Master Systems Biology

Rachel Cavill/ Michelle Moerel
Maastricht Centre for Systems Biology
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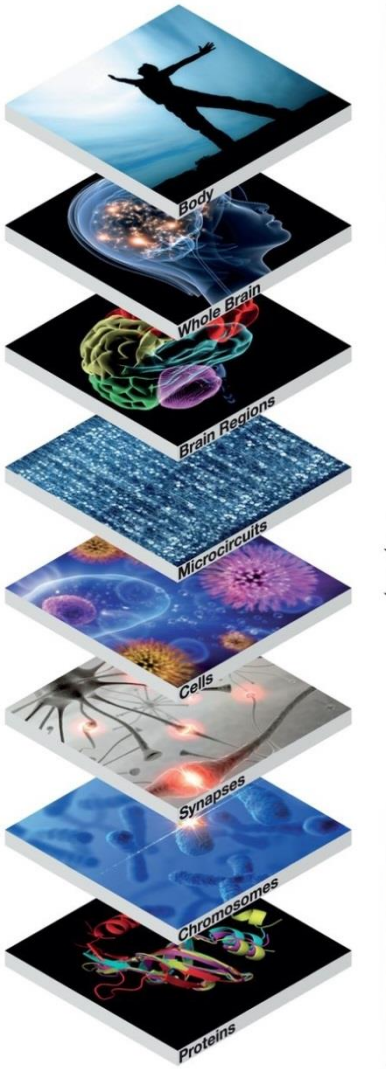
Maastricht University

Master Systems Biology

Started 31 august 2015

- 2 year, full-time master
- 120 ECTS
- At the Health Campus (Randwyck, UM)
- Fully English programme

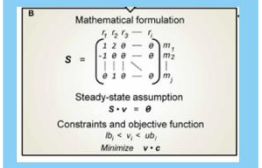
Systems Biology:



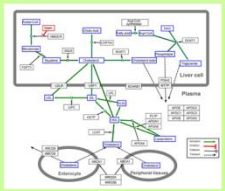
- Is a rapidly evolving multidisciplinary field of science
- Combines biology, computational models, and mathematics
- Aims to understand the behavior of biological systems ...
- ... and predict new behaviors

Towards the virtual physiological human

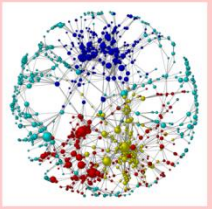
Mathematical modelling
- biology based
- prediction
- metabolism

