

MSc Biomedical Engineering Orientation 2017



Who we are



Christian Frei

- Coordinator MSc Biomedical Engineering



Reto Kreuzer

- Coordinator of studies D-ITET
- Note: D-ITET is the leading department. Also involved: D-HEST, D-MAVT and D-PHYS

Who we are



- Specialized Master of Science (MSc) Program
Biomedical Engineering
- Education and research in 5 different tracks
 - Bioelectronics
 - Bioimaging
 - Biomechanics
 - Medical Physics
 - Molecular Bioengineering

Track Advisors



Tony Lomax



Marco Stampanoni
Medical Physics



Klaas Prüssmann
Bioimaging



Ralph Müller
Biomechanics



Janos Vörös
Bioelectronics



Marcy Zenobi-Wong
Molecular Bioengineering

Who we are

- BEEZ: Biomedical Engineering Student Association



- AMIV: Student's Association of D-ITET and D-MAVT



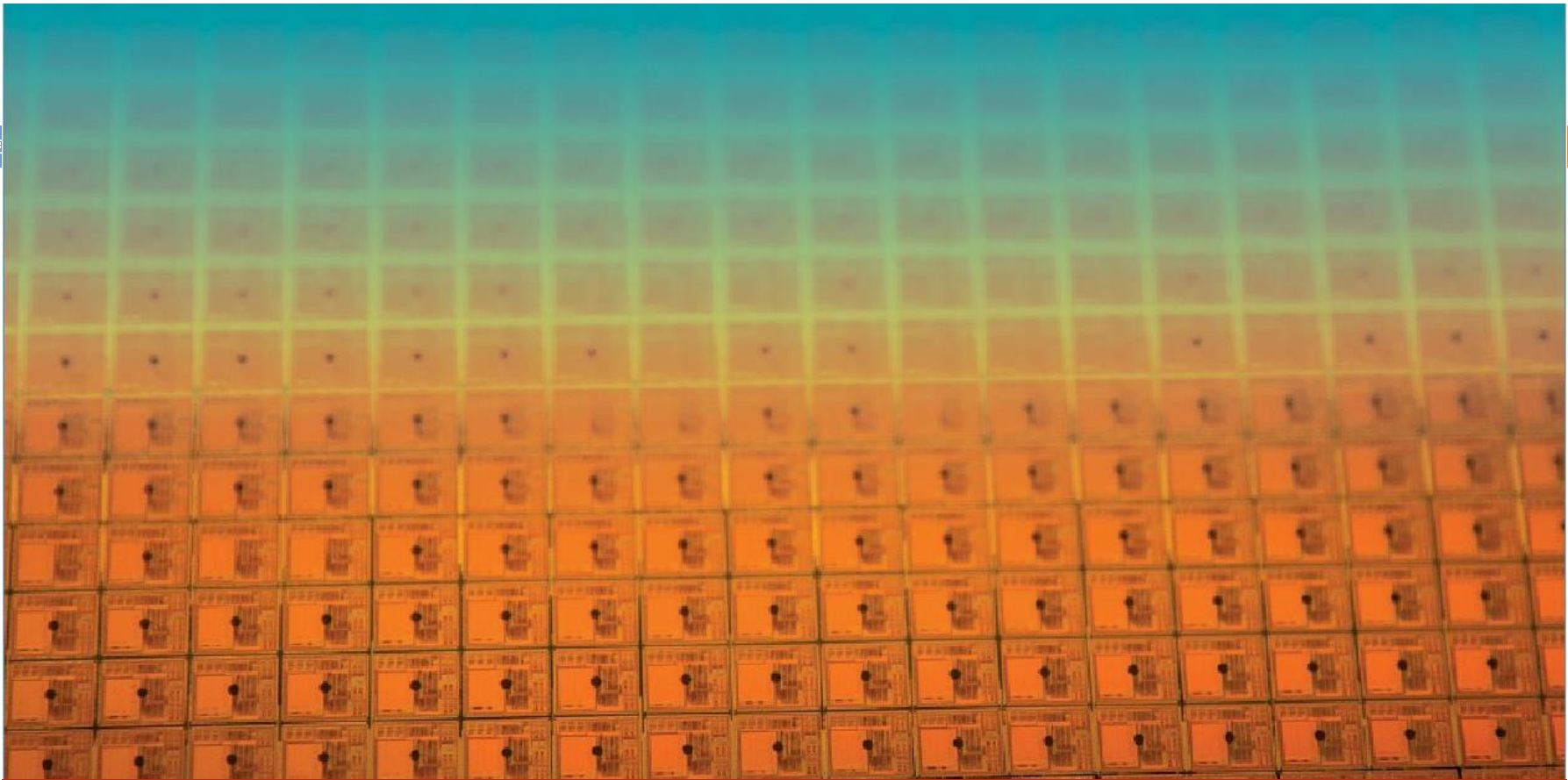
amiv



Tobias Hagen

Incoming Class

- 45 students *
- Austria (1), Canada (2), China (2), France (2), Germany (2), Greece (3), Iceland (1), Italy (2), Saudi Arabia (1), Switzerland (23), Serbia (1), Turkey (2), UK (2) and USA (1)
- 21 ETH Bachelors



Courses, Credits and Exams

Your studies are subject to regulation

- **Study regulations** (mostly available in German only)

www.rechtssammlung.ethz.ch (complete collection, German)

www.master-biomed.ethz.ch > Documents (BME regulations in English)

- **Rector's Directives** (some available in German only)

www.ethz.ch/students > Studies > Legal basis > Directives Collection

International students, please contact Ms Annina Wanner at the Rectorate (HG F 22.3) or the Department Secretariat (ETZ H 85) for help on regulations.

Reminder: students online portal



Your administrative duties on www.mystudies.ethz.ch:

- **Enrollment to courses and exams**
 - Register for each semester until the end of the second week.
