

15-16.06.23

# SFB 2023

SWISS-FRENCH BIOMATERIALS

YOUNG RESEARCHERS' SUMMER SCHOOL

by the SSB+RM & BIOMAT Young Scientists boards



 ZURICH, ETH

SSB  
+ RM  
Young Scientists

JEUNES CHERCHEURS

BIOMAT

CRÉER RÉPARER RÉGÉNÉRER

## Welcome!

This year's Annual Conference of the European Society for Biomaterials (ESB) will be held in Davos, Switzerland, where the **SSB+RM Young Scientists** will be present to support the event. Last year's edition was held in Bordeaux, France, where the young scientist division of the French association **BIOMAT** were supporting. As both young scientist divisions have been connecting due to this event, the idea came up to co-organize a summer school before this year's big conference. **This summer school will be a two-day event hosted at ETH Zürich in Switzerland on the 15<sup>th</sup> and 16<sup>th</sup> of June 2023.** On each day, there will be an invited keynote speaker presenting their research. In addition, there will be a career path round table with established scientists, as well as industry representatives, with plenty of chances for eager attendees to ask their own burning questions. There will be a soft skill workshop about how to make a compelling abstract and presentation/poster, as well as another workshop about turning ideas into companies. There will be lab tours at different departments at ETH Zürich, the University Hospital Zürich and multiple startup companies, which will allow you to get a glimpse into a new and potential future working environment. Some attendees will also be presenting their own research in rapid fires and poster sessions. Furthermore, there will be multiple opportunities to continue discussions and networking with other attendees and the invited senior speakers during coffee breaks, lunches and the social evening at the reserved bar. We hope that new collaborations between our both countries will birth from this event

We are looking forward to the first SFB summer school and seeing you there!

Best,

**The Young Scientists Boards of SSB+RM and BIOMAT Societies**

Meet the board of BIOMAT and SSB+RM Young Scientists

# TEAM BIOMAT



**CYRIL D'ARROS**  
SPECIALIST INNOVATION SCIENTIST  
Nantes (FR)



**JOANNA BABILOTTE**  
POST-DOC  
Maastricht (NL)



**BAPTISTE CHARBONNIER**  
ATIP-Avenir Junior Group Leader  
Nantes (FR)



**MARJORIE DUFAUD**  
PHD CANDIDATE  
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**AMEL HOUAOUI**  
POST-DOC  
Tampere (FI)



**MATHILDE MAILLARD**  
POST-DOC  
Paris (FR)



**ISABELLE MARTINIER**  
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**BRUNO PAIVA DOS SANTOS**  
LECTURER & RESEARCHER  
Paris (FR)



# TEAM SSB+RM YOUNG SCIENTISTS



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ETH Zurich (CH)



**DAPHNE VAN DER HEIDE**  
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University Hospital Zurich (CH)



**ANTONIO SILEO**  
PHD CANDIDATE  
University of Basel (CH)



**PATRICK WEBER**  
PHD CANDIDATE  
ETH Zurich (CH)



## Programme

Location: ETH Zürich Hauptgebäude (HG) - Room D7.1, Rämistrasse 101, 8006 Zürich  
(information on how to get here you can find on page 16)

Thursday, June 15th 2023

### Morning session

8.30	Registration & poster hanging
9.00	Welcome session
9.15	Keynote speaker #1: Calcium phosphate based bone graft substitutes, influence of the processing and architecture of the porosity on the biological performance <i>Dr. Yassine Maazouz (RMS Foundation, Switzerland)</i>
10.00	Break & poster session
10.30	Round Table Discussion: Paving your career path <i>Dr. Daniela Gunz (Career center University of Zurich, Switzerland)</i> <i>Dr. Tanja Fauti (Roche, Switzerland)</i> <i>Dr. Yassine Maazouz (RMS Foundation, Switzerland)</i> <i>Prof. Martin Ehrbar (University Hospital Zurich, Switzerland)</i>
12.30	Rapid fire presentations
12.45	Lunch & poster session (free lunch will be provided, note that some vegetarian options will be available but other dietary options will unfortunately not be taken into account)