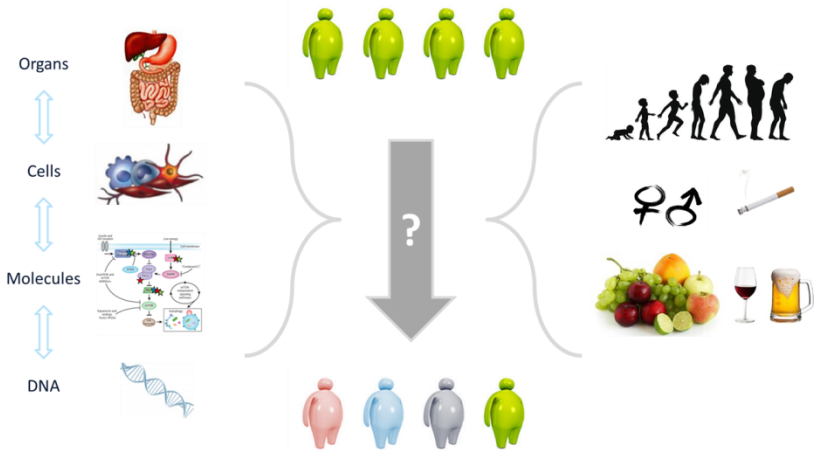


Pathway analysis
- biology based
- easily add regulatory info



Data-driven analysis
- correlations
- detect novel mechanisms





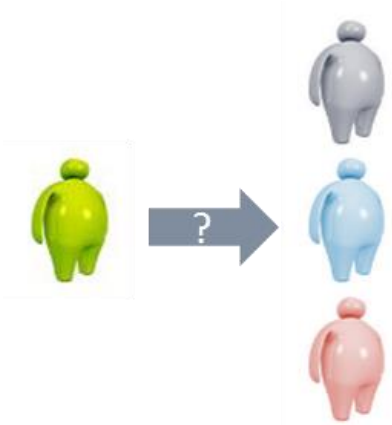
Why Systems Biology?

Societal

Replace animal testing

Basic research

Diagnostics



Personalized medicine

Scientific challenges for the future:

- are multidisciplinary and international
- need teams spanning scientific disciplines to develop solutions
- require a new generation of scientists

→ **new teaching programmes**

Need for students:

- who have a broad interest in combining biology, computer science, and mathematics
- who do not want to be limited to a fixed, highly specialized programme
- who want to learn how to think, work and communicate across disciplines

Programme Master SB

1st year MSc Systems Biology (total 60 EC)

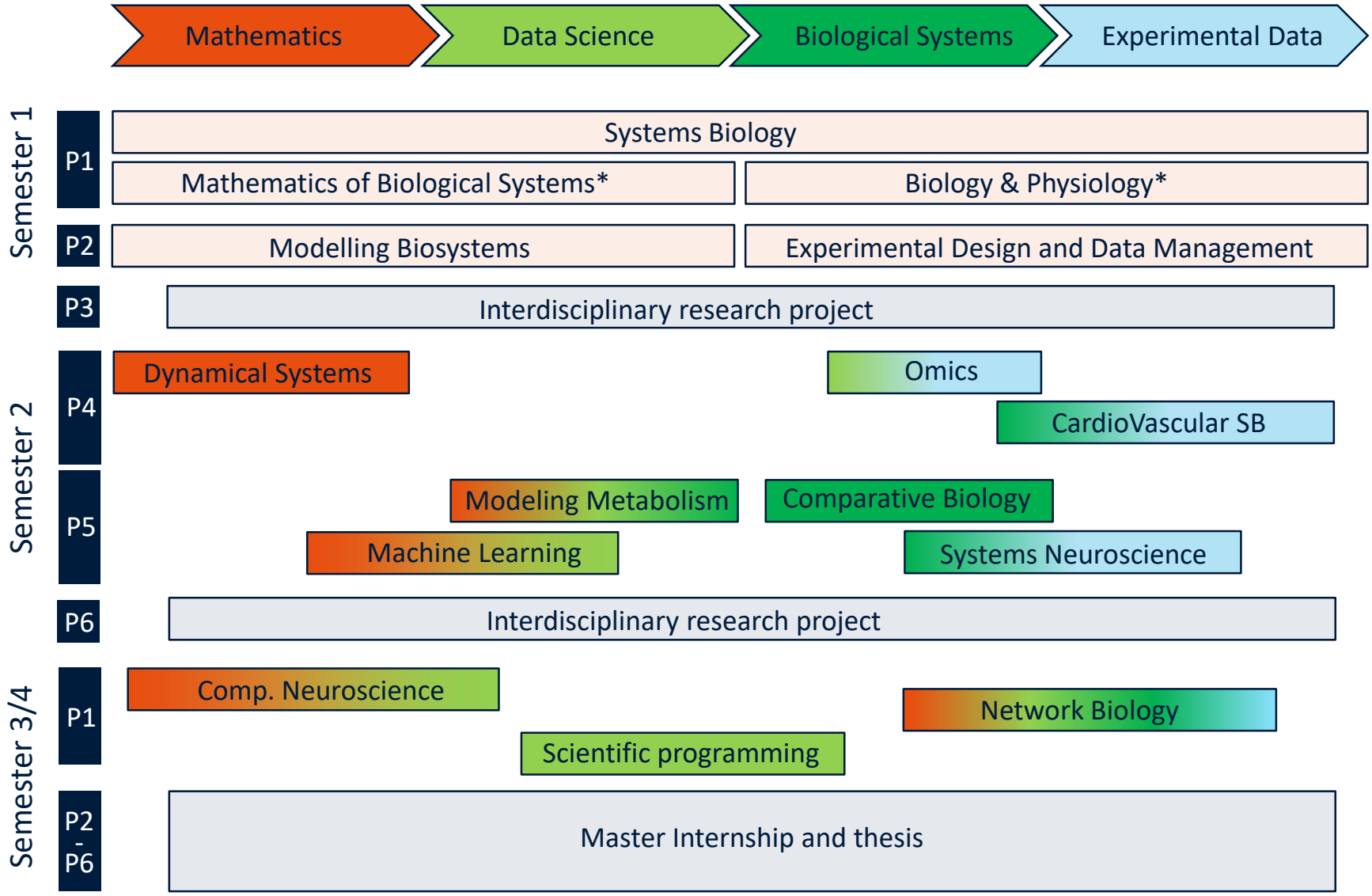
8 weeks	8 weeks	4 weeks	8 weeks	8 weeks	4 weeks
Compulsory courses	Compulsory courses	Project	Electives	Electives	Project
		student research (group)	Choose 2	Choose 2	student research (group)
2 x 6 EC	2 x 6 EC	6 EC	2 x 6 EC	2 x 6 EC	6 EC