 - Register for **courses** (early in the semester; you need to be registered for a course to enroll for an exam)
 - Submit a **study plan/tutor agreement** (until the **end of the 4th week**).
 - Enroll for **exams** – please enroll during the **3rd and 4th week** of the semester (withdrawal possible until very late).

- **Notify us of your address changes**

- **Read your E-Mails!**

How to choose / enroll for your lectures?

- **Consult your track advisor!**
- **Overview of lectures to choose from:**
<http://www.master-biomed.ethz.ch/education>
- **Course catalogue:**
www.vvz.ethz.ch > Programme > Biomedical Engineering Master
- **Enrollment through the online-portal:**
www.mystudies.ethz.ch

Enrolling for courses in BME



- **All** courses you wish to **count** towards your Master Diploma must be enrolled for (both the course and the exam).
- Only courses agreed upon with the **track advisor** will count.
- In particular, do not forget to enroll for the **Semester Project** and the **Master Thesis**.

Performance Assessments (examinations)



Three types of performance assessments:

1. Session examinations (Note registration/deregistration deadlines)
(Winter session: January/February – Summer session: August)
2. End-of-semester examinations (Note registration/deregistration deadlines)
3. Graded/ungraded semester performance (e.g. semester project or internship in industry) (Note minimum/maximum allowed time)

Where to find the type of examination and allowed (written) aids?

- Course catalogue > see "Performance assessment"
- Personal exam schedule in myStudies (for session examinations)
- Lecturer/examiner

Course Requirements

- □ Track Courses 50 CP
 - Track Core Courses, at least 12 CP
 - Recommended Elective Courses
 - Biology Courses
- Semester Project 8 CP
- Master Thesis 30 CP
- Humanities (GESS/SIP) 2 CP
- **Total** **90 CP**