### Afternoon session

14.00	Lab & company visits at different academic/industrial campus sites (more information you can find on page 13)
19.00	Social Evening at Amboss Rampe Zurich (information on how to get here you can find on page 16)

**Friday, June 16th 2023**

**Morning session**

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9.15 Keynote speaker #2: Cell-material interaction: a challenge in biomaterial engineering  
*Dr. Carla Palomino-Durand (University of Lille, France)*

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10.00 Break & poster session

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10.30 Soft Skill Workshop: How to make a compelling abstract & presentation/poster  
*Prof. Mark Tibbitt (ETH Zurich, Switzerland)*

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12.30 Lunch & poster session  
(free lunch will be provided, note that some vegetarian options will be available but other dietary options will unfortunately not be taken into account)

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**Afternoon session**

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13.30 Workshop: Turning ideas into companies  
*Dr. Michio Painter (TDA University of Zurich, Switzerland)*

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15.00 Closing session

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## Abstracts of keynote speakers

### Keynote #1: Calcium phosphate based bone graft substitutes, influence of the processing and architecture of the porosity on the biological performance

**Dr. Yassine Maazouz, Senior researcher at RMS Foundation, Switzerland**



Dr. Yassine Maazouz holds an MSc from the European School of Material Science and Engineering (EEIGM, Université de Lorraine, France) and a PhD degree in Materials Science from the UPC (Technical University of Catalonia, Spain). His PhD dealt with low temperature 3D printed calcium phosphate scaffold by robocasting. He is an expert on calcium phosphate based bone graft substitutes and is trained and experienced in both academic and industrial R&D. His experience ranges from material science to preclinical and clinical research on biomaterials. He is co-author of more than 19 articles and participated in many international conferences as a speaker. Dr. Yassine Maazouz is co-founder of Mimetis Biomaterials a spin-off company of the UPC that was recently sold to the Swiss based dental implant multinational Nobel Biocare AG; he has acted as CTO and member of the board of directors of the company for 5 years and has extensive experience in bone graft substitutes development and certification (2 products placed on the European market). He is now a senior researcher at RMS Foundation involved in product development in collaboration with medical device manufacturers.

### Keynote #2: Cell-material interaction: a challenge in biomaterial engineering

**Dr. Carla Palomino-Durand, Associate Professor at University of Lille, France**



Carla Palomino-Durand is a graduate of the Catholic University of Santa Maria, in Arequipa, Peru, where she obtained a Bachelor's degree in Biotechnological Engineering. After which she traveled to France to obtain a Master's degree in Science, Technology and Health from the University of Lille. She later remained in Lille where she earned a Ph.D. in Life and Health Sciences, specializing in Biomaterials. Her doctoral research project, at the INSERM U1008

laboratory, was based on the development of chitosan-based injectable hydrogels and sponges for their application in bone tissue engineering.

Most recently, Carla worked as a temporary lecturer and researcher in CY Cergy Paris University, France. Her research topic focused on the study of cell-biomaterial interaction on different systems, a work that she carried out at the ERRMECe laboratory in the Biomaterials for Health group. In September, she started an Associate professor position at the University of Lille at the MabLab (Marrow adiposity and Bone) laboratory. Her research topic will be related with the study of biomineralization *in vitro* in healthy and disease conditions.

## Soft Skill Workshop: How to make a compelling abstract & presentation/poster

### Prof. Mark Tibbitt, Professor at ETH Zurich, Switzerland



Mark Tibbitt completed his PhD in Chemical and Biological Engineering at the University of Colorado Boulder in 2012 under the supervision of Prof. Kristi S. Anseth. He then conducted postdoctoral research at MIT with Prof. Robert Langer. Since 2017, he is Assistant Professor of Macromolecular Engineering in the Department of Mechanical and Process Engineering at ETH Zürich. Research in the Macromolecular Engineering Laboratory at ETH focuses on combining polymer engineering, synthetic chemistry, mechanical and bioengineering to design new materials for biomedical applications. Main application areas are biofabrication, drug delivery, self-assembled and supramolecular materials design, and cell mechanobiology.