2nd year MSc Systems Biology (total 60 EC)

8 weeks	32 weeks
Electives	Master Thesis Research Project
Choose 2	Individual student research project
2 x 6 EC	48 EC

Curriculum set-up:

Multidisciplinary programme: broad spectrum of topics spanning from mathematics to biology



Maastricht University

**Followed course depends on previous education*

Study load:
What does a week of study look like?

Two courses each week (up to 20 hr contact time)

module	hr/module	total/week
• 2 x 1 lecture per week	1.5-2 hr/lecture	3-4 hr
• 2 x 2 tutorials per week	1.5-2 hr/tutorial	6-8 hr
• Skills training: computing, practical, or academic skills		8 hr
• *Self study*	20-24 hr/week	20-24 hr

Teaching by active researchers

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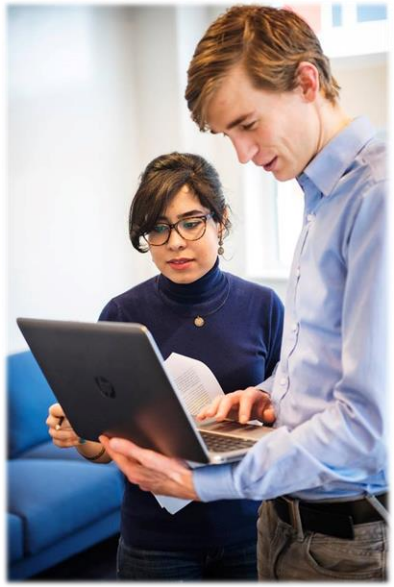

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https://www.maastrichtuniversity.nl/macsbio

