ETH zürich

D-ITET

Master your Master
MSc Biomedical Engineering

Dr. Christian Frei
Coordinator MSc Biomedical Engineering
October 31, 2023

MSc Biomedical Engineering (BME)

- A specialized Master hosted by the departments D-ITET (leading house), D-HEST, D-MAVT and D-PHYS

Christian Frei

Reto Kreuzer

Coordinator of studies, D-ITET

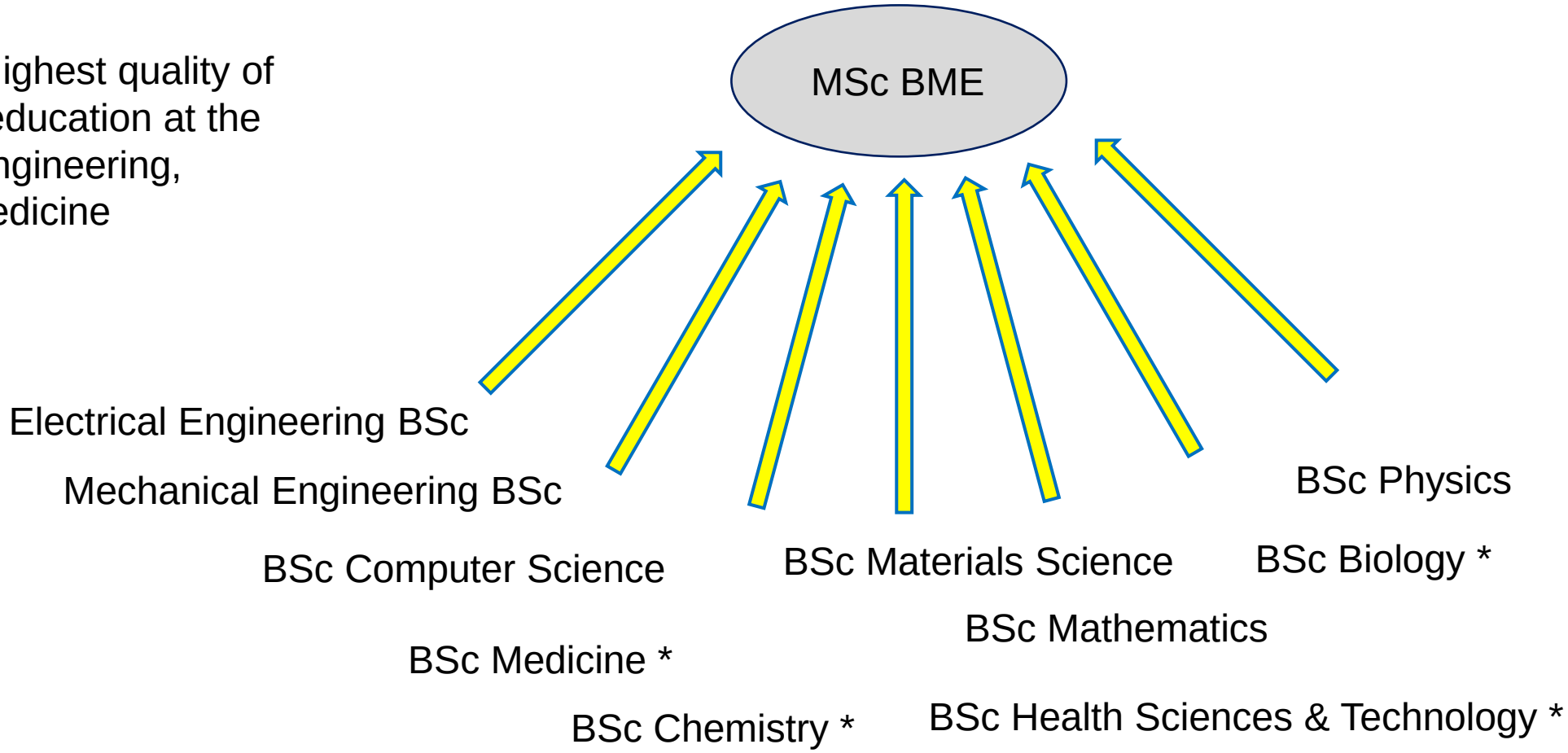
MSc Biomedical Engineering: Five tracks

- Bioelectronics
- Bioimaging
- Biomechanics
- Medical Physics
- Molecular Bioengineering

