

MSc Biomedical Engineering

ETH zürich

**BIOMEDICAL
ENGINEERING**

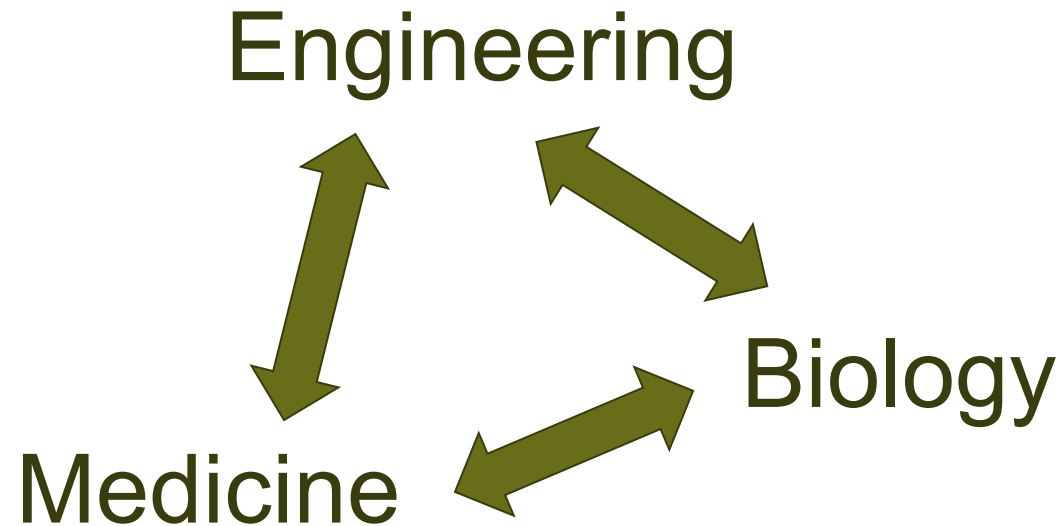


MSc Biomedical Engineering

- Coordinator
Christian Frei



MSc BME: Research and Education at the Interface of Engineering Sciences, Medicine and Biology



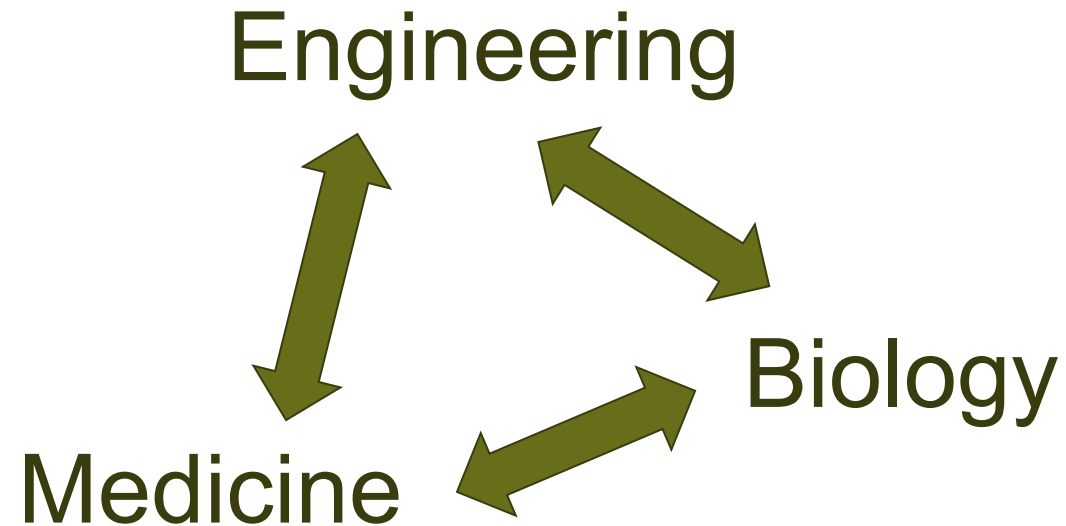
Five tracks:

- Bioelectronics
- Bioimaging
- Biomechanics
- Medical Physics
- Mol. Bioengineering

Four departments:

