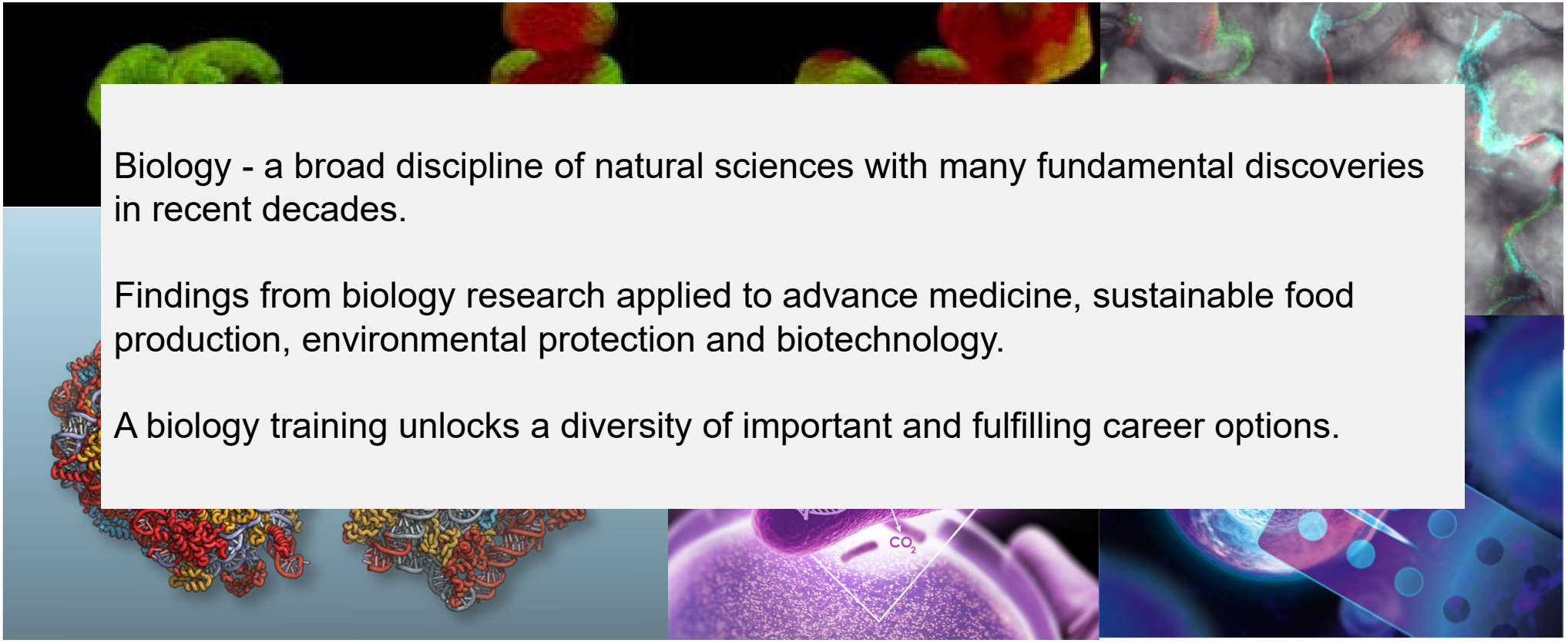
- **The Department of Biology – ‘D-BIOL’**

- 38 Professors with an impressive breadth of expertise
- Six institutes specialized in different areas

  Biochemistry
  Microbiology
  Molecular Biology and Biophysics
  Molecular Health Sciences
  Molecular Plant Biology
  Molecular Systems Biology

- Strength in fundamental research
- Strength in applied research

A fascination with Biology…



Biology - a broad discipline of natural sciences with many fundamental discoveries in recent decades.

