

## Organisational Advices

### Course Instructor

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

### Length

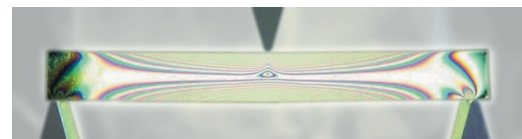
3.5 days

### 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. Benedikt Schlager
Prof. Niklaus F. Friederich	Dr. Ulrich Simon
PD Dr. Andreas Seitz	Luisa de Roy M.Sc.
PD Dr. Christian Liebsch	Jonas Schwer M.Sc.
Dr. Verena Fischer	



### Number of Participants

Min 12, max 20.

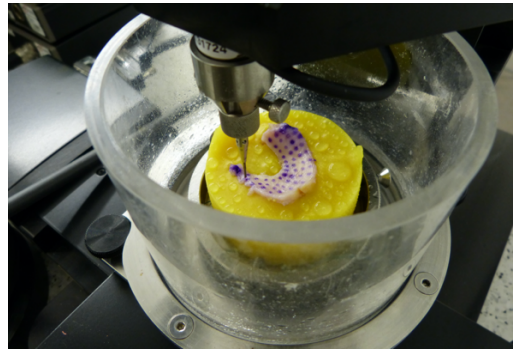
### Costs

1250 Euros including workshop script, lunches and dinners.

An **Early bird fee** of 880 Euros will be granted if you register by January 31, 2025. By registration until May 31, 2025, the early bird fee is 990 Euros.

### 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.

### Accommodation

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

### Homepage

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

### Cooperation with



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

## SUMMER COURSE

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

July 22-25, 2025



Organised by the Institute of  
Orthopaedic Research and Biomechanics  
Ulm University

Director: Prof. Dr. Anita Ignatius

sponsored by  

**Deutsche Arthrose-Hilfe e.V.**

under the patronage of 

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

