Organisational Advices

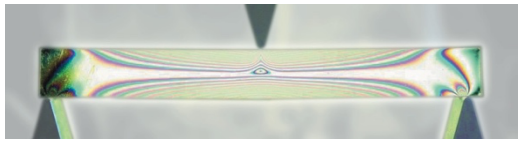
Course Instructor
Prof. Dr. Hans-Joachim Wilke
Institute of Orthopaedic Research and Biomechanics
University of Ulm

Length
3.5 days

Topics
There will be 7 lectures and 3 hands-ons in which every participant will perform 12 practical exercises.

Instructors

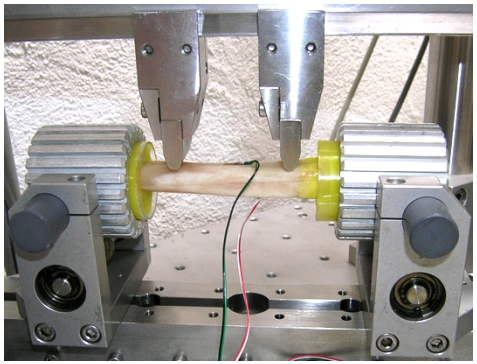
Prof. Dr. Hans-Joachim Wilke	Dr. Lena Schröter
Prof. Niklaus F. Friederich	Luisa de Roy M.Sc.
PD Dr. Andreas Seitz	Morten Vogt M.Sc.
PD Dr. Christian Liebsch	Jonas Schwer M.Sc.
Dr. Benedikt Schlager	Jan Jansen M.Sc.
Dr. Ulrich Simon	



Number of Participants
Min 12, max 20.

Costs
1250 Euros including workshop script, lunches and dinners.
An **early bird fee** of 990 Euros will be granted if you register by May 23, 2024.

Language
All lectures and hands-ons are held in English.



Venue
Institute of Orthopaedic Research and Biomechanics
Helmholtzstraße 14, 89081 Ulm, Germany

Registration
You can find any information about registration at our homepage. Please register soon because the chronological order of incoming registrations is decisive.

Confirmation of Participation
Every participant will get a confirmation of participation at the end of the course.

Accomodation
A list of hotels in Ulm is linked on the homepage.

Homepage
https://www.uni-ulm.de/index.php?id=82621

Cooperation with

AKADEMIE
FÜR WISSENSCHAFT, WIRTSCHAFT
UND TECHNIK
an der Universität Ulm e.V.

https://www.uni-ulm.de/index.php?id=6645

SUMMER COURSE

Basic Biomechanics and Biomechanical Methods for Experimental Research of the Musculoskeletal System

July 23-26, 2024

Organised by the Institute of Orthopaedic Research and Biomechanics Ulm University
Director: Prof. Dr. Anita Ignatius

sponsored by EURO SPINE, Hengstberger Stiftung
Deutsche Arthrose-Hilfe e.V.
under the patronage of DWG
in cooperation with
Akademie für Wissenschaft, Wirtschaft und Technik

Invitation
In Ulm, around Ulm and around about Ulm: There's plenty to do in and around Ulm. Experiencing cultural events, exploring history, or doing some sightseeing in Ulm's Old Town and Fishing District, climbing the outstanding, 161 meters high spire of the Ulm Cathedral or visiting the Ulm Biomechanics Summer Course.
The aim of this course is to train clinicians and biomedical engineers in basic principles of biomechanics. It allows to gain knowledge in planning and conducting biomechanical experiments by a balanced mixture of 7 lectures and 12 laboratories. The number of participants is limited to 20 in order to guarantee a maximum efficiency for the single participant.

Prof. Dr. Hans-Joachim Wilke
Course Instructor

Preliminary Program

Lecture I
Anatomy and Biomechanics: Illustrative cases

Lecture II
Basic Mechanics 1: Statics: Forces, moments, free-body diagram, static equilibrium

Lecture III
Basic Mechanics 2: Elastostatics: Stress and strain, material properties
Dynamics: Inertia, dynamic equilibrium

Lecture IV
Measuring techniques in biomechanics:
How to measure force, displacement, pressure, strain, and calibration methods

Lecture V
Biomechanics of the locomotion apparatus:
Functional anatomy, significance of muscle forces, adaption of bone

Lecture VI
Mechanical properties of biological tissues: Elasticity, viscoelasticity, homogenous/anisotropic properties of bone, cartilage and ligaments

Lecture VII
Biomechanical testing and basic joint kinematics

- Modifications are possible -

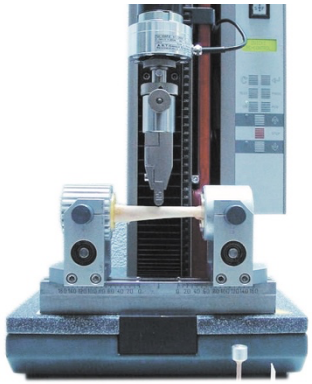
Laboratory I
1. Biomechanical testing – soft tissue
2. Biomechanical testing – hard tissue
3. Fatigue Test (Wöhler diagram)
4. Spine motion and loading simulator

Laboratory II
1. Interface movement between bone and total hip replacement
2. Pressure measurements
3. Photoelastic experiment: femur, stress protection and concentration
4. Computer simulation including FEM

Laboratory III
1. Subsidence of cages
2. Surface strain measurements
3. Biomechanics of suture techniques
4. Motion analysis using Optitrack/Vicon

Evening Program

First Evening
Welcome party

Second Evening
Dinner in the
old town of Ulm

Third evening
free