- Ø 2013-2023: 50 new students/year
- Ø 2013-2023: 54.1% CH-Bachelors

MSc Biomedical Engineering (BME)

- Our mission: Highest quality of research and education at the interfaces of engineering, biology and medicine



*: does not qualify for all tracks (see below)

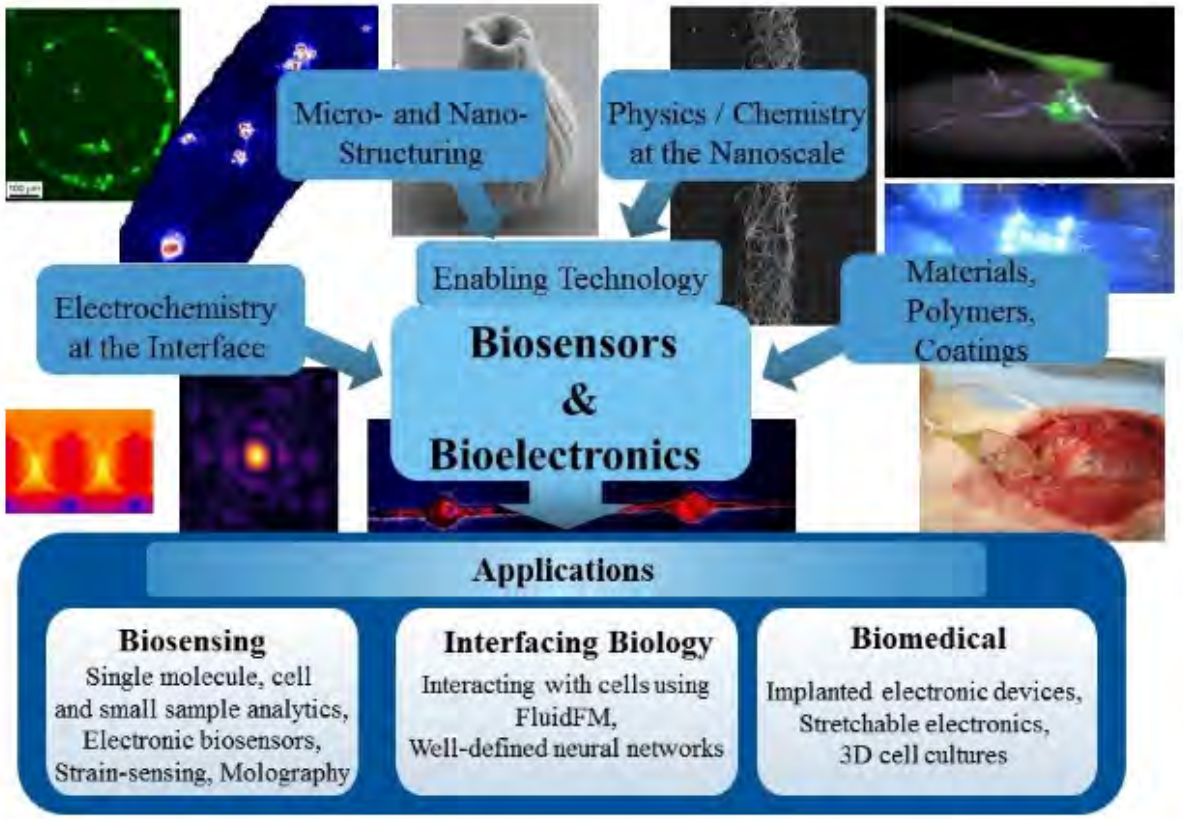
Track Bioelectronics

Track advisors

- Taekwang Jang
- Janos Vörös
- Hua Wang
- Mehmet Fatih Yanik




We conduct interdisciplinary research at the interface between engineering, nanotechnology, materials science, medicine, and biology. We are interested in answering basic research questions that are related to molecular and cellular processes at electrified interfaces and to **neural networks** →.
We apply our knowledge for developing new nanoscale tools (e.g. the **FluidFM**) and methods for **biosensing, diagnostics** →, and **interfacing biology** →.
We also develop new **biomedical devices** → using stretchable electronics.