Lectures: Track Courses

ETH zürich

Department of Information Technology and Electrical Engineering

Masters in Biomedical Engineering

Student portal
Alumni association

Login | Contact | en

Keyword or person

Departments

Education Research Admission People Documents News & Events Links

ETH Zurich → D-TET → Masters in Biomedical Engineering →

Bioelectronics

Biomechanics

Bioimaging

Medical Physics

Molecular Bioengineering

Requirements

Individual Study Plan

Semester Project

Master Project

GESS Courses

Bioelectronics

The track **Bioelectronics** provides in-depth knowledge of the development and use of instruments and signal processing theory to measure physical, physiologic or biologic signals in humans and other living organisms. The development of instrumentation is based on technologies including bioMEMS, micro- and nanosystems, biophotonics, sensors, optics and micro-fluidics. These technologies are applied to a wide array of instruments and devices including hearing aids, biosensors, labs-on-a-chip, and electrograms.

Advisor Track Bioelectronics

ETH Zurich
Inst. f. Biomedizinische Technik
Prof. Dr. Janos Vörös
Deputy head of Institute for Biomedical Engineering
ETZ F 82
Gloriastrasse 35
8092 Zürich
Switzerland

+41 44 632 59 03 →

+41 44 632 11 93 →

janos.voros@biomed.ee.ethz.ch →

Schedule Bioelectronics



Schedule Bioelectronics
2017 (PDF, 201 KB) ↓



2017 BME
Brochure
(PDF, 771
KB) ↓

Core courses, spring semester 2017

Number	Unit	Lecturer
227-1032-00L	Neuromorphic Engineering II →	T. Delbrück, G. Indiveri, S.-C. Liu

Recommended elective courses, spring semester 2017

Number	Unit	Lecturer
151-0172-00L	Devices and Systems →	C. Hierold, A. Hierlemann, C. J. Berman



MSc in Biomedical Engineering "Bioelectronics Track"

last update: May 31, 2017

Autumn semester 2017

Track Core Courses Recommended Elective Courses Biology Courses

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:00		Physiology and Anatomy Biomedical Engineers I			
09:00		Rehabilitation Engineering II	Biomedical Engineering		Biocompatible Materials
10:00	Frontiers in Nanotechnology	Cross-Disciplinary Research & Development		Introduction to Neuroinformatics	Signal and Information Processing: Modeling, Filtering, Learning
11:00				Micro-robotics	Analog Integrated Circuits
12:00		Biomicrofluidic Engineering		Nano-systems	
13:00	Neuromorphic Engineering I	Biomedical Imaging	Bioelectronics and Biosensors	Cell and Molecular Biology Engineers I	Physics in Medical Research: From Atoms to Cells
14:00			Biological Engineering and Biotechnology	Image Analysis and Computer Vision	Frontiers in Nanotechnology
15:00			Micro/Nanotechnology Microfluidics for Biomedical Applications	Energy Conversion and Transport in Biosystems	Analog Integrated Circuits
16:00	Micro-robotics			Micro-systems I: Process Technology and Integration	
17:00		Bio-microfluidic Engineering		Biological Methods Engineers (Basic Lab)	Energy Conv. and Transport Biosys.
18:00					

Spring semester 2017

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:00		Physiology Anatomy for Biomedical Engineers II	Appropriate Health System Design		Rehabilitation Engineering I
09:00		Rehabilitation Engineer. I		Quantitative Big Imaging: From Images to Statistics	
10:00	Elements of Microscopy	Biomedical Photonics		Nono-robotics	Principles in Tissue Engineering
11:00		Nano-robotics		Development strategies Medical Implants	Physics Against Cancer: The Physics of Imaging...
12:00				Measuring on the Nanometer Scale	Advanced Topics in Control
13:00					Physics Against Cancer: ...
14:00	Orthopaedic Bio-mechanics			Cell and Molecular Biology for Engineers II	
15:00	Computer Simulations of Sensory Systems		Finite Element Analysis in Biomedical Engineer.	Devices and Systems	Physics in Medical Research: From Humans to Cells
16:00		Advanced Topics in Control			
17:00		Neuromorphic Engineering II			
18:00					