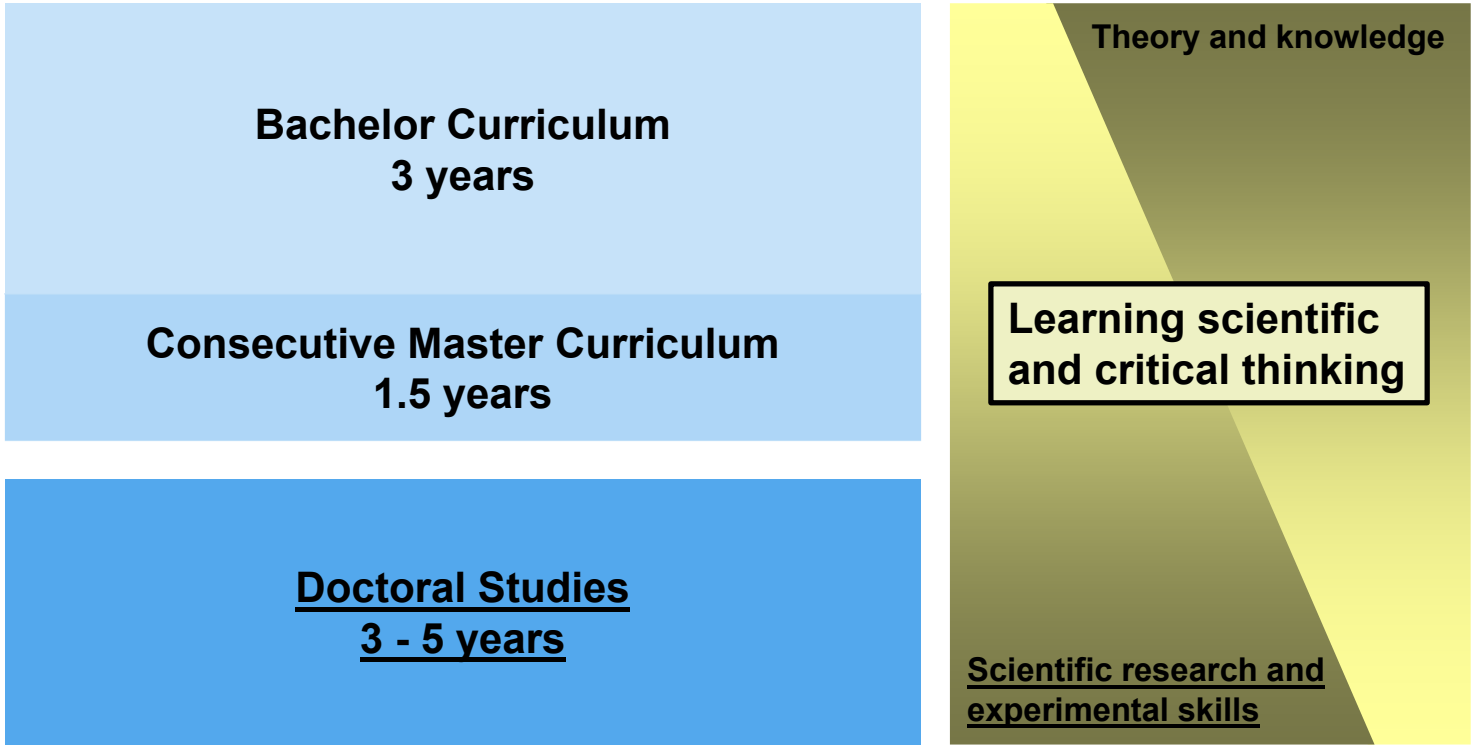
Findings from biology research applied to advance medicine, sustainable food production, environmental protection and biotechnology.

A biology training unlocks a diversity of important and fulfilling career options.

A fascination with Biology…

https://www.youtube.com/watch?v=awc6a5RIMnU

Biology at ETH Zürich: from theory to experiment-driven research



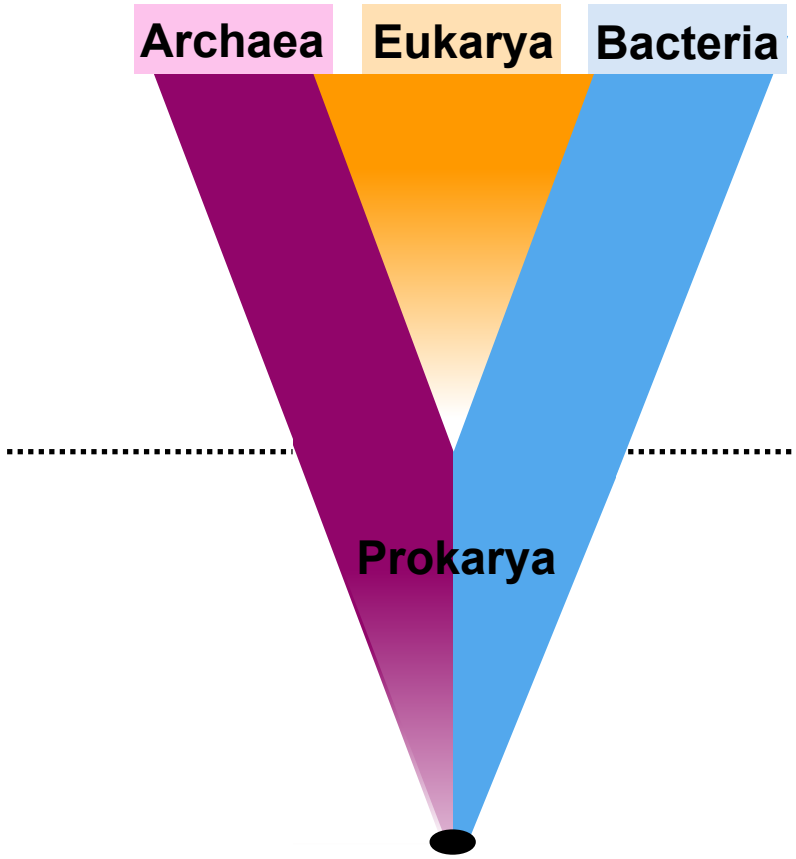
Biology at ETH Zürich… Theory and Practice

In-person teaching by Biology professors, supported by a Centre for Active Learning supplying online tools and resources.

Biology at ETH Zürich… Theory and Practice

Practicals in the first and second years, guided by experienced senior scientists and doctoral students.