## Workshop: Turning ideas into companies

**Dr. Michio Painter, TDA head at University of Zurich, Switzerland**















Michio is currently the Head of the Therapy Development Accelerator and Board Secretary of the Life Sciences Fund at the University of Zurich. Prior to joining the TDA, Michio was the Chief Science Partner for Ataraxia VC, where he led seed stage lifescience investments in the U.S. and Europe. He is the co-founder and former CEO of Blue Therapeutics, a Boston-based biotech company developing novel CNS-acting compounds. Michio has an extensive academic research background, having published high impact work in the fields of immunology, neuroscience, and aging. He completed his PhD under an NRSA fellowship at Harvard before performing post-doctoral studies as an HHMI fellow at the Harvard Stem Cell Institute.





























## List of Posters










Poster boards are suitable for A0 sized posters and pins will be provided during registration. Highlighted presenters in blue will also present their research in a 2 minutes Rapid Fire Presentation.

Nr.	Presenter's name	Affiliation	Title
1	Alain Plüss	University Hospital Zurich 	Perfused bone organoids to study extravasation and metastasis of cancer cells
2	Anamar Miranda	CY Cergy-Paris Université 	Modeling the buildup and antibacterial properties of bifunctional poly-L-lysine multilayered films
3	Antonio Sileo	University of Basel 	Mid-throughput multimodal bioreactor platform for cardiac tissue engineering
4	Anissa Benkhedim	Université de Montpellier 	Hybrid hydrogel/nanoparticles system for combined delivery of anticancer agents
5	Asghar Eskandarinia	Empa 	
6	Anna Wozniak	Université Sorbonne Paris Nord 	Bioactive polymer grafting onto silicone breast implants surface to improve biological response
7	Bianca Maria Carrara	University Hospital Zurich 	Analysing how mesenchymal stromal cells support the development of engineered bone marrow organoids
8	Annousha Devi Govindan	Université de Poitiers 	Combination of biomaterial and stem cell-based strategies to improve cortical repair
9	Daphne van der Heide	AO Research Institute Davos 	Bone resembling composite biomaterial-ink consisting of hyaluronan, collagen and calcium phosphate particles for bone regeneration
10	Chloé Dujardin	Université Paris Cité 	Development of a 3D polysaccharide porous membrane for the modelling of the outer blood retina barrier
11	Ekaterina Maevskaia	University of Zurich 	TPMS-based scaffolds for bone tissue engineering
12	Chloé Falcoz	University of Montpellier 	Design and characterization of a degradable nanofibrous scaffold composed of linear and star-shaped

