



# Master your Master!

Find out more about your favourite Master's programme in engineering and technology at ETH Zurich



**Christian Frei**

**Coordinator MSc BME**

**ETH zürich**

**BIOMEDICAL  
ENGINEERING**



## MSc Biomedical Engineering (BME)

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



ETH zürich

**Student representatives (BEEZ):**

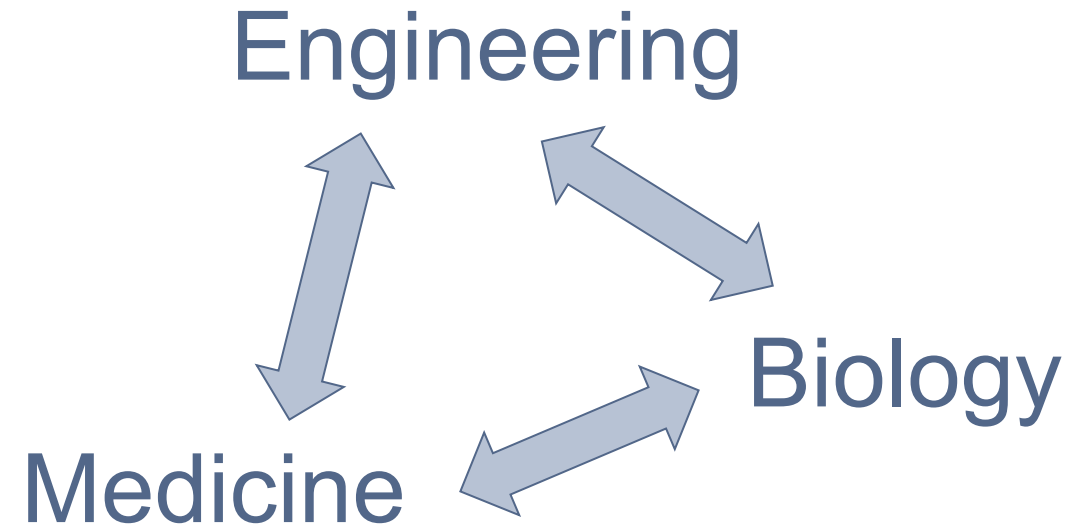
- **Walter Bernardi** (Bioelectronics)
- **Eylul Ceylan** (Biomechanics)
- **Gian Guido Parenza** (Medical Physics)
- **Leila Gastli** (Bioimaging)
- **Luca Pricolo** (Mol. Bioengineering)

**BIOMEDICAL  
ENGINEERING**

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**Our mission: highest quality of research and education at the interfaces of engineering, biology and medicine**



# MSc Biomedical Engineering: five tracks

- Bioelectronics
  - Bioimaging
  - Biomechanics
  - Medical Physics
  - Molecular Bioengineering
- 
- Ø 2013-2019: 39 new students/year
  - Ø 2013-2019: 50.7% CH-Bachelors