June 2017: Biological Methods for Engineers (Advanced Lab) 227-0949-10L

Note: This list is an informal help for students. The official courses can be seen on the Course Catalogue of ETH (www.vzz.ethz.ch)

Course Catalogue

↓ Courses | ↓ Lecturers | ↓ Time and Place

Start →

Search for Courses

Semester	Autumn Semester 2017 ▼	
Level	Master's Degree Programme ▼	
Department	Information Technology and Electrical Engine ▼	
Structure		
Programme	Biomedical Engineering Master ▼	
Section	▼	
Further criteria		
Course unit	<input type="text"/>	<input type="text"/>
	Title	Number
Lecturer	<input type="text"/>	<input type="text"/>
	Last name	First name
Type	▼	
Language of instruction	▼	
Catalogue data	<input type="text"/>	
Search result	<input type="checkbox"/> without structural information	

Reset ✕

Search →

Important Information

[Academic calendar](#) →
[Starting times](#) →
[Key](#) →

Complete Catalogue

The catalogue of lecturers and the complete schedule can be downloaded for the current and past semesters from the page [Complete Catalogue](#).

Further Events

[Events Calendar](#) →
[Language Center](#) →
[Video Portal](#) →
[Centre for Continuing Education](#) →
[Human Resources](#) →

Search result: Course units in Autumn Semester 2017

[Course units](#) | [Catalogue data](#) | [Courses](#)

<< Page 1 of 6 >> All

Biomedical Engineering Master ⓘ

▶ Track Courses

▶ ▶ Bioelectronics

▶ ▶ ▶ Track Core Courses

| During the Master program, a minimum of 12 CP must be obtained from track core courses.

Number	Title	Type	ECTS	Hours	Lecturers
151-0604-00L	Microrobotics ⓘ	W	4 credits	3G	B. Nelson
151-0605-00L	Nanosystems	W	4 credits	4G	A. Stemmer
151-0621-00L	Microsystems I: Process Technology and Integration ⓘ	W	6 credits	3V + 3U	M. Haluska, C. Hierold
227-0385-10L	Biomedical Imaging	W	6 credits	5G	S. Kozerke, K. P. Prüssmann
227-0386-00L	Biomedical Engineering ⓘ	W	4 credits	3G	J. Vörös, S. J. Ferguson, S. Kozerke, U. Moser, M. Rudin, M. P. Wolf, M. Zenobi-Wong
227-0393-10L	Bioelectronics and Biosensors	W	6 credits	2V + 2U	J. Vörös, M. F. Yanik, T. Zambelli
227-0427-00L	Signal and Information Processing: Modeling, Filtering, Learning ⓘ	W	6 credits	4G	H.-A. Loeliger
227-1037-00L	Introduction to Neuroinformatics ⓘ	W	6 credits	2V + 1U	V. Mante, M. Cook, B. Grewe, G. Indiveri, K. A. Martin
376-1714-00L	Biocompatible Materials	W	4 credits	3G	K. Maniura, J. Möller, M. Zenobi-Wong
402-0674-00L	Physics in Medical Research: From Atoms to Cells ⓘ	W	6 credits	2V + 1U	B. K. R. Müller

▶ ▶ ▶ Recommended Elective Courses

| These courses are particularly recommended for the Bioelectronics track. Please consult your track advisor if you wish to select other subjects.