PCLA for Intervertebral Disc regeneration

13	Federica Orellana	Empa & University of Freiburg 	3D Imaging of the meniscal vascular network using X-ray Computed Tomography
14	Christopher Leon-Valdivieso	University of Montpellier 	Towards scarless healing with the use of hybrid collagen/polymer dermal substitutes: a study on their physical properties and biological behaviour over time
15	Gregor Miklosic	AO Research Institute Davos 	Printing the Intervertebral Disc: A Hyaluronan-Collagen Bioink Analogue of the Nucleus Pulposus
16	Daniel-Adrian Blaga	Sorbonne Université 	ATP/collagen coacervates as new precursors for bioprinted dense collagen matrices
17	Donata landolo	Université Jean Monnet & University of Cambridge 	Bone tissue engineering: a bioelectronics approach
18	Magda Plaga	ETH Zurich & Empa, 	Development of skin models for the investigation of material - skin interaction
19	Elise Ponthier	Université Toulouse III – Paul Sabatier 	Development of 3D microphysiological systems to study intestinal stem cells fate and model early steps of tumorigenesis
20	Mahrukh Riaz	University of Zurich 	Role of innervation on pre-vascularization and regeneration in bioengineered human skin
21	Elliot Lopez	Université Paris Cité 	A polysaccharide-based platform for the production, growth, and chemotherapy evaluation of tumoroids.
22	Marine de Lapeyrière	Empa 	Rapid fabrication of alginate-based microgel scaffold for wound dressing applications
23	Gaëtan Roudier	University of Bordeaux 	First use of a completely biological thread-based vascular graft as an arteriovenous shunt in sheep
24	Mira Jacobs	University Hospital Zurich 	Development of an in vitro ovary model for the sustained culture of primary follicles
25	Guillaume Patt-Lafitte	Université Jean Monnet 	Fibers-reinforcement of a photocurable hydroxyapatite thiol-ene resin composite intended as bone

			fixation patch using poly(ethylene terephthalate) mesh
26	Muhmamad Zohaib Iqbal	University of Zurich 	Role of macrophages on vascularisation and repair/regeneration of bio-engineered human skin
27	Guoyan Xian	Université Paris Cité 	Mechanism of Bone Regeneration in Gyroid-structured Implants in Rat Calvarial Defect
28	Oscar Cipolato	ETH Zurich 	Nanoparticle-enhanced laser tissue soldering
29	Justine Pernaud	Université de Cergy-Pontoise 	Craniofacial bone regeneration : a non-inferiority study of two xenogenic bone matrix purification processes
30	Patrick Weber	ETH Zurich 	Cartilage-Penetrating Zwitterionic Polymer-Drug Conjugates for Ultra-low Dose Glucocorticoid Delivery
31	Khaoula Benabderrahmane	Université Sorbonne Paris Nord 	Development of a double layer electrospun patch for the treatment of myelomeningocele
32	Phelipe Hatt	AO Research Institute Davos 	$\beta$ -TCP can act as a phosphate source during the osteogenic differentiation of hBM-MSCs
33	Marjorie Dufaud	University of Montpellier 	Extrusion-based 3D Bioprinting of Composite Hydrogels for Joint Tissue Engineering
34	Silvia Pravato	University Hospital Zurich 	Engineered porous hydrogels to promote bone healing
35	Marta Sacchi	Université Grenoble Alpes & Université Paris-Saclay 	Engineering brain ECM-like hydrogels with Schiff-base dynamic covalent cross-links
36	Minaine Bouabdallah	Sorbonne Université 	Unravelling the roles of texture and basal lamina composition on the endothelialisation of biomimetic type I collagen matrices
37	Sima Bordbar	Tehran University 	Mechanically loaded bioreactor on Cartilage tissue engineered biomatrix containing TGF- $\beta$ loaded alginate microspheres encapsulating in decellularized cartilage hydrogel
38	Naima Ahmed-Omar	University of Bordeaux 	Development of two novel polysaccharidic membranes for guided bone regeneration: in vitro and in vivo studies

39	Noelline Riquel-Loizelet	University of Evry 	Supramolecular assemblies of the polyrotaxane type: synthesis of biocompatible models of muscle cells
40	Tino Jucker	Empa 	Biomechanical skin model to understand the formation of pressure injuries in newborns
41	Rosa Calderon	CY Cergy Paris Université 	Towards a naturally based and bi-functionalized platform for skin delivery
42	Sacha Barberat	Université de Montpellier 	Stereolithography-printed biomimetic scaffold allowing glial cell alignment for spinal cord regeneration
43	Tuba Majid	ETH Zurich 	
44	Sammuel Lemaire	Université de Lorraine 	Numerical study of a lattice structure: application for a mandibular rehabilitation with implant-supported fixed prosthesis
45	Vaibhav Pal	Penn State 	
46	Thibault de la Taille	Université Sorbonne Paris Nord 	Polysaccharide nanoparticles for a targeted combo treatment of ischemic strokes
47	Julien Venant	French Armed Forces Biomedical Research Institute 	Development of an optimized strategy of imaging processing and segmentation to allow statistical bone rat morphology analysis