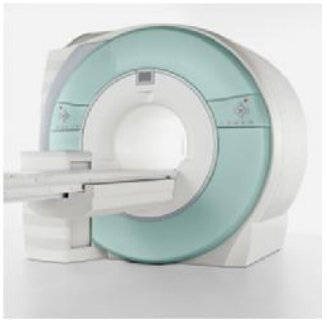
Maastricht University

Infrastructure and facilities

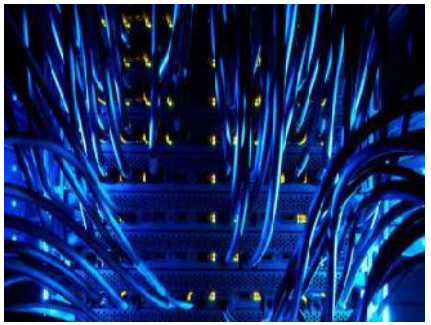
Laboratories

Clean rooms

Large cohorts



MRI scanners

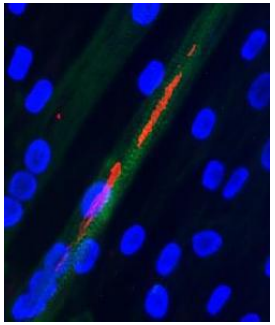


High-performance computing facilities

Multi-modal molecular imaging

Macro/micro/nano-biofabrication technology

Genomics & Proteomics



Cell Biology/ iPSC facilities

Career opportunities

Researcher PhD research	Universities, hospitals, applied science organizations, pharmaceutical and biotech companies
Policy maker	Government organizations, centres for population health, environment, genetics, prevention
Entrepreneur	Specialized Systems Biology company (“life sciences incubator”)

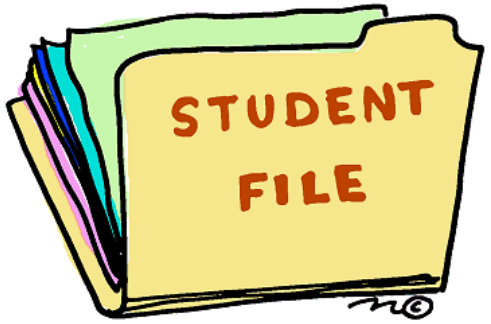
Admission requirements:

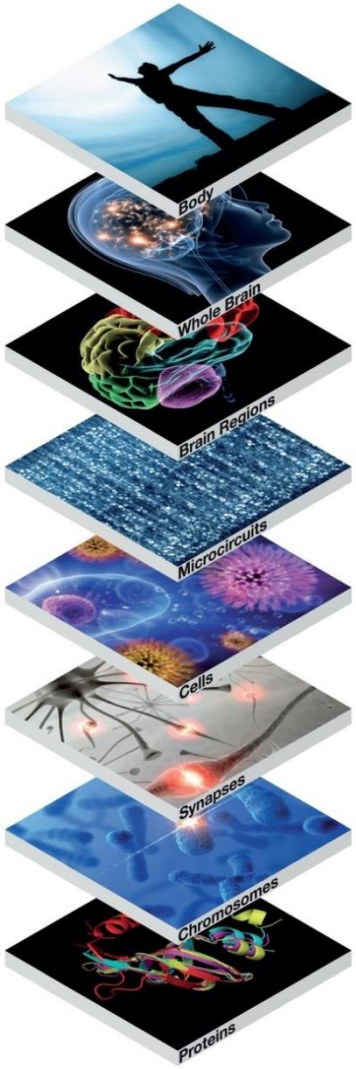
- **Bachelor diploma**: biomedical sciences, sciences (e.g., MSP), university college (e.g., UCM), mathematics, data science, neuroscience, biomedical engineering, (bio)informatics, etc.
- **Motivation** to study across disciplines
- Proficiency in the **English** language
- Required **15 ECTS in mathematics/statistics** at bachelor level

  → Can be waived based on individual background: *contact us!*

Admission procedure:

- Send in **all documents**: bachelor diploma; transcripts or grade list; motivation letter; 2 reference letters; copy passport; english proficiency (IELTS, TOEFL, etc.)
- **Interview**: approx. 30 minutes to determine if there is a match between student and master programme
- Board of admissions makes a **decision** on admission





Contact/Information:

E-mail:
Sb-info@maastrichtuniversity.nl

Website:
www.maastrichtuniversity.nl/fse/systems-biology

/MScSystemsBiology
Science and Engineering Maastricht University

/macsbio
@MaCSBio
https://www.maastrichtuniversity.nl/macsbio

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