

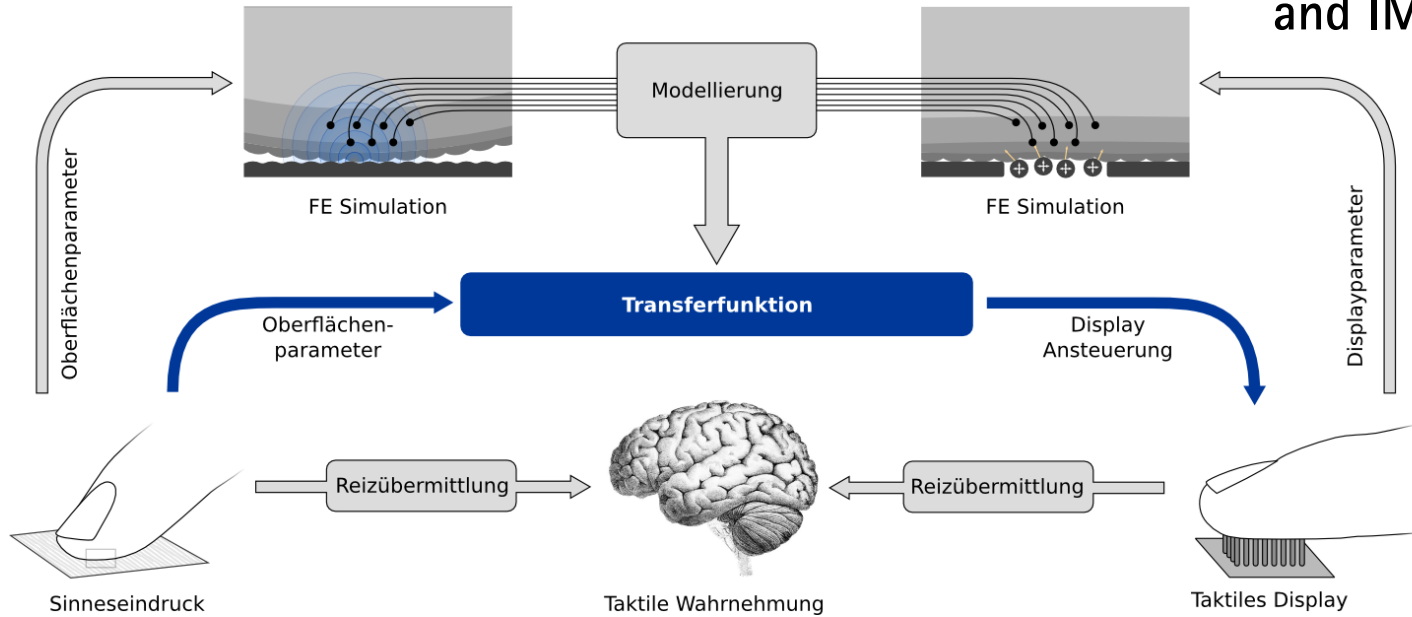
# Welfenlab Research

F.-E. Wolter

Based on presentation at  
Faculty Retreat  
Nienburg, February 18, 2015

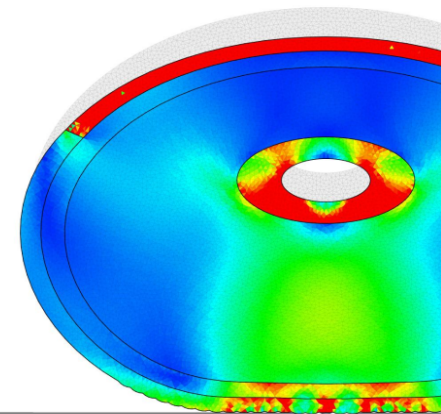
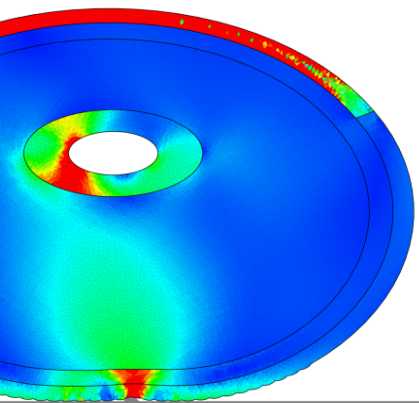
# Tactile Displays for Virtual Reality Applications

Project funded by DFG. Cooperation of Welfenlab (Project coordinator), IDS and IMPT.



