Objectives

Our main aims are that:
– you advance in your understanding of digital twins for health-tech
– you can incite new collaborations in this field
– you contribute in defining the future roadmaps for digital twins in healthcare

The targeted topics are:
– Building blocks and types of human avatars
– Digital twins for personalized, in-silico therapy
– Multiphysics modeling for digital twins
– Multiscale modeling for digital twins
– Wearables for body monitoring
– Biomedical imaging technologies
– Next generation drug delivery devices

This workshop will host an interdisciplinary group of materials scientists, engineers, biochemists, medical doctors and data scientists. We stimulate interactions by invited talks of leading experts, pitches of participating scientists, a poster session, a hands-on workshop and a lot of coffee breaks…

Directions to Empa, St. Gallen

Motorway exit St. Gallen-Winkeln
Direction «Abtwil, St. Gallen»

Motorway exit St. Gallen-Kreuzbleiche
Direction «St. Gallen West»

Line 1 / Direction Winkeln
Line 2 / Direction Wolfgangshof
Line 3 / Direction Abtwil / St. Josaphen
Line 4 / Direction Säntispark

Train Station St. Gallen

Car park Lerchenfeld

Bus stop Lerchenfeldstrasse

Directions to Empa, St. Gallen

General Information

Location
Empa, St. Gallen
Lerchenfeldstrasse 5
9014 St. Gallen
Switzerland

Costs
The event is sponsored by Empa and free of charge for the participants, including coffee breaks, lunch and apero. Possible lodging has to be arranged by the participant individually.

Registration
www.empa-akademie.ch/digitalhealth

All participants are encouraged to submit a tentative title of a poster (for the poster session) or an oral presentation title together with the registration in case they are interested to show their work.

Deadline
Registration period ends on
February 16, 2020

Contact
Empa
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www.empa.ch

Organizing Committee

This workshop is linked, amongst others, to following projects and initiatives: Novartis Research Foundation, CCMX and the Subitex Innovation Network.

WINTER WORKSHOP EMPA

How to build your digital human twin?

Empa, St. Gallen
Lerchenfeldstrasse 5, 9014 St. Gallen, Switzerland
February 27–28, 2020

Online registration:
www.empa-akademie.ch/digitalhealth
Program – Thursday, February 27, 2020
09:30 Arrival of participants
09:30 Welcome Coffee
09:30 Registration
10:00 Opening remarks
10:00 Prof. A. Dommann, Empa
10:10 How to build your human avatar?
10:10 Prof. T. Defraeye, Empa
10:30 Multiscale mechanistic modeling of the skin
10:30 Dr A. Naegel, Goethe University
11:30 From modeling medical imaging to image-based modeling for personalized medicine
11:30 Dr E. Neufeld, IT’IS Foundation
12:00 Lunch
13:00 Lab tours at Empa
13:30 Calculating skin permeability using molecular dynamics simulations
13:30 Dr M. Lundborg, ERCO Pharma
14:30 Coffee break
15:00 Thermal body and skin models
15:00 Prof. R. Rossi, Empa
15:30 Biomedical Imaging Technology for digital twins
15:30 Dr R. Zboray, Prof. A. Neels, Empa
16:00 Creating 3D human body models from medical image data:
16:00 Workflow solutions for human digital twins
16:00 D. Feindt, Synopsys GmbH
16:30 Poster session and Apero Riche

Program – Friday, February 28, 2020
08:30 Arrival of participants
08:30 Welcome Coffee
08:30 Registration
09:00 Basics of molecular dynamics and applications
09:00 Dr R. Malini, Empa
09:30 Computational biomechanics: personalization and clinical applications
09:30 P. Buechler, ARTORG Center, Uni Berne
10:00 Coffee break
10:30 Generating and testing virtual samples of biological tissues and biomedical materials
10:30 Dr A. Ehret, ETH Zürich/Empa
11:30 Best practice in multiphysics modeling
11:30 Prof. T. Defraeye, Empa
12:00 Lunch & Learn demo session of Simpleware software (in parallel):
12:00 Workflow solutions for human digital twins
13:00 COMSOL workshop on Multiphysics modeling in health-tech
13:00 Z. Vidakovic, Dr A. Radu, COMSOL Multiphysics
14:30 Coffee break
15:00 COMSOL workshop on Multiphysics modeling in health-tech
15:00 Z. Vidakovic, Dr A. Radu, COMSOL Multiphysics
16:30 Closure

Topic
Human avatars, or digital twins, of the human body and its organs are being developed to steer in-silico the medical therapies of the future. The large hype in this field makes that many digital human twins with different complexity and accuracy are surfacing. This rapidly evolving field will challenge us to keep guaranteeing the quality and reliability of the used models and simulations, to avoid that the trust in such digital tools is lost. This need is even pushing governmental organizations, including the FDA, to develop a regulatory framework in this respect.

With this workshop, we want that you walk away with a proper knowledge of the different building blocks of such human avatars, from the nanoscale to the human scale, and with the best practices for reliable modeling and simulation. This workshop aims thereby to help safeguarding the trust and reliability of this immense technological opportunity for improving the future of precision healthcare.

In these two days, we target medical applications such as transdermal drug delivery, skin burns, hyperthermic oncology, wound dressings and functionalized medical membranes for controlled release of active compounds.

Target audience
Scientists, PhDs, postdocs, engineers and medical doctors working with computational models and body monitoring in health-tech. We particularly promote the participation of young researchers and women.