## Lab tours

There will be the opportunity to visit multiple labs from different universities and companies during this summer school. There will be 4 different locations around Zurich with each 2-3 different labs that you can visit. In order to make an informed choice about which location you would like to visit, please find below more information about each location and their labs. You can give your preference for which location you would like to visit using the following link:

<https://docs.google.com/forms/d/e/1FAIpQLSfBTbMwDu4mlwPKOM68tFvn98mTKGrc3FkgrXB5jZmB6OdUpw/viewform>

### Location A: Balgrist

13.30	Travel to Balgrist	
14.30	Overview presentations	
15.00	<b>Group A1:</b> Tour of Balgrist Ecosystem & OR-X	<b>Group A2:</b> Tour of Biomechanics-Lab
15.20	<b>Group A1:</b> Tour of Biomechanics-Lab	<b>Group A2:</b> Tour of Balgrist Ecosystem & OR-X
15.40	<b>Group A1:</b> Tour of ZuriMED AG	<b>Group A2:</b> Tour of Modic changes-Lab
16.00	<b>Group A1:</b> Tour of Modic changes-Lab	<b>Group A2:</b> Tour of ZuriMED AG
16.30	<b>Group A1:</b> Tour of Snedeker-Lab	<b>Group A2:</b> Tour of Snedeker-Lab

### OR-X (<https://or-x.ch/>)

The OR-X is a highly technological equipped research and training infrastructure where surgical innovation and education can happen without patient burden. It consists of a cadaveric operating theater and training labs in which surgeries can be performed from A to Z.

### Biomechanics-Lab (<https://spine-biomechanics.balgrist.ch/en/>)

The Spine Biomechanics group performs translational research in the interface between fundamental biomechanical research and the development of clinically applicable methods. Under the lead of Dr. Jonas Widmer, group leader of Spine Biomechanics, a multitude of peer-reviewed studies have been published on biomechanical and computational topics of the spine.

### ZuriMED AG (<https://zurimed.com/>)

ZuriMED develops a complete solution for ACL reconstruction built on innovations and technologies that enable superior biomechanical and biological performance. Their devices eliminate the need for interferences screws, dramatically reducing surgical steps, while reliably providing strong fixation.

### Modic changes-Lab (<https://www.dudli-lab.ch/>)

Modic changes (MC) are painful vertebral bone marrow lesions visualized as signal intensity changes by magnetic resonance imaging. To date, no MC specific targeted treatments exist. Hence, we dedicate ourselves to investigate the pathomechanisms of this disabling disease and work on the identification of MC biomarkers and the development of MC specific treatment.

### Snedeker-Lab (<https://orthobiomech.ethz.ch/>)

The orthopaedic biomechanics lab tries to create impact through basic science focused on tendon mechanobiology and translation of innovations in orthopedic surgery and rehabilitation.

### Location B: Zurich city center

13.30	Overview presentations in HG D7.1	
14.15	<b>Group B1:</b> Tour of Tibbitt-Lab	<b>Group B2:</b> Tour of Ehrbar-Lab
15.00	<b>Group B1:</b> Tour of Ehrbar-Lab	<b>Group B2:</b> Tour of Tibbitt-Lab
15.45	<b>Group B1:</b> Presentation of Wyss	<b>Group B2:</b> Tour of Wyss Cleanroom
16.15	<b>Group B1:</b> Tour of Wyss Cleanroom	<b>Group B2:</b> Presentation of Wyss

#### Tibitt-Lab (<https://macro.ethz.ch/>)

Research in the Macromolecular Engineering Laboratory integrates concepts and techniques from chemical and mechanical engineering, synthetic chemistry, materials science, and biology to design and assemble responsive soft (bio)materials. Our user-programmable and responsive materials are employed to understand fundamental processes in biology and materials science as well as translated to solve clinical problems in the fields of drug delivery, regenerative medicine, and biomedical diagnostics.