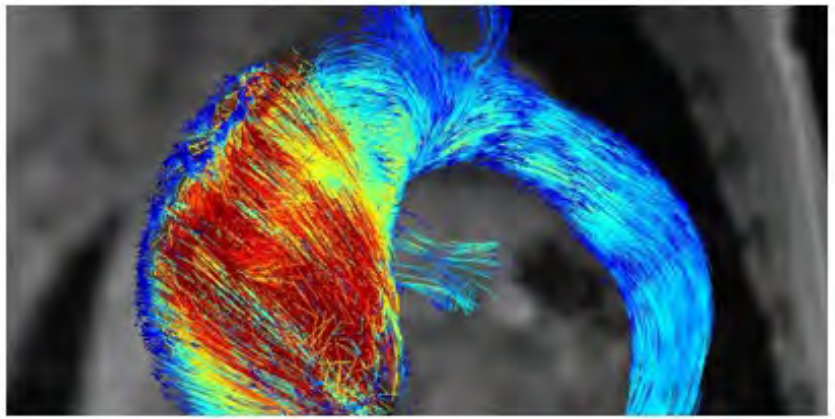


Track Bioimaging

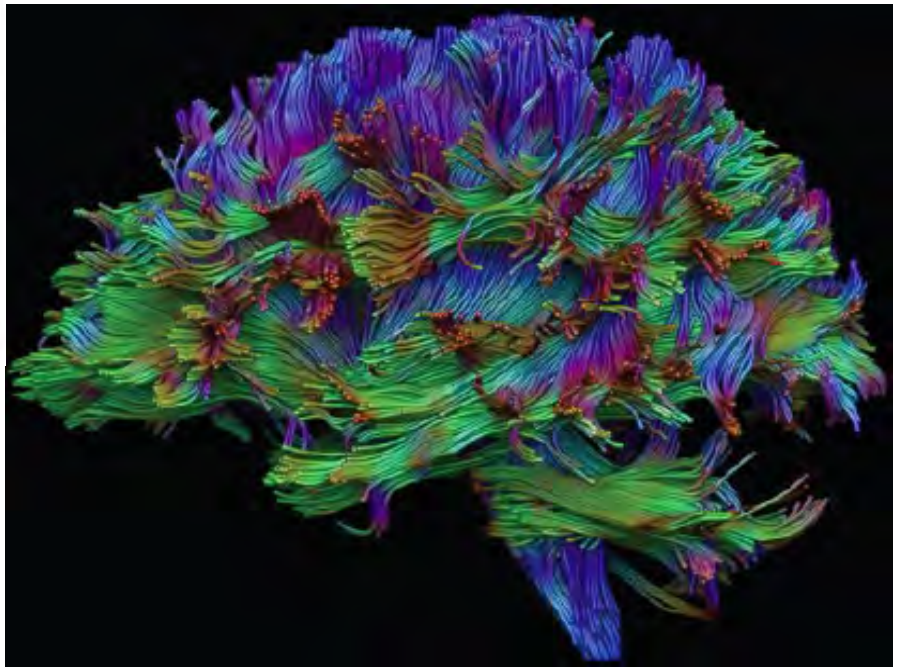
Track advisor

- Klaas Prüssmann

Blood flow in the aorta



Connectivity in the brain



MRI technology

Track Biomechanics

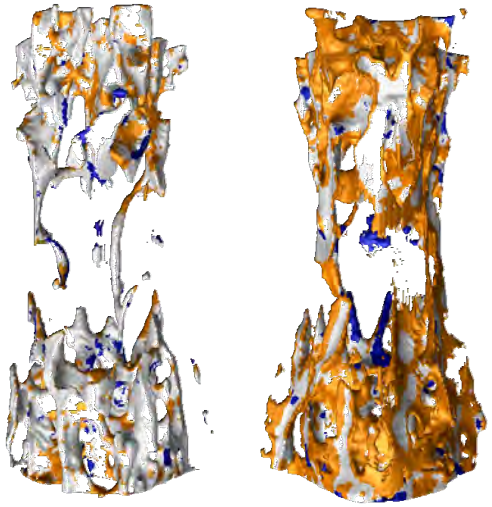
Track advisor

- Ralph Müller

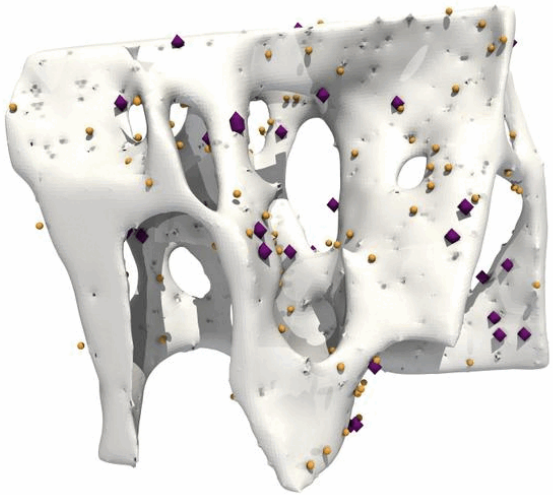
The track Biomechanics gives in-depth knowledge about the application of mechanics and measurement methods for understanding the structure and function of biological materials at the organism, organ, tissue, cell, and molecular level.

The track provides education and hands-on research opportunities in theoretical, experimental, computational and translational biomechanics. Biomechanics is a discipline, which is increasingly influenced by cellular and molecular approaches.