Biology at ETH Zürich… Reformed curriculum since 2020



Humans

Animals and land plants

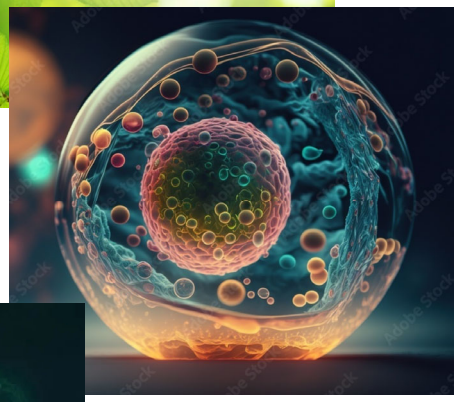
Multicellularity

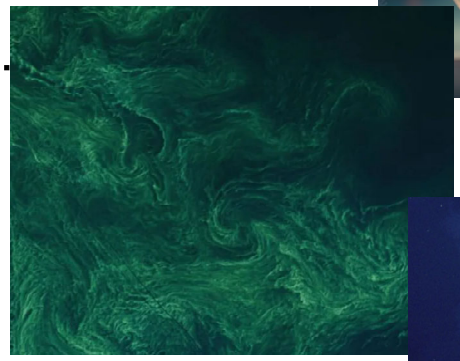
Meiosis

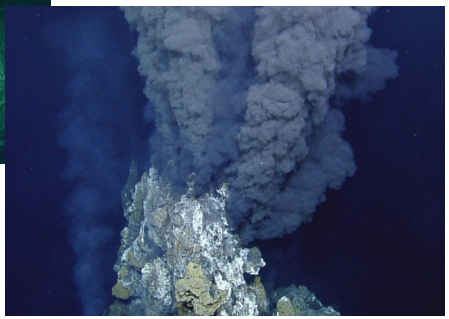
Eukaryogenesis

Photosynthesis

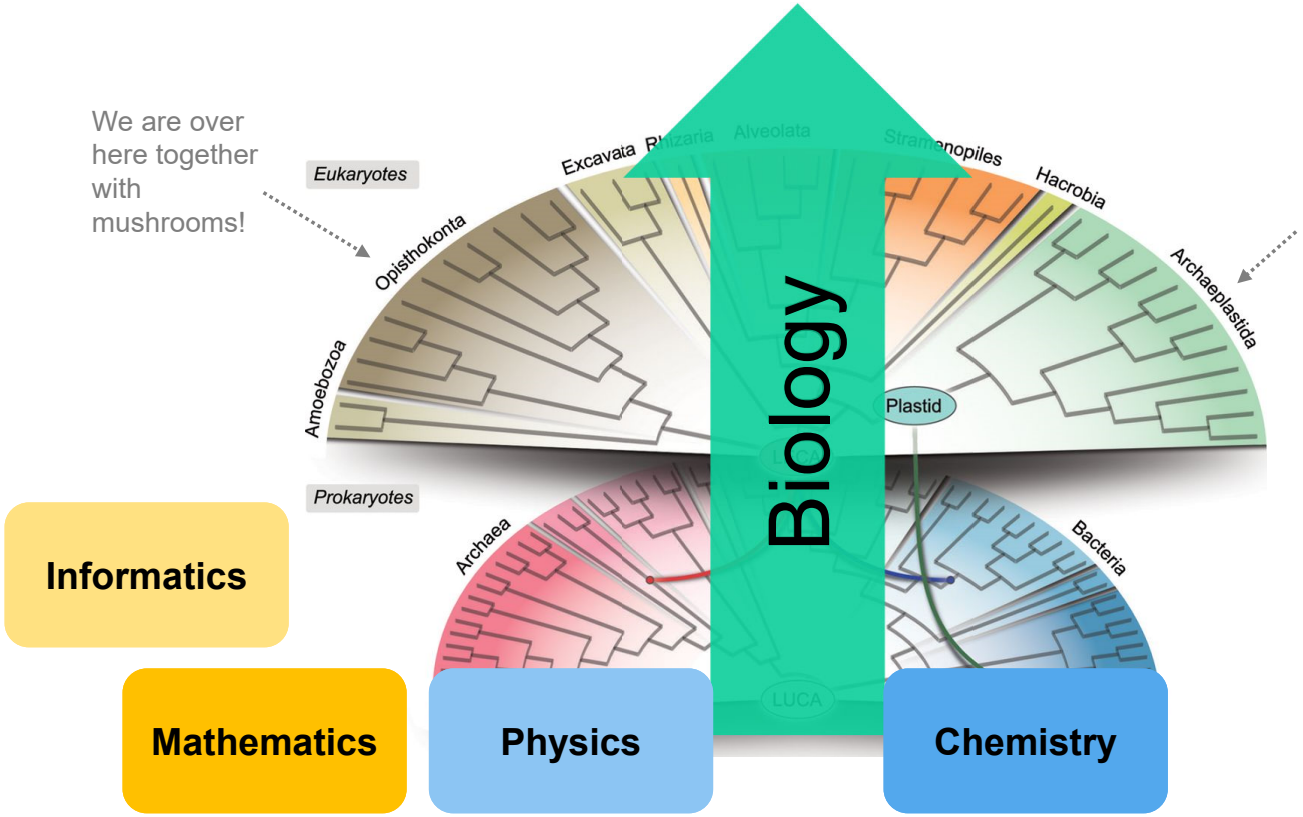
Emergence of Life





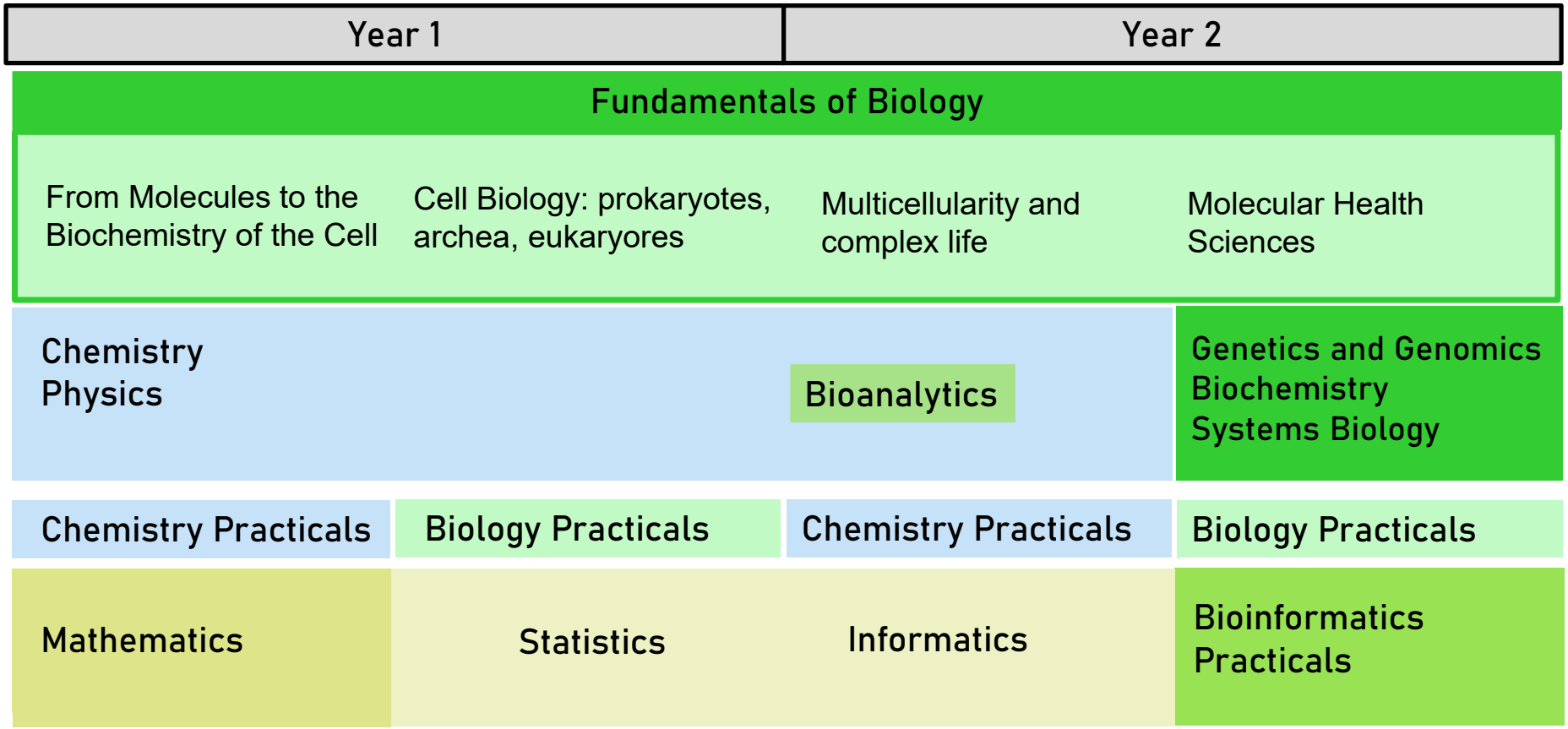


Biology at ETH Zürich… Reformed curriculum since 2020



- Evolution and increasing complexity as a common thread
- Basics in chemistry and physics
- Linking theory and practice
- Current research perspectives