- Aim: representation of arbitrary surfaces on the *tactile display*
- FE Analysis to establish receptor parameters
- Search for optimal control of the display

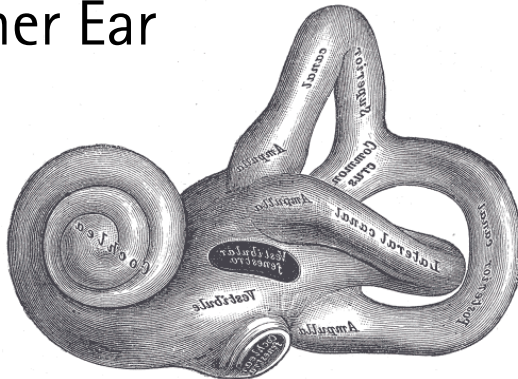
For background cf. 1, 2, 3 in List of references



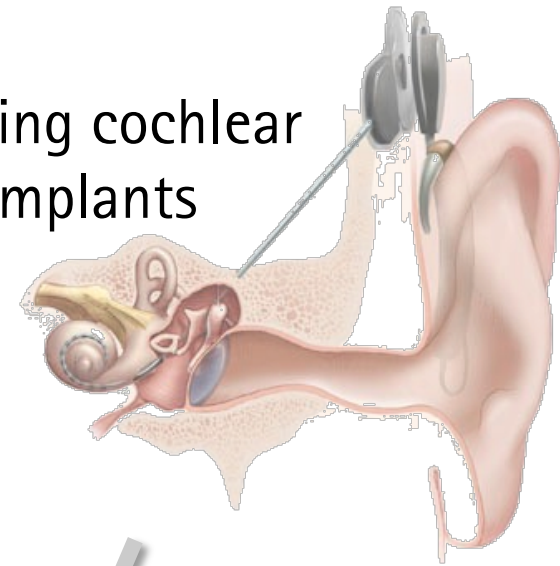
# Research: Cochlea

Physiology of Inner Ear

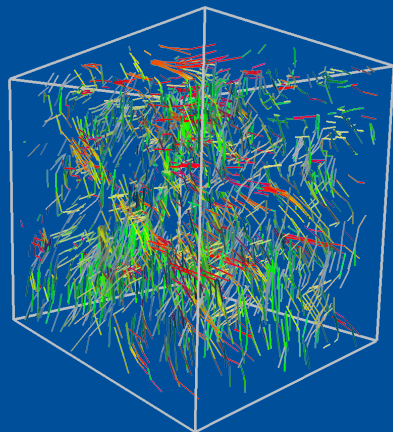
Grays Anatomy, 1918



Existing cochlear implants



National Institute's of Health



3D Fluid Simulation



Evaluation and Optimization of hearing implants



Welfenlab

In cooperation with



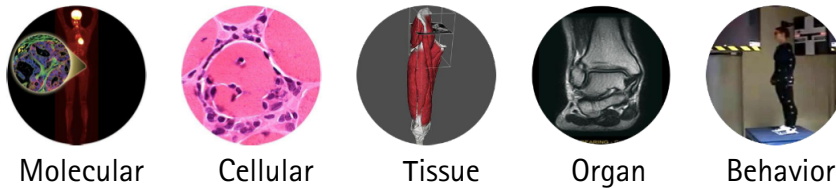
Medizinische Hochschule Hannover

For background cf. 4 in List of references

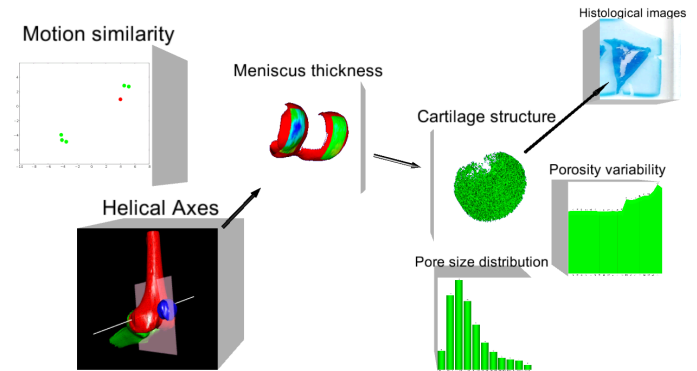
# MultiScaleHuman Project



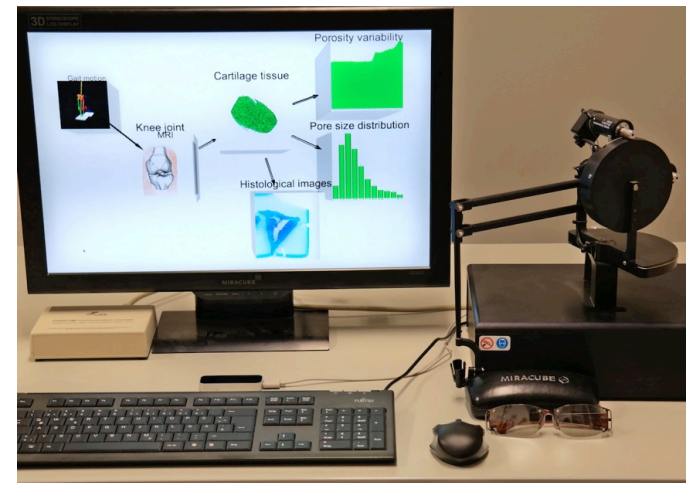
EU Marie Curie Initial Training Network FP7



- Aim: Improved understanding of musculoskeletal diseases in physiological human articulations
- Exploration of multi-scale biological data
- 3D multi-scale navigation and multimodal user interaction



Visualization of knee joint multi-scale dataset



Multimodal exploratory environment  
(hand gestures, haptic)