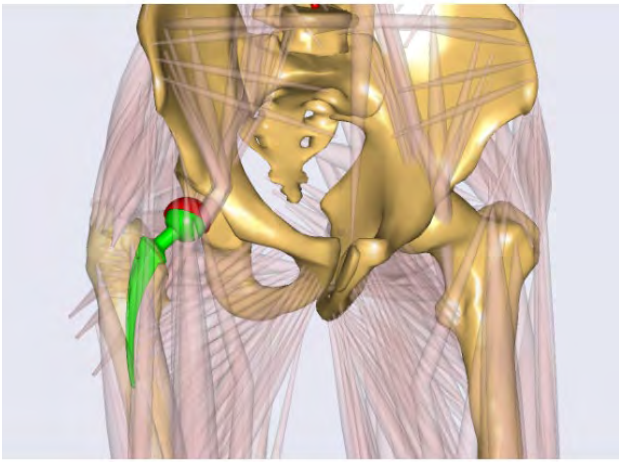
Experimental



Computational



Translational

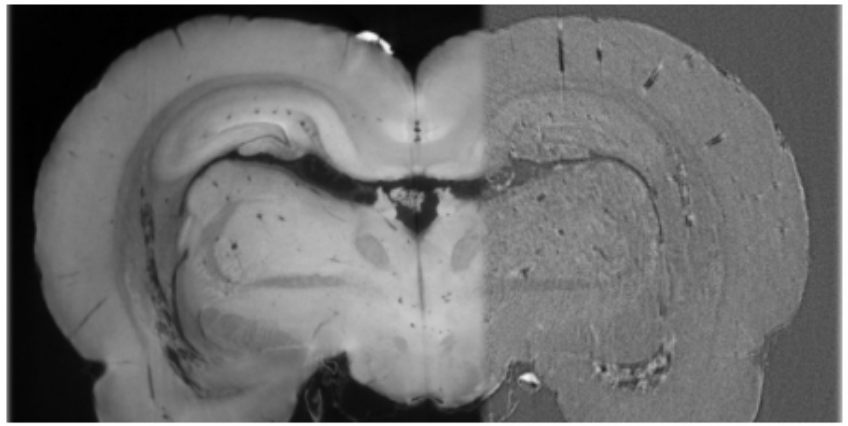


Track Medical Physics

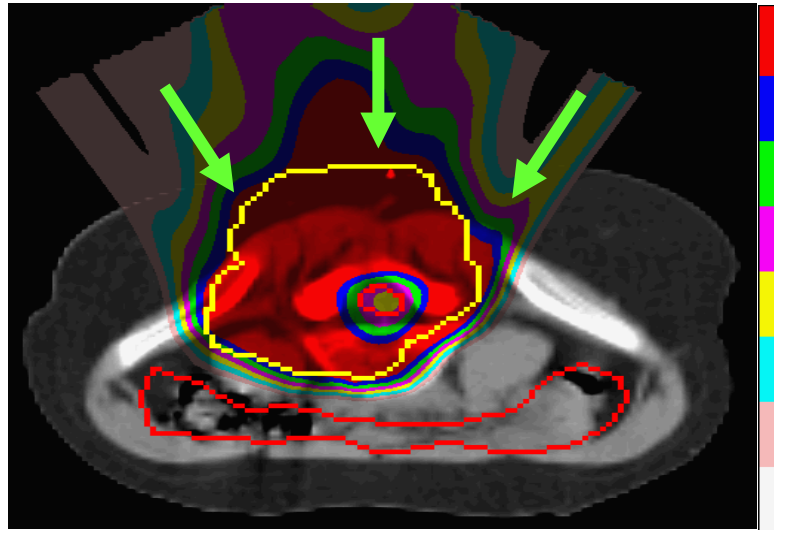
Track advisors

- Tony Lomax
- Marco Stampanoni

X-Ray imaging



Proton therapy

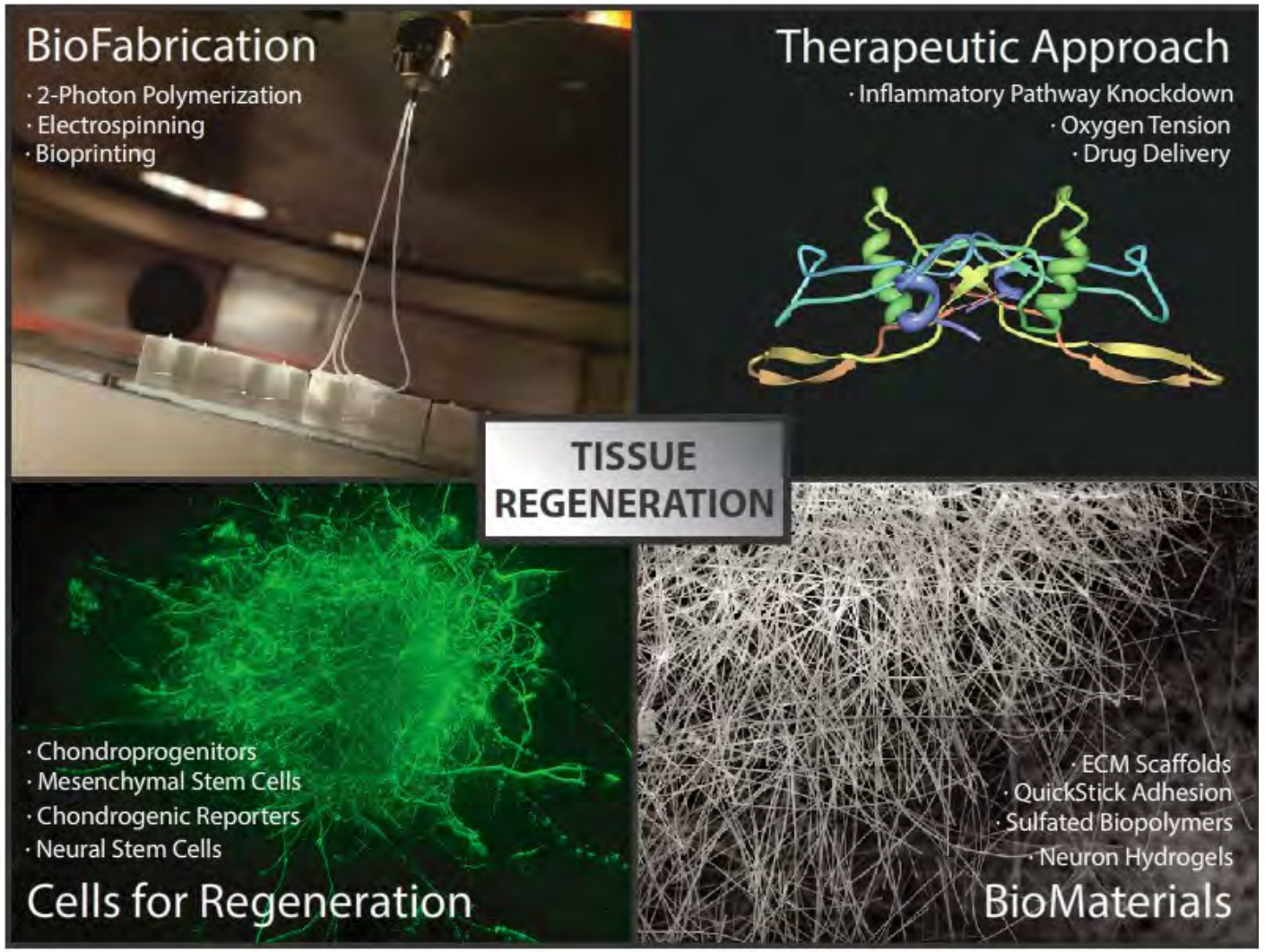


Paul Scherrer Institute, Villigen

Track Molecular Bioengineering

Track advisors

- Mark Tibbitt
- Marcy Zenobi



How to enter our program

- Application through the Rectorate (Admission's office)
- November 1 - December 15, or April 1 - April 30 (Bachelors from Switzerland only)
- (ESOP application: Nov.-Dec. only)
- Start of the MSc: Autumn semester

- Selection committee (about 5 members): Evaluation of all applications