- Identifying open questions in biology right from the start

Biology at ETH Zürich… 1st and 2nd year.



What type of concepts do we address in the 1st year?

What is life and how could the first cells have come into being?

Which molecules are central to living things and which energy sources drive life processes?

How is cellular information stored, copied and made usable for the cell?

How does a cell copy itself?

How do cells interact chemically and physically with their environment?

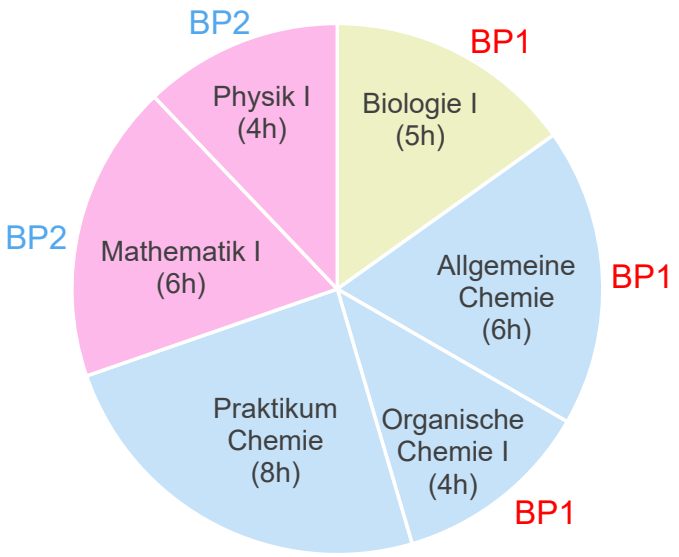
How do living things influence their environment?

What is the basis of cellular complexity?