- D-ITET (leading house)
- D-HEST
- D-MAVT
- D-PHYS

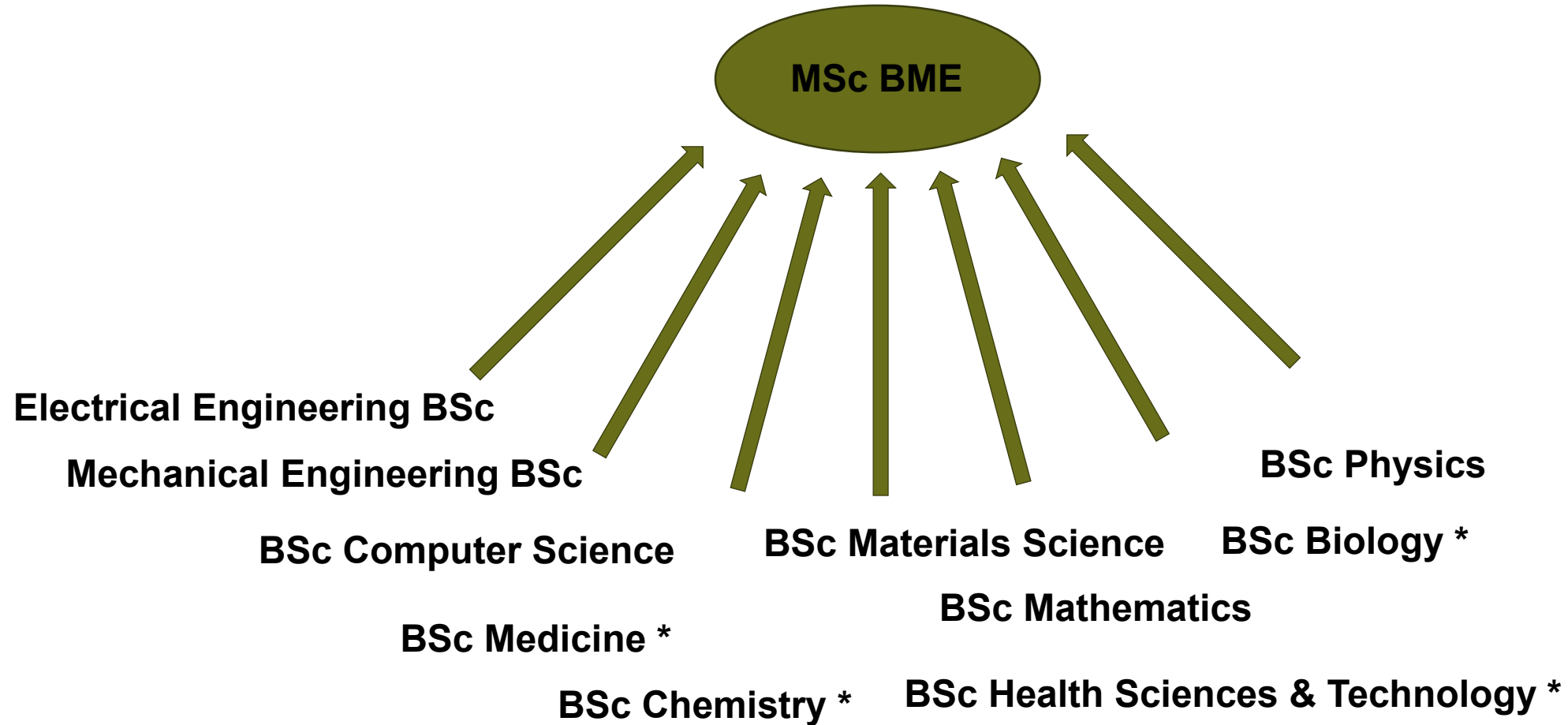
MSc BME: Research and Education at the Interface of Engineering Sciences, Medicine and Biology



International program:

- Ø 2013-2020: 42 new students/year
- Ø 2013-2020: 50.7% CH-Bachelors

MSc BME: Qualifying BSc Degrees

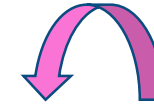


*: does not qualify for all tracks

MSc Biomedical Engineering is a 120 CP Master

- **Track Courses**
 - Core courses of specialization (min. 12 cp)
 - Elective courses of specialization (-- cp)
 - Biology courses (-- cp)
- **Semester Project** **12 credits**
- **Additional Research Projects and/or Track Courses** **min. 24 credits**
 - Semester project (min. 12 cp)
 - Group- and Research projects (up to 24 cp)
 - Internship in industry (12 cp)
- **Science in Perspective (D-GESS)** **min. 2 credits**
- **Master Thesis** **30 credits**