- Positive evaluation: Admission to one particular track

Qualifying Bachelor degrees

a. For admission to the tracks “Bioelectronics” and “Bioimaging”:
- Electrical Engineering
- Mechanical Engineering
- Physics
- Material Science
- Computer Science
- Mathematics
- Chemical Engineering
- Biotechnology
- Computational Science and Engineering
- Biomedical Engineering

b. For admission to the tracks “Biomechanics”:
All disciplines listed in Subpara. a and:
- Health Sciences and Technology
- Human Movement Sciences
- Life Sciences and Technology

c. For admission to the tracks “Mol. Bioengineering”:
All disciplines listed in Subpara. a and:
- Biology
- Chemistry
- Health Sciences and Technology
- Human Movement Sciences
- Life Sciences and Technology
- Medicine

d. For admission to the tracks “Medical Physics”:
All disciplines listed in Subpara. a and:
- Biology
- Chemistry
- Health Sciences and Technology
- Life Sciences and Technology
- Medicine

120 Credits ECTS to fulfill the MSc BME

- Mandatory credits

– Track Courses	52 CP	Part of the learning agreement (approval by the track advisor)
– Track Core Courses, at least 12 CP		
– Recommended Elective Courses		
– Biology Courses		
– Semester Project	12 CP	
– Master Project	30 CP	
– Science in Perspective (SiP)	2 CP	

- Sum 96 CP

120 Credits ECTS to fulfill the MSc BME

- Mandatory credits
  - Track Courses 52 CP
    - Track Core Courses, at least 12 CP
    - Recommended Elective Courses
    - Biology Courses
  - Semester Project 12 CP
  - Master Project 30 CP
  - Science in Perspective (SiP) 2 CP
- Sum 96 CP