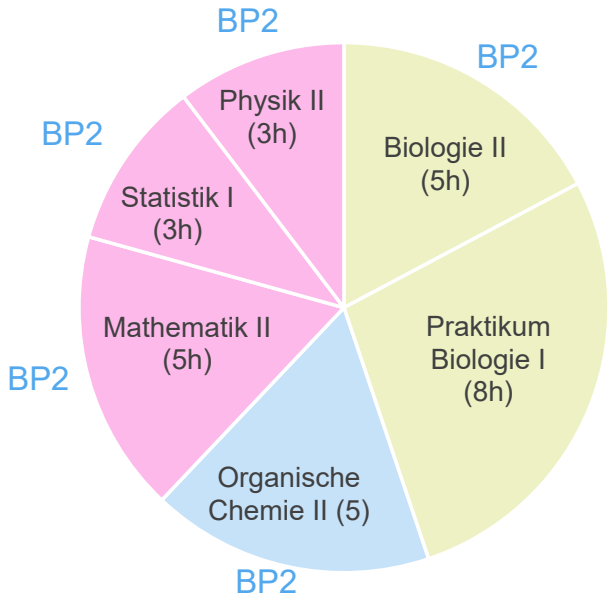
How did eukaryotic cells come into being?

Which processes are common/unique to different organisms?

Biology Bachelor – 1st Year



1st Semester



2nd Semester

Performance assessments in the 1st year are combined into 2 blocks.

Block 1 (BP1)

Block 2 (BP2)

What type of concepts do we address in the 2nd year?

The diversity of life.

What are the opportunities and challenges of multicellular life?

How do cells coordinate specialise and communicate within an organism?

How do organisms distinguish between self and foreign?

How do the molecular machines that produce the cell's essential molecules work?

How can we find out which molecules are present in a cell and when?

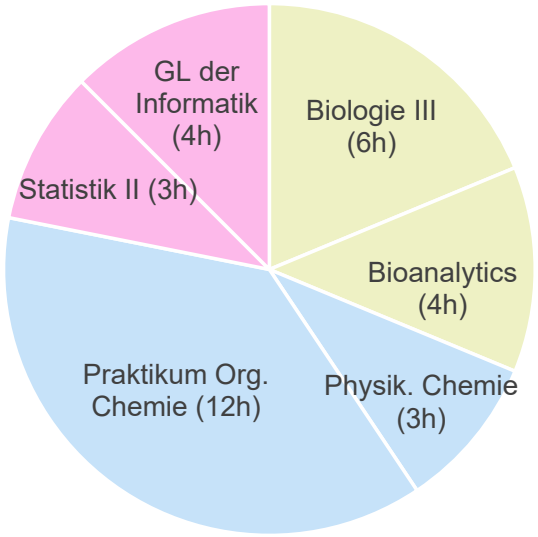
How do tumor cells become metastases and how can this be prevented?

How can CRISPR-Cas genome editing be used to cure diseases?

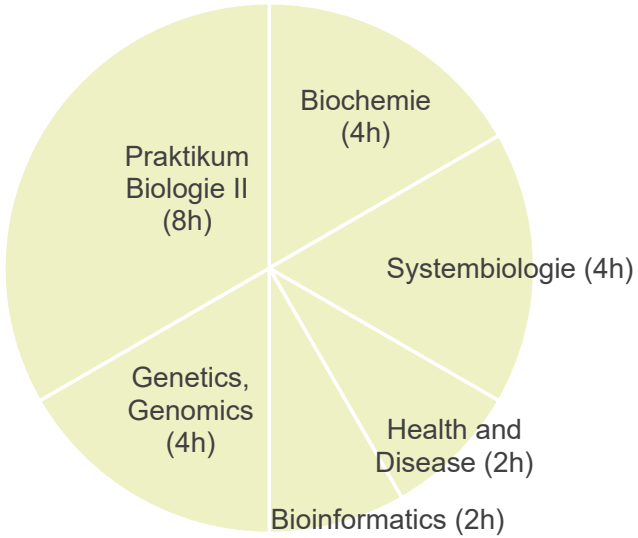
How do the biological elements - genes, proteins and metabolites - interact in a functional organism?

How can biological questions be answered using computer methods?

Biology Bachelor – 2nd Year



3rd Semester



4th Semester

Courses individually assessed (i.e. no 'Blocks')

Third Study Year: a wide choice of courses

An orientation year in preparation for the next step…

3 – 5 Concept courses
- **Lecture courses**
- Choice from 12 advanced courses
- Freely selectable

5 – 7 Block courses
- **Practical courses in Research Groups**
- Choice from almost 100 diverse courses
- Freely selectable

Third Study Year: a wide choice of courses

An orientation year in preparation for the next step…

3 – 5 Concept courses
- **Lecture courses**
- Choice from 12 advanced courses
- Freely selectable

5 – 7 Block courses
- **Practical courses in Research Groups**
- Choice from almost 100 diverse courses
- Freely selectable

The concept courses.