#### Ehrbar-Lab (<http://www.ehrbarlab.com/>)

By combining materials engineering with cell biology and clinical research, the Ehrbar laboratory is engaged in studying and engineering tissue healing. Towards this end, we have developed materials, which by modular assembly of synthetic and biological building blocks allow creation of specific, cell-instructive, healing microenvironments. These platforms are being used to optimize materials properties and signals that control recruitment, expansion, and differentiation of local progenitor cells. Based on such findings next generation materials and application strategies are being designed, which will be tailored towards clinically relevant treatments.

#### Wyss (<https://www.wysszurich.ch/platforms/regenerative-medicine>)

The Wyss Zurich Translational Center is a joint institution between the University of Zurich and ETH Zurich. It operates technology platforms in robotics and regenerative medicine, supporting the translation of innovative research into market-ready products. In regenerative medicine, it provides cleanroom infrastructure and regulatory expertise (GMP and ISO 13485) for manufacturing test samples in clinical studies.

### Location C: ETH Hönggerberg

13.25	Travel to Hönggerberg	
14.00	Overview presentations in HCI H8.1	
15.45	<b>Group C1:</b> Tour of Zenobi-Wong-Lab	<b>Group C2:</b> Tour of deMello-Lab
15.30	<b>Group C1:</b> Tour of deMello-Lab	<b>Group C2:</b> Tour of Zenobi-Wong-Lab

#### Zenobi-Wong-Lab (<https://biofabrication.ethz.ch/>)

The goal of the tissue engineering and biofabrication (TEB) lab is to develop living tissue engineered strategies to regenerate parts of the human body which have lost their function due to injury or disease. The TEB lab designs instructive cellular microenvironments which allow cells of the neo-tissue to restore as much as possible the structure and/or function of the original tissue.

#### deMello-Lab (<https://www.demellogroup.ethz.ch/>)

The deMello group is interested in the development of microfluidic devices for analytical and bio-analytical applications such as ultra-sensitive optical detection techniques, nanofluidic reaction systems for chemical synthesis, segmented flow microfluidics for high-throughput biology, novel methods for nanoparticle synthesis, and the exploitation of semiconducting materials in diagnostic applications.

#### Location D: Schlieren

13.30	Travel to Schlieren		
14.30	Overview presentations		
15.00	<b>Group D1:</b> Tour of inSphero	<b>Group D2:</b> Tour of Hemotune	<b>Group D3:</b> Tour of Surgical Fusion
16.30	<b>Group D1:</b> Tour of Hemotune	<b>Group D2:</b> Tour of Surgical Fusion	<b>Group D3:</b> Tour of inSphero
17.15	<b>Group D1:</b> Tour of Surgical Fusion	<b>Group D2:</b> Tour of inSphero	<b>Group D3:</b> Tour of Hemotune

#### **inSphero** (<https://insphero.com/>)

InSphero advances drug discovery and our understanding of healthy and diseased human biology pioneering the 3D in vitro cell culture and organ-on-a-chip technologies, an inspired combination of bioengineering, micro-technologies, and computational approaches.

#### **Hemotune** (<https://www.hemotune.ch/>)

Hemotune has designed a multi-target precision medicine blood purification treatment to restore immune balance in septic shock and improve patient outcomes. Combining cutting-edge scientific results from biomedicine and nanotechnology, hemotune develops a disruptive blood purification platform based on magnetic beads.