min. 52 credits



Learning agreement
with track advisor

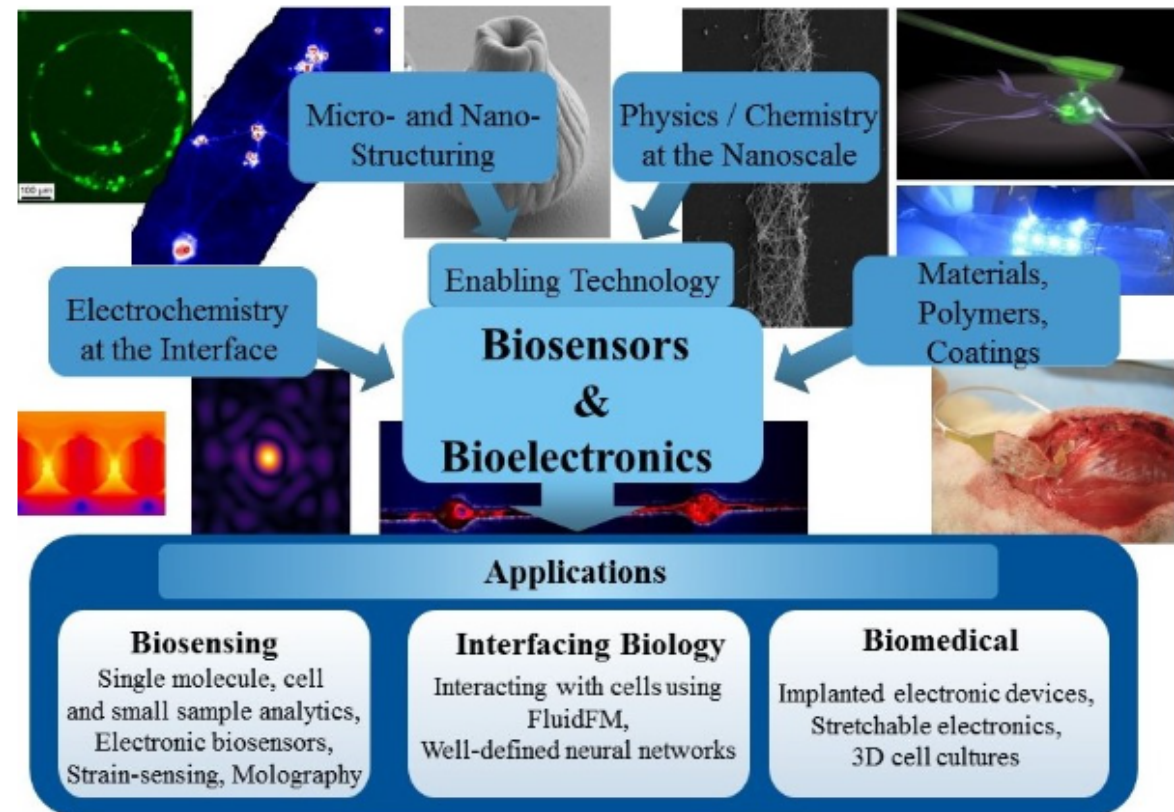
Track Bioelectronics

- Track advisor

Prof. Janos Vörös



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.