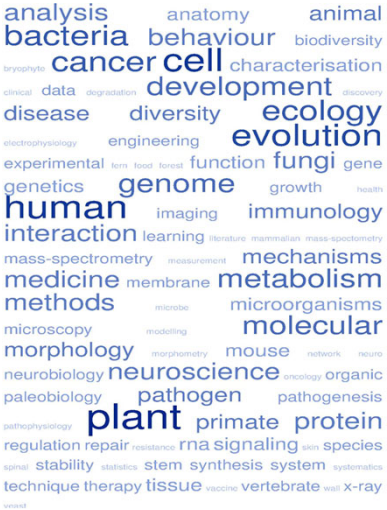
- Bioinformatics
- Cell Biology in Health and Disease
- Cellular Biochemistry
- Concepts in Modern Genetics
- Evolutionary Genetics
- Immunology
- Microbiology
- Molecular and Structural Biology
- Molecular Life of Plants
- Nucleic Acids and Carbohydrates
- Proteins and Lipids
- Systems Biology

Third Study Year: a wide choice of courses

An orientation year in preparation for the next step…

3 – 5 Concept courses
- Lecture courses
- Choice from 12 advanced courses
- Freely selectable

5 – 7 Block courses
- **Practical courses in Research Groups**
- Choice from almost 100 diverse courses
- Freely selectable



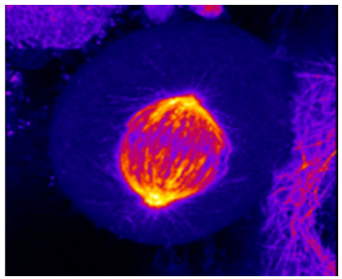
The block course system.

Embedded within the different research groups across the Department of Biology, other ETH Zurich departments, and partners institutions (e.g. PSI, EAWAG, UZH).

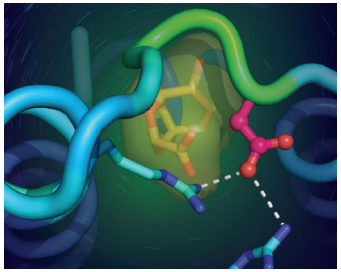
Students take a deep dive into contemporary research themes and cutting-edge technologies in life science research, with close supervision by researchers.

The Masters in Biology: Eight thematic directions.

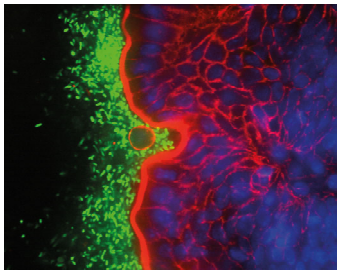
Biochemistry



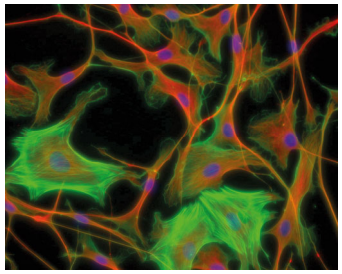
Biological Chemistry



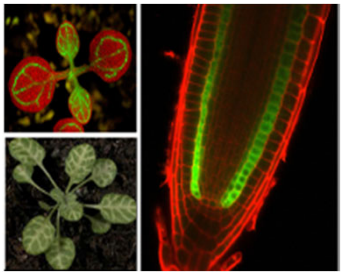
Microbiology and Immunology



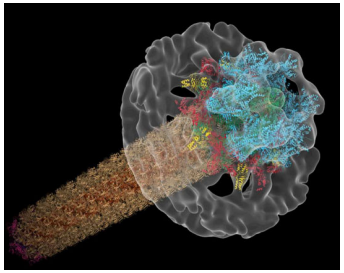
Molecular Mechanisms of Health and Disease