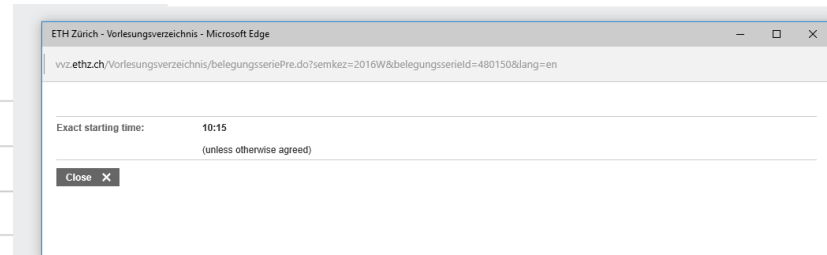
Number	Title	Type	ECTS	Hours	Lecturers
227-0166-00L	Analog Integrated Circuits ⓘ	W	6 credits	2V + 2U	Q. Huang
227-0447-00L	Image Analysis and Computer Vision ⓘ	W	6 credits	3V + 1U	L. Van Gool, O. Göksel, E. Konukoglu
227-0468-00L	Analog Signal Processing and Filtering ⓘ	W	6 credits	2V + 2U	H. Schmid

Course Catalogue

[Courses](#) | [Lecturers](#) | [Time and Place](#)[Start →](#)

151-0604-00L Microrobotics


Semester	Autumn Semester 2017
Lecturers	B. Nelson
Periodicity	yearly course
Language of instruction	English



Catalogue data | **Performance assessment** | Learning materials | **Courses** | Restrictions | Offered in | Overview

Abstract	Microrobotics is an interdisciplinary field that combines aspects of robotics, micro and nanotechnology, biomedical engineering, and materials science. The aim of this course is to expose students to the fundamentals of this emerging field. Throughout the course students are expected to submit assignments. The course concludes with an end-of-semester examination.
Objective	The objective of this course is to expose students to the fundamental aspects of the emerging field of microrobotics. This includes a focus on physical laws that predominate at the microscale, technologies for fabricating small devices, bio-inspired design, and applications of the field.
Content	Main topics of the course include: <ul style="list-style-type: none">- Scaling laws at micro/nano scales- Electrostatics- Electromagnetism- Low Reynolds number flows- Observation tools- Materials and fabrication methods- Applications of biomedical microrobots
Lecture notes	The powerpoint slides presented in the lectures will be made available as pdf files. Several readings will also be made available electronically.
Prerequisites / Notice	The lecture will be taught in English.

Course Requirements

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 -  - Biology Courses
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- **Total** **90 CP**

Biology Courses

- Cell and Molecular Biology for Engineers
- Anatomy and Physiology for Biomedical Engineers
- Biological Methods for Engineers Basic Lab (December)
- Biological Methods for Engineers Extended Lab (June)

These courses should only be taken by students that do not have prior knowledge in these topics

Individual Study plan

- Contains all core courses, recommended elective courses and biology courses
- Track Medical Physics: Select Tutor
- All other tracks: the track advisor is preselected as the tutor



The screenshot shows the 'myStudies' portal interface. At the top, there is a blue header with the ETH logo and 'myStudies' text. Below the header, there is a navigation bar with 'Welcome - Matriculation [JSP: /studImmatrikulation.jsp]' and links for 'Help', 'Contact', and 'Logout'. The main content area is titled 'Matriculation' and displays the following information:

- Electrical Engin. + Information Technology MSc**
- Current semester:** Spring Semester 2016, enrolled
- Deadlines: latest possible date**
- Master degree:** End of Spring Semester 2016
- Tutor:** A yellow button labeled 'Select Tutor' is highlighted with a red box.

Below the 'Tutor' section, there is a list of links for various services:

- Register for course units and courses: [Course registration](#)
- Register, view and change research projects, papers and Master's theses: [Projects/papers/theses](#)
- Register for examinations or withdraw from examinations; registration deadline is 2016.07.25: [Examinations](#)
- Show transcript of records and assign performance assessments to categories: [Transcript of records](#)
- Compose your individual learning agreement in accordance with your tutor: [Learning Agreement](#)
- Show and print study overview and course attendance confirmation sheets: [Studies overview](#)
- Request for degree certificate: [Degree request](#)

At the bottom, there is a 'Contact' section with the following text:

Contact
For administrative questions, please contact the [Registrar's Office](#), Tel. 044 632 30 00
For programme specific questions, please contact your Study Administration Office.
> <https://www.ethz.ch/students/en.html>