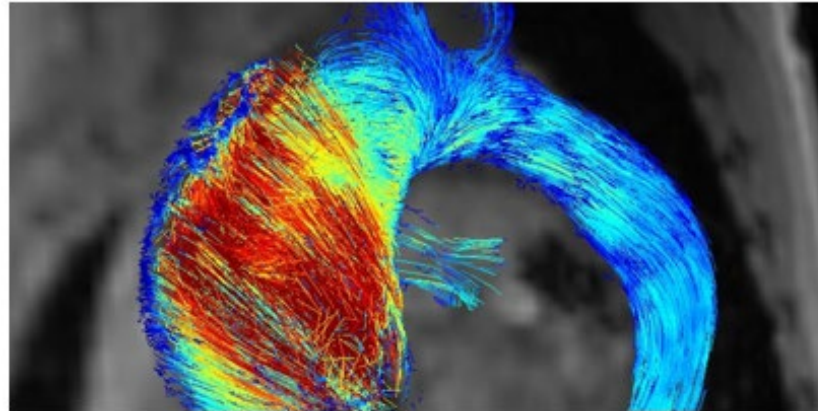


Track Bioimaging

- Track advisor
Prof. Klaas Prüssmann



Blood flow in the aorta



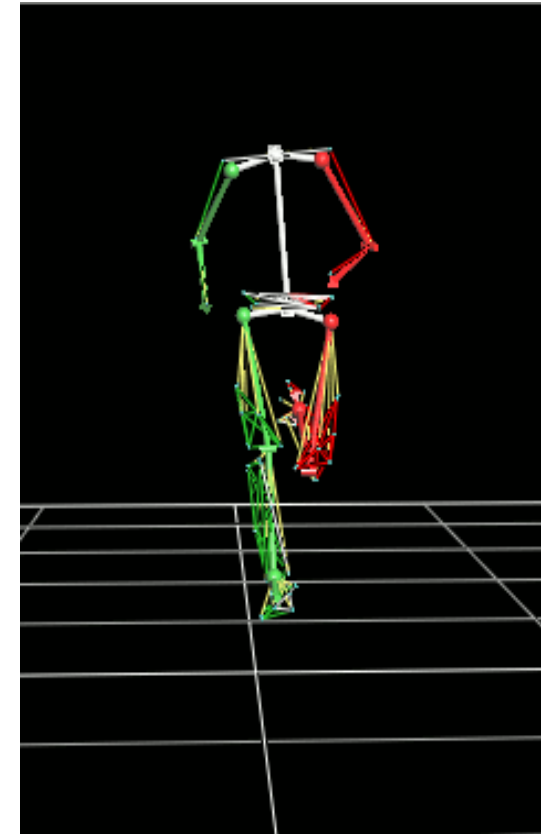
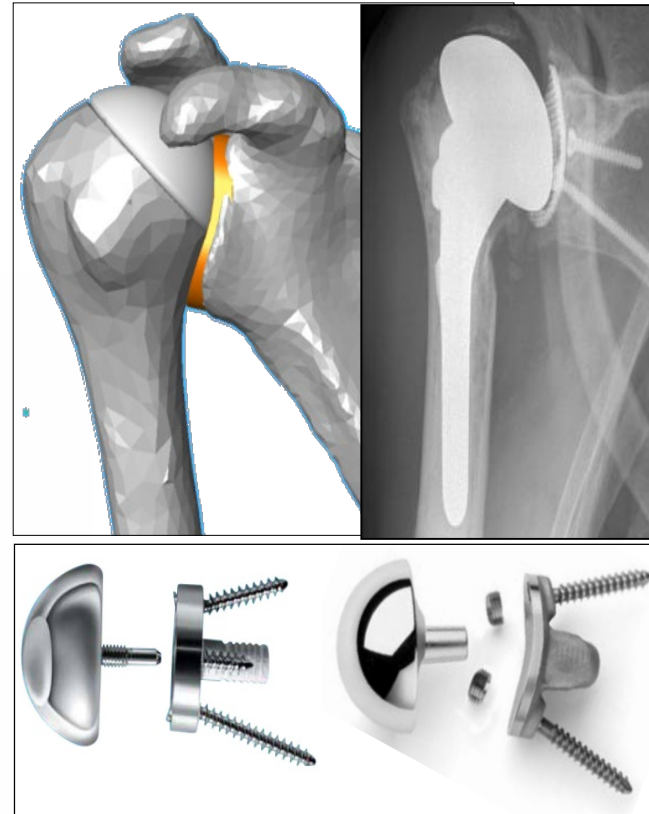
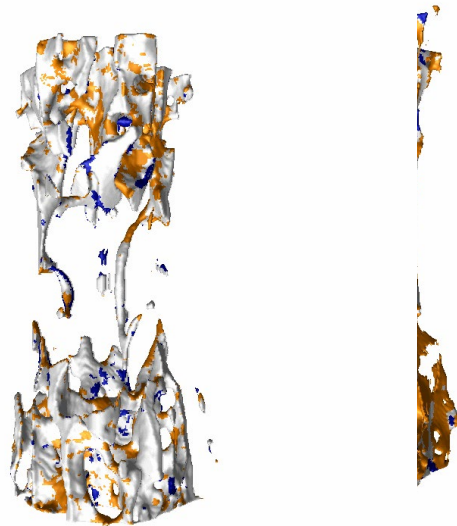
MRI technology



Connectivity in the brain

Track Biomechanics

- Track advisor
Prof. Ralph Müller



Track Medical Physics

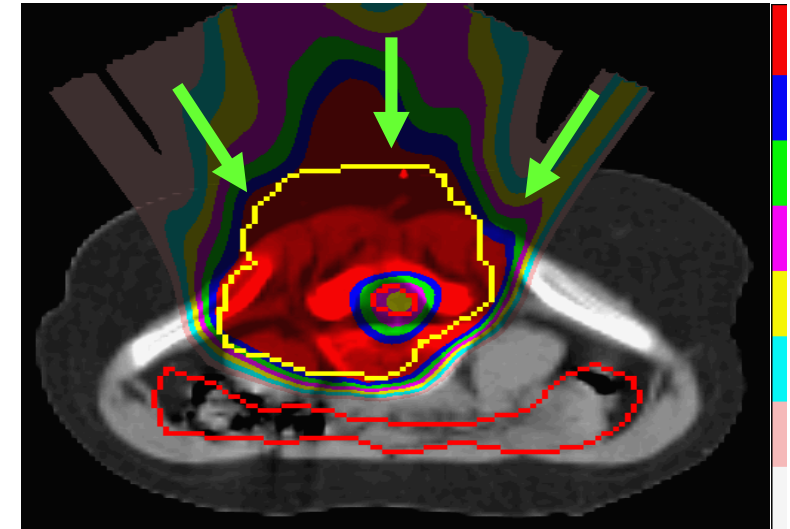
- Track advisors

Prof. Tony Lomax

Prof. Marco Stampanoni



Paul Scherrer Institute, Villigen



The MSc runs in parallel with the MAS (Master of advanced studies) in Medical Physics

Fachanerkennung *Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik (SGSMP)*

Track Molecular Bioengineering

- Track advisor

Prof. Marcy Zenobi



BioFabrication

- 2-Photon Polymerization
- Electrospinning
- Bioprinting

Therapeutic Approach

- Inflammatory Pathway Knockdown
- Oxygen Tension
- Drug Delivery

TISSUE REGENERATION

Cells for Regeneration

- Chondroprogenitors
- Mesenchymal Stem Cells
- Chondrogenic Reporters
- Neural Stem Cells

BioMaterials

- ECM Scaffolds
- QuickStick Adhesion
- Sulfated Biopolymers
- Neuron Hydrogels

How to enter our program

- Application through the Rectorate (Admission's office)
- November 15 - December 15, or March 1 - March 31
- Start of the MSc: Autumn semester

- Documents required:
- Bachelor degree (the same rules apply as in your consecutive BSc)
- Transcripts (Pdf of «Leistungsübersicht» from mystudies)
- Motivation letter, CV, GRE (Graduate Record Examinations; suggested) and two letters of reference (ETH/EPFL-Bachelors are exempt)
- Holders of a Swiss matriculation certificate (Matura) and/or an ETH Bachelor: No English language certificate required

Qualifying Bachelor degrees

Note: minimal requirements in mathematics/physics

a. For admission to the tracks “Bioelectronics” and “Bioimaging”:

- Electrical Engineering
- Mechanical Engineering **min. 30 cp**
- 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: **min. 22 cp**
- 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 **min. 10 cp**
- 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 **min. 22 cp**
- Chemistry
- Health Sciences and Technology
- Life Sciences and Technology
- Medicine

www.master-biomed.ethz.ch

The screenshot shows the website header with the ETH zürich logo and navigation links for 'Student portal', 'Alumni association', 'Login', 'Contact', and 'en'. The main title is 'Masters in Biomedical Engineering' under the 'Department of Information Technology and Electrical Engineering'. A navigation bar includes 'Education', 'Research', 'Admission', 'People', 'Documents', 'News & Events', and 'Links'. A breadcrumb trail reads 'ETH Zurich > D-ITET > Masters in Biomedical Engineering'. The main content area features a video player with a green-tinted image of 3D-printed fluorescent tubes, titled 'Molecular Bioengineering' with the subtitle '3D-printed fluorescent tubes'. To the right, a green sidebar contains the text: 'Biomedical Engineering is an exciting and growing field which resides at the interfaces between engineering, biology and medicine. The broad goal of biomedical engineering is to solve human health problems through advances in diagnosis, treatment and/or prevention of human disease.'



BEEZ student's association