Molecular Plant Biology

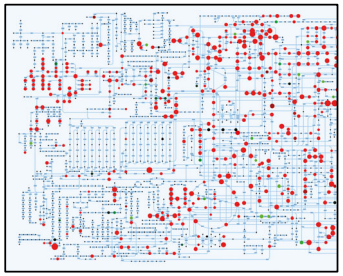


Molecular- and Structural Biology



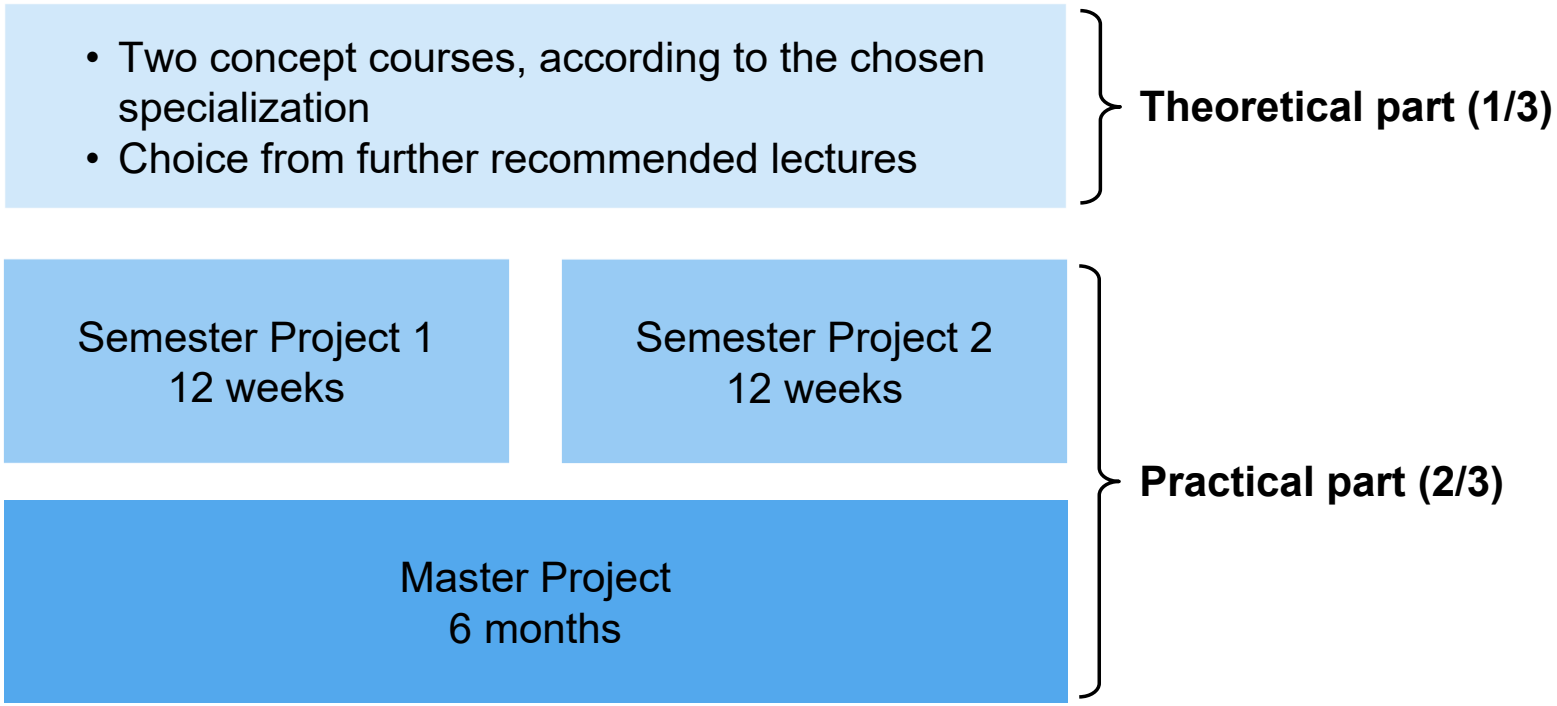
Ecology and Evolution

Systems Biology



Collaborations with sister departments at ETH Zurich, and with partner institutions in Switzerland and abroad, provide opportunities for interdisciplinarity studies and for personal mobility.

The Masters in Biology: a brief overview...



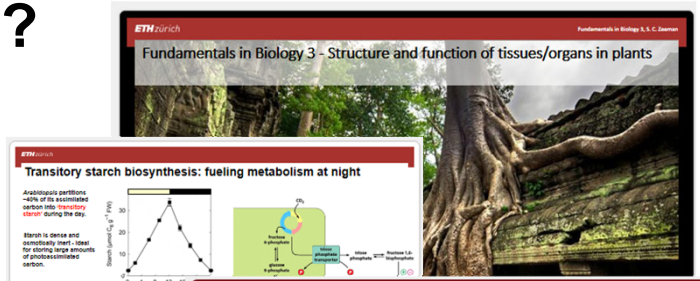
The Biology curriculum – where am I involved?

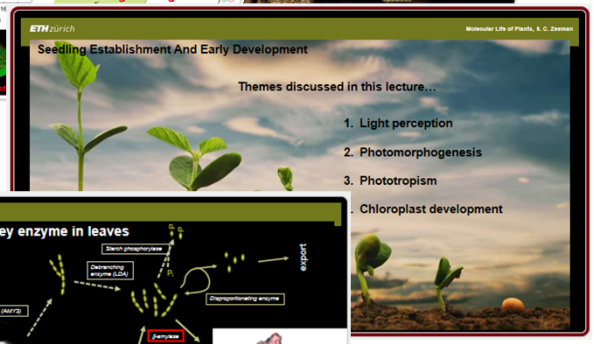
Bachelor Curriculum
3 years

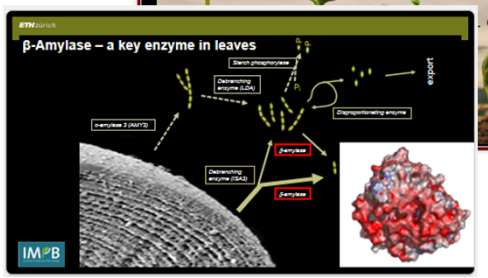
Consecutive Master Curriculum
1.5 years

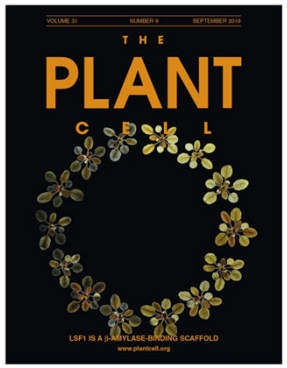
Doctoral Studies
3 - 5 years

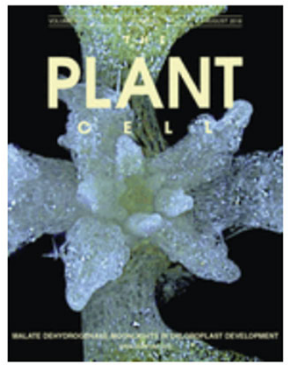
- Teaching the fundamentals of Plant Biology
- Advanced concepts in Molecular Plant Biology
- Specialized Master's course in plant metabolism
- 3-5 Master student semester/thesis projects
- 5-8 Doctoral student projects











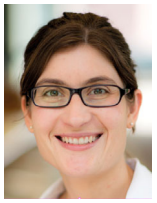
Biologists in professional life – a few examples