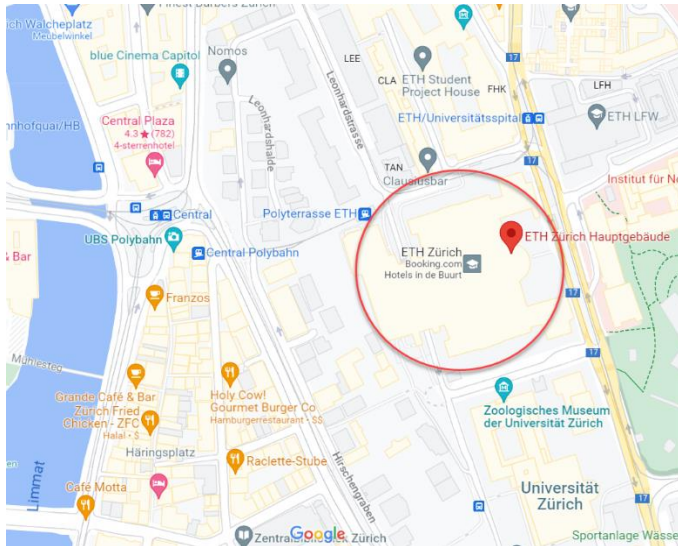
#### **Surgical Fusion** (<https://www.surgical-fusion.com/>)

Surgical Fusion provides innovative technologies for soft tissue to bone fixation, ligament stabilization and joint preservation, regeneration, and repair. The process employs ultrasonic energy to liquefy pre-defined polymeric components of the implant. These form an exceptionally tight bond between implant and bone.

## Location

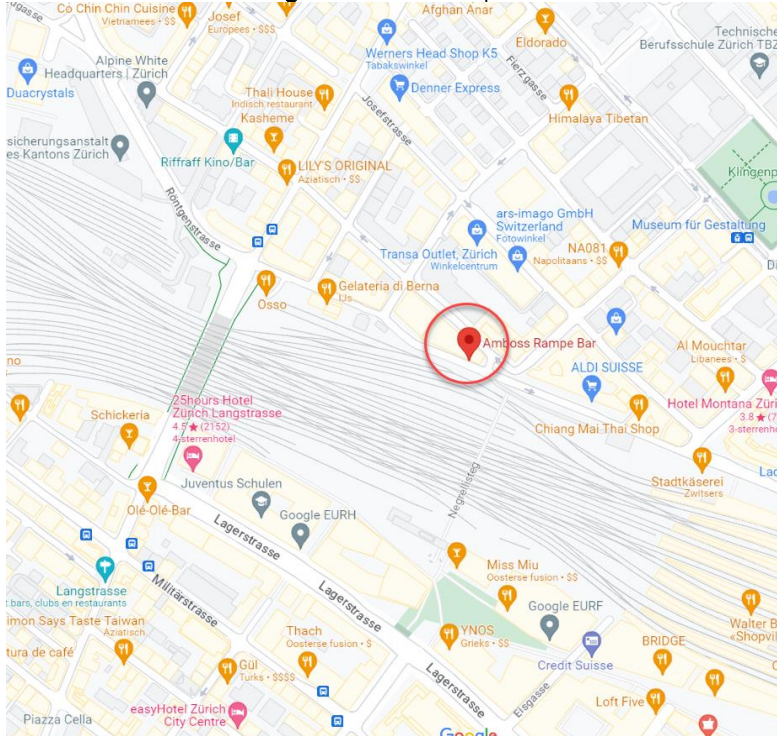
For all public transport in Switzerland, you can use the following website or download the app: <https://www.sbb.ch/en/home.html> Here, you can find all connections and also easily buy your public transport tickets.

**Location of the summer school:** ETH Zürich Hauptgebäude (HG) - Room D7.1, Rämistrasse 101, 8006 Zürich



To get to ETH Zürich HG you have multiple options, use the following location for finding your easiest connection: 'Zürich, ETH/Universitätsspital'. This stop is right outside of the ETH HG building. In the building there will be signs of the summer school with directions to room D7.1.

**Location social evening:** Amboss Rampe, Zollstrasse 80, 8005 Zürich





## Sponsors