Individual Study plan

myStudies: called "Learning Agreement"

- Discuss your choice with the track advisor, edit and submit the list in *myStudies* by the end of the fourth week of the semester



Learning Agreement of Arnold Zürcher (In process)

Programme regulations	Master's Programme in Electrical Engineering and Information Technology
Tutor	Prof. Dr. J. Reymond

The student has to discuss the Learning Agreement (also known as "Tutor Agreement") with the tutor/track advisor before submitting it in myStudies. The Learning Agreement must be submitted in myStudies and approved by the tutor/track advisor no later than 4 weeks after the start of program (usually the fall semester).

The Learning Agreement can be updated during the study period, but needs to be in the final version before the start of the Master thesis.

Note: The fields concerning the "Mentor" (see next step) must be left empty.

Completion of mandatory courses	Treatment of mandatory courses.
Not regular	Category assignment disagrees with official Course Catalogue.
Changes	New: Newly added, Moved: Moved to another category, Modified: Text modified, for external courses only.

Category	Registered	Title	ECTS credits			Completion of mandatory course	Not regular	Changes
			Planned	Needed	Missing			
Major Courses			42	42				
Print			Delete					
Edit			Submit			Back		

- Only these courses can be accounted for the final degree

Course Requirements

- Track Courses 50 CP
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- □ Master Thesis 30 CP
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- **Total** **90 CP**


Semester/Master Projects

- Semester Project 14 week 50% or 7 weeks 100%
- Master Project, 6 months, 100%

- Register with *myStudies*

- Projects must be supervised by a professor affiliated with one of the 4 participating departments: D-ITET, D-HEST, D-MAVT or D-PHYS

Course Requirements

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 - Track Core Courses, at least 12 CP
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- **Total** **90 CP**

GESS/SIP (Science in Perspective)

ETH zürich

Student portal | Login | Contact | de en
Alumni association
D-GESS Intranet

Keyword or person
Departments

Department of Humanities, Social and Political Sciences

News & Events | The Department | Research | Studies | Doctoral Studies | Continuing Education | Information & Documents

ETH Zurich → D-GESS →

The D-GESS adds a further perspective to the predominantly scientific-technical orientation of the university's activities, thus contributing to the unique competence profile of ETH Zurich.

[Read more →](#)

Can conflict be predicted?

According to ETH professor Lars-Erik Cederman, modern data science techniques can also be useful in conflict research – but only to a certain degree.

[Read more →](#)

Department of Humanities, Social and Political Sciences
Understanding People - Steering Developments - Grasping Knowledge

A unique profile
With the D-GESS department, ETH Zurich can offer an extraordinary range of research and teaching, which strengthens the university's position. [Learn more about D-GESS →](#)

Contact
ETH Zürich
D-GESS
Haldeneggsteig 4
8006 Zürich
Schweiz
☎ +41 44 632 23 08 →
☎ +41 44 632 10 27 →

Award for D-GESS Researchers
Doc.CH in the humanities and social sciences: the SNSF awards three D-GESS grants
[Read more ↗](#)

Congratulations to:
Felix Karstens (Political Science), **Theresa Leimpek** (Political Science) und **Carl Müller-Crepon** (Political Science)

D-GESS in numbers
23 Professors
47 Bachelor students

Humanities, Social and Political Sciences, GESS/SIP



- The GESS/SIP "Compulsory Elective" courses are mandatory for all students at ETH, all students must earn 2 cp during their MSc studies.
- For language courses, special rules apply (see [directives collection](#)).
- GESS courses are selected and offered by the Department of Humanities, Social and Political Sciences (D-GESS).

Contact: Study admin D-GESS, Viola Gloor, viola.gloor@gess.ethz.ch

On the web: www.gess.ethz.ch

Questions



- Come to us
- This document can be downloaded from the “news & events” section of the BME website:

www.master-biomed.ethz.ch