Lena Stallmach,
Science Journalist,
NZZ

Dr. Dominik Brem,
Sustainability and scientific concepts,
ETH Zürich

Dr. Raphael Troesch,
Associate Editor,
Nature Plants

Dr. Reto Schneider,
Leader of Emerging Risk Management,
Swiss Re Insurance



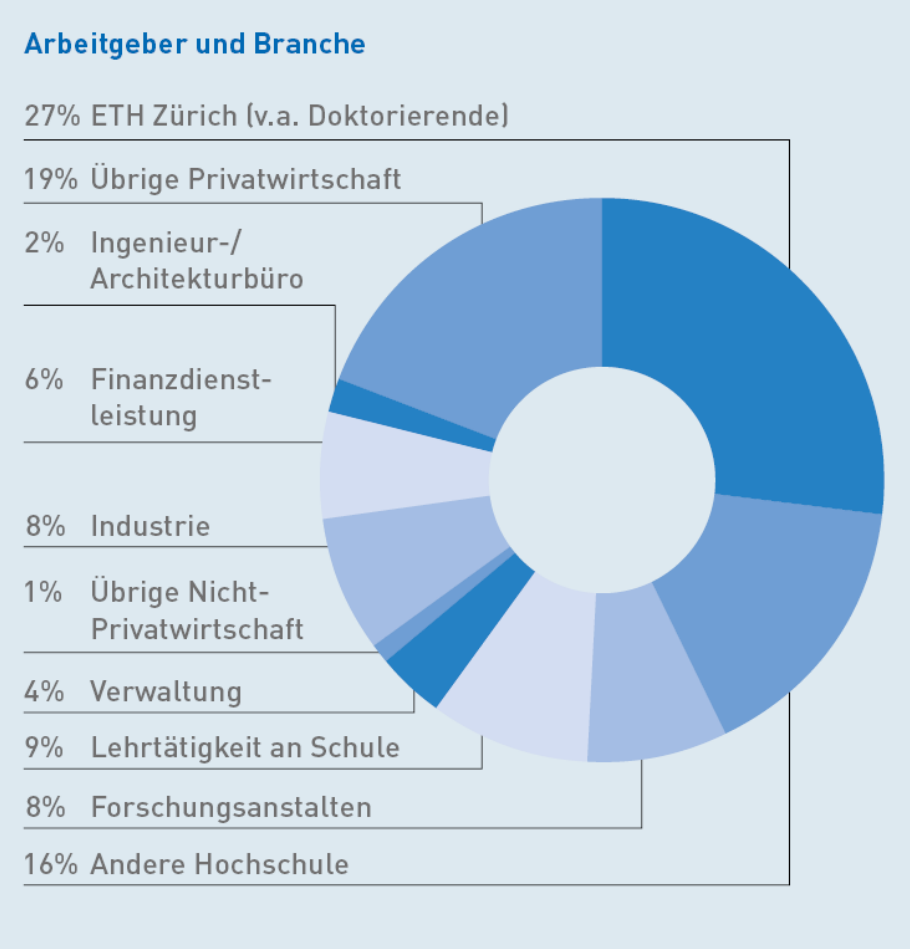
Dr. Corinne John,
Co-founder and Exec. Vice President,
Redbiotec AG

Prof. Dr. Leonie Luginbühl,
Professor,
University of Cambridge

34 short videos of professional portraits of biologists:

https://www.youtube.com/watch?v=hwRRvfkOaGc&list=PL2ZmvO9hgI08xVCA3c0_JhEbhU9icQmIT

Employment of biology graduates - a recent survey…



Graduates who completed their Master's degree ≤5 years ago were surveyed.

What qualities should you bring with you when studying biology with us?

Motivation and dedication

Curiosity and an interest in the natural sciences

Capacity for both independence and teamwork

Enjoy planning and experimentation

Language skills; German and English.

Why study biology at ETH Zurich?

Focus on molecular and cellular aspects of biology

Modern curriculum with a common thread

Strong foundation in chemistry, physics, mathematics

Orientation year leading to specialized Master's degrees

Emphasis on experimental training

Insight into contemporary, world-class life-science research

Excellent teaching and research infrastructure

Training by renowned professors

What additional qualities will you get when studying biology with us?

Personal Development and Self-Direction

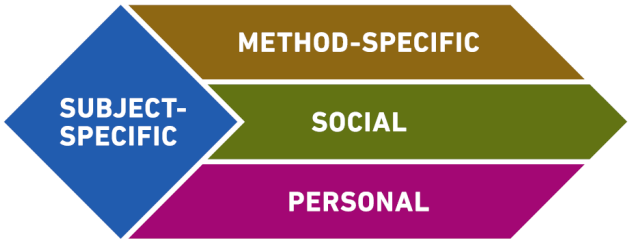
Analytical & problem-solving

Project Management & Organisational Skills.

Communication & Cooperation, Teamwork & Leadership

Creativity & Critical Thinking

Integrity & Work Ethics



Further information about Biology and other Life-Science Curricula

- Biology Stand in the main hall: information on Research and Teaching in D-BIOL
- Example Lecture, Prof. H. Gehart, HG E3, 11.15 - 12.00
- Lab tour in LFW, 13:45 – 14:30 (meet at the Biology Stand).
- Comparison of Life-Science Curricula, HG E7, 12.30 - 13.15 and 16:15- 17.00

Further information online

- Information on studying and research at the Departement of Biology: www.biol.ethz.ch
- Information on studying at ETH Zurich: https://ethz.ch/de/studium.html
- The Biology students' association (VeBiS):https://vebis.ch
- Information on Teacher training: http://www.didaktischeausbildung.ethz.ch