**ETH** zürich

**BIOMEDICAL  
ENGINEERING**

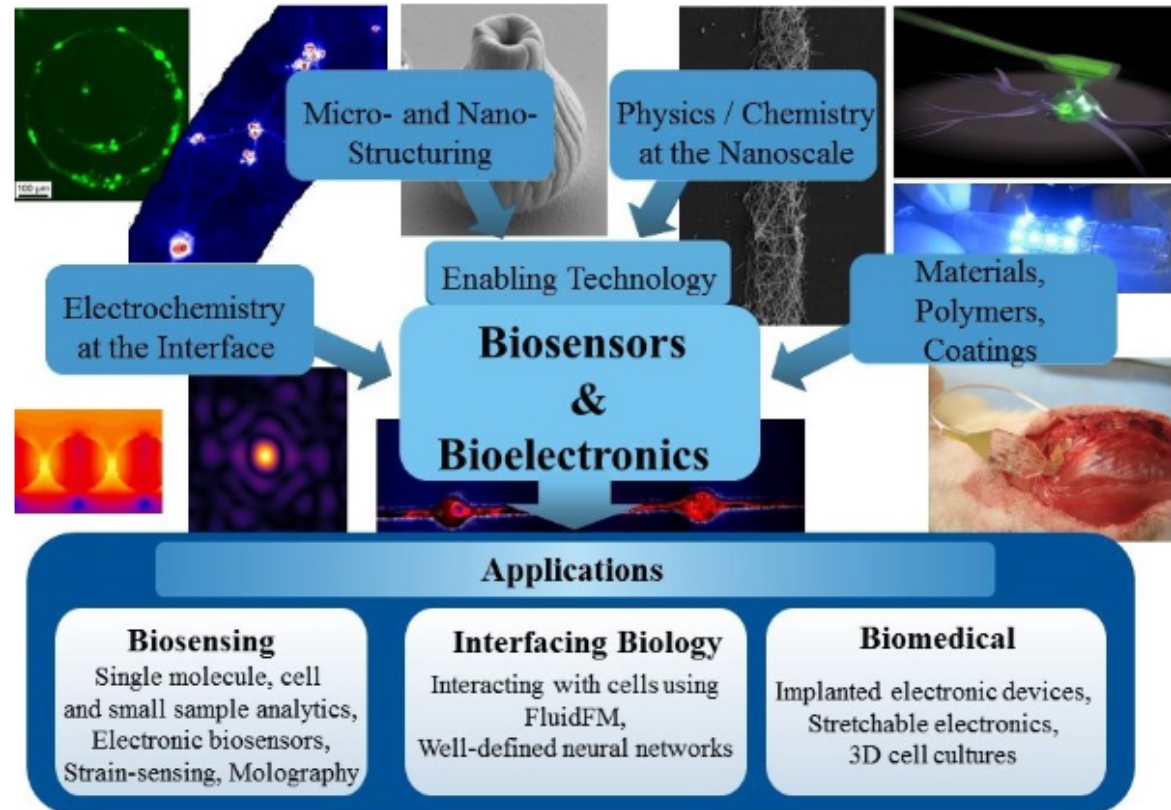


# Track Bioelectronics

- 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.