- Selected choice
  - More Track Courses up to 24 CP
  - Additional Projects and Laboratory Courses
    - Semester Project 2 12 CP
    - Research Project 6, 12, 18 or 24 CP
    - Industry Internship 12 CP
- Sum 24 CP

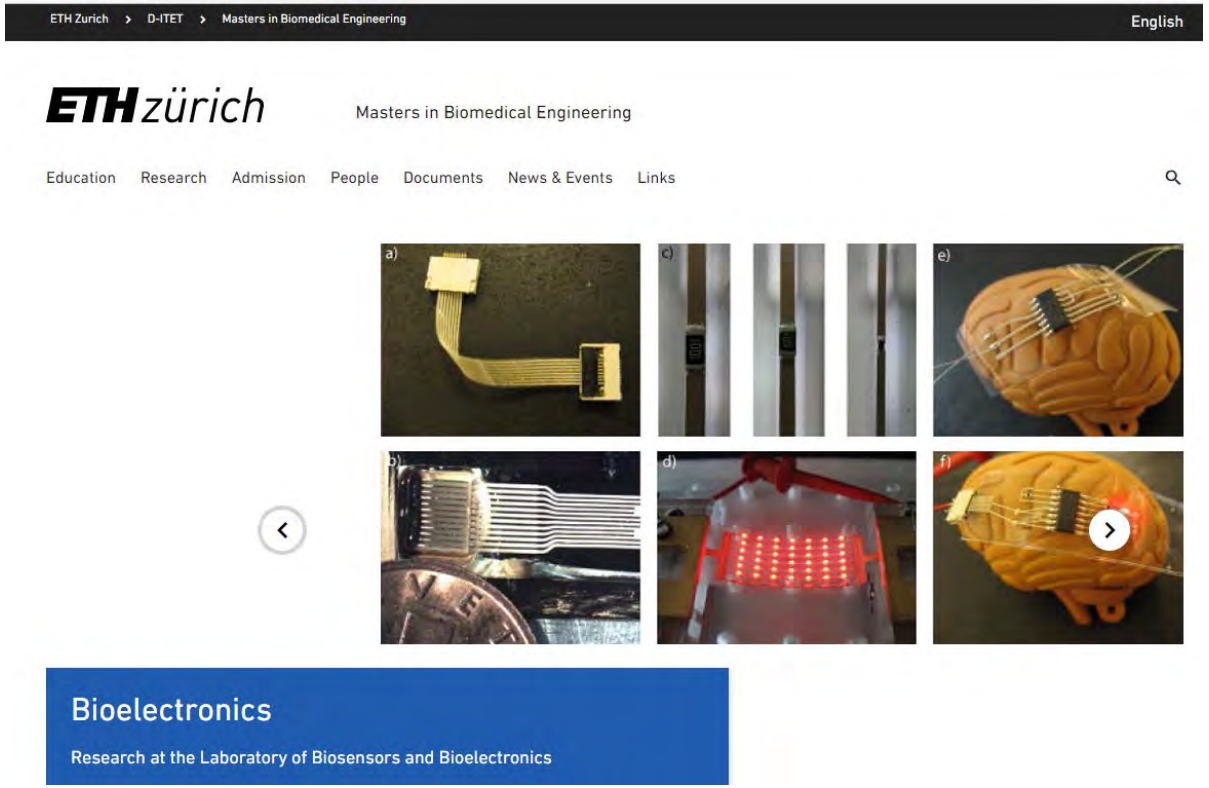
Need to be supervised by a Professor from a predefined list

>100 Professors from 9 different departments at ETH Zurich

No approval by track advisor required

Questions?

- This presentation can be downloaded from our website:
  - http://www.master-biomed.ethz.ch/



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BIOMEDICAL ENGINEERING

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Dr. Christian Frei
Coordinator MSc Biomedical Engineering
frei@biomed.ee.ethz.ch

ETH Zürich
D-ITET
Gloriastrasse 37/39, GLC F 12.2
8092 Zürich