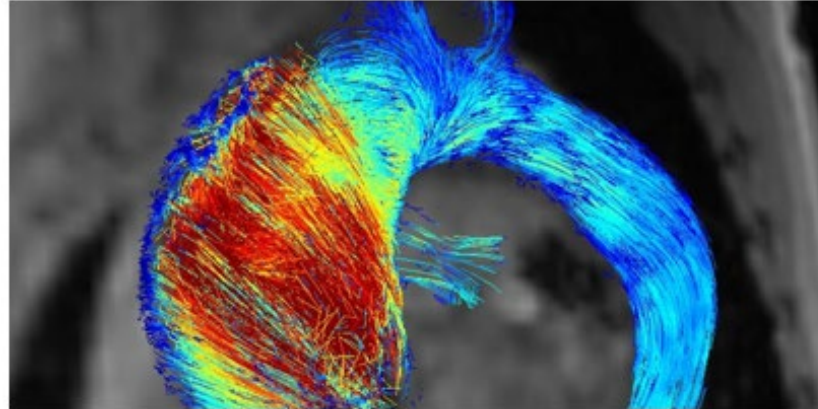


# Track Bioimaging

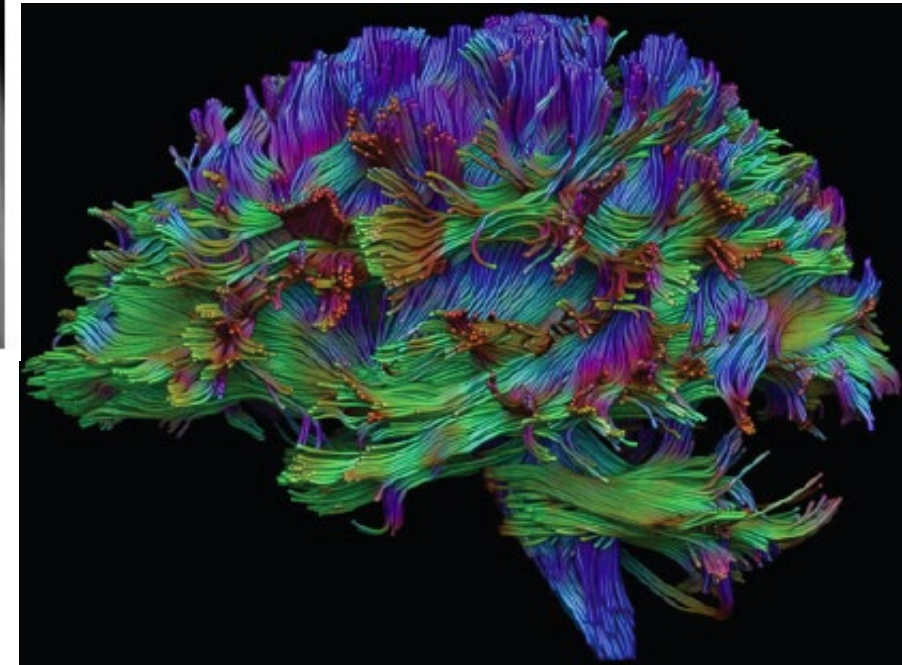
- Track advisor  
Prof. Klaas Prüssmann



Blood flow in the aorta



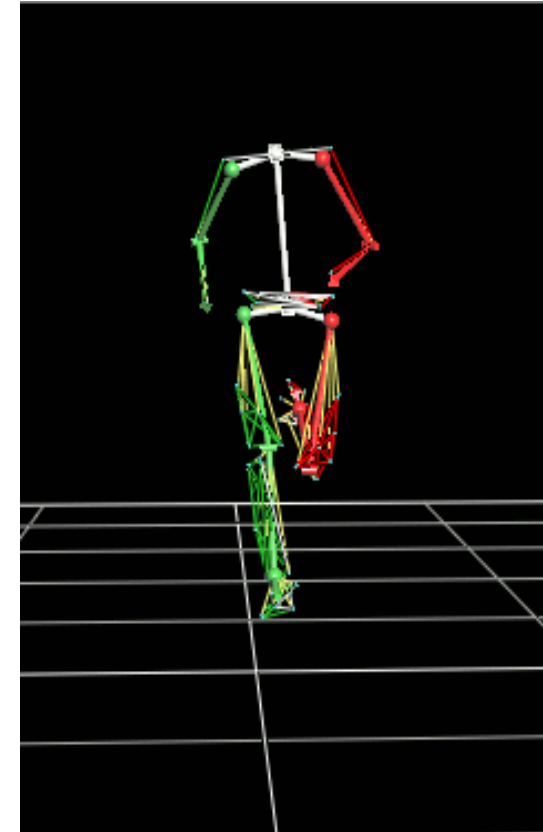
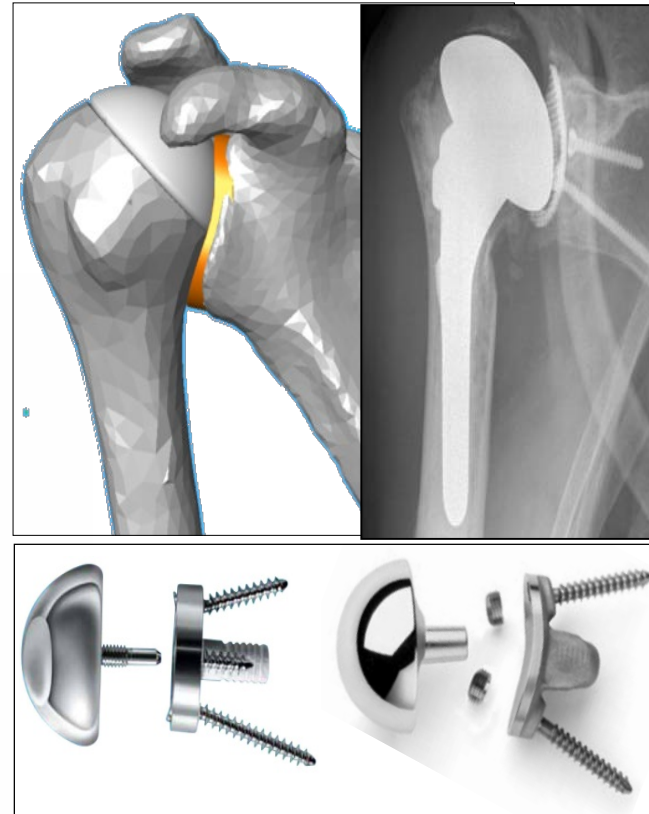
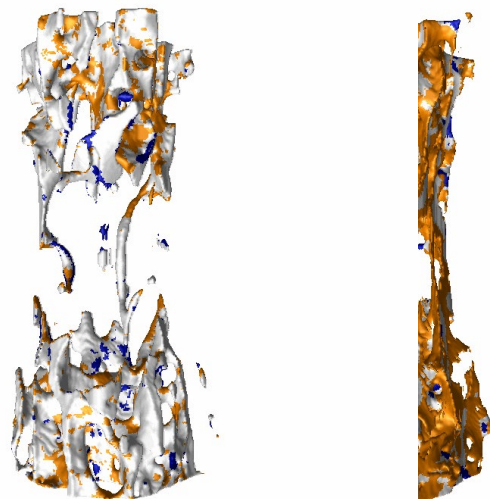
MRI technology



Connectivity in the brain

# Track Biomechanics

- Track advisor  
Prof. Ralph Müller





# Track Medical Physics

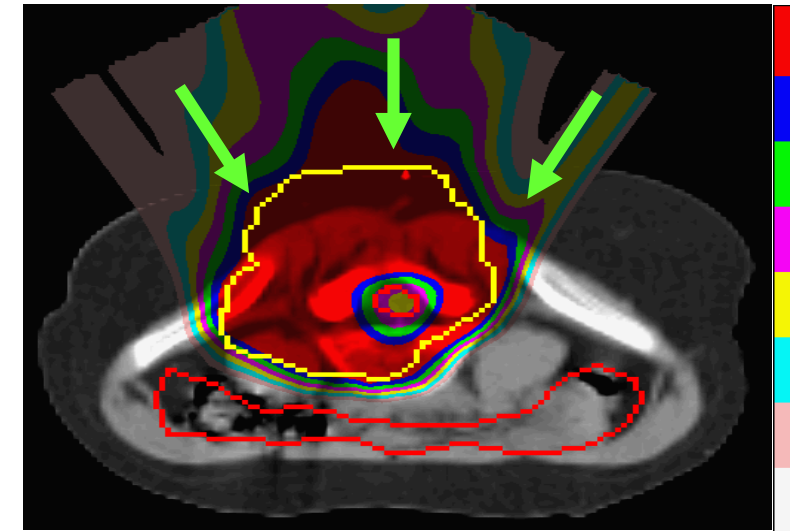
- Track advisors

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

Merkblatt für an der ETH Zürich immatrikulierte Bachelor-Studierende

## Übertritt vom ETH Bachelor- ins ETH Master-Studium zum Herbstsemester 2020 und Frühjahrssemester 2021

### Übersicht

1. Vier Varianten des Übertritts in einen Master-Studiengang
2. Zeitpunkt des Übertritts
3. Zwischensemester/-jahr vor Beginn eines konsekutiven Master-Studiums
4. Am häufigsten gestellte Fragen

### Kapitel 1 Vier Varianten des Übertritts in einen Master-Studiengang

Für den Übertritt ins ETH-Master-Studium mit einem ETH-Bachelor-Diplom oder nach Erreichen der Mindestanzahl Kreditpunkte in einem ETH Bachelor-Studiengang gibt es vier Varianten. Der Übertritt ist für diese **vier Varianten** unterschiedlich geregelt:

**Variante 1: Übertritt in einen konsekutiven Master-Studiengang ohne Wechsel der Studienrichtung**

s. Seite 2

Die Mehrzahl der Studierenden tritt nach dieser Variante in einen an ihr Bachelor-Studium anschliessenden konsekutiven Master-Studiengang ein.

**Variante 2: Übertritt in einen konsekutiven Master-Studiengang mit Wechsel der Studienrichtung**

s. Seite 4

**Variante 3: Übertritt in einen spezialisierten Master-Studiengang oder in einen Joint Master-Studiengang mit Einreichung der Bewerbung an der ETH, s. Seite 5.**

**Variante 4: Übertritt in einen Joint Master-Studiengang mit Einreichung der Bewerbung an einer anderen Hochschule, s. Seite 6.**

# How to enter our program

- Application through the Rectorate (Admission's office)
- November 1 - 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-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

# How to enter our program

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

# MSc Biomedical Engineering is a 120 CP Master

- a. Specialization courses
  - Core courses of specialization (min. 12 cp)
  - Elective courses of specialization (-- cp)
  - Biology courses (-- cp)
- b. Projects and practicals
  - Semester project (min. 12 cp)
  - Group- and Research projects (24 cp)
  - Internship in industry (12 cp)
- c. Science in Perspective (D-GESS)
- d. Master Thesis

min. 52 credits

Learning agreement  
with track advisor

min. 12 credits

min. 2 credits

30 credits

- The minima of compulsory cp sum up to 96 cp. The remaining 24 cp can be obtained from categories a. and/or b. (but not c. and d.).

The screenshot shows the website interface for the Masters in Biomedical Engineering at ETH Zurich. The top navigation bar includes 'Student portal', 'Alumni association', 'Login', 'Contact', and 'en'. A search bar and a 'Departments' dropdown menu are also present. The main header features the 'ETH zürich' logo and the text 'Department of Information Technology and Electrical Engineering'. Below this, the title 'Masters in Biomedical Engineering' is displayed, followed by a menu with categories: 'Education', 'Research', 'Admission', 'People', 'Documents', 'News & Events', and 'Links'. A breadcrumb trail indicates the current location: 'ETH Zurich > D-ITET > Masters in Biomedical Engineering'. The main content area is split into two sections: a video player on the left and a text block on the right. The video player shows a close-up of 3D-printed fluorescent tubes with the title 'Molecular Bioengineering' and subtitle '3D-printed fluorescent tubes'. The text block on the right describes Biomedical Engineering as an exciting field at the intersection of engineering, biology, and medicine, aimed at solving human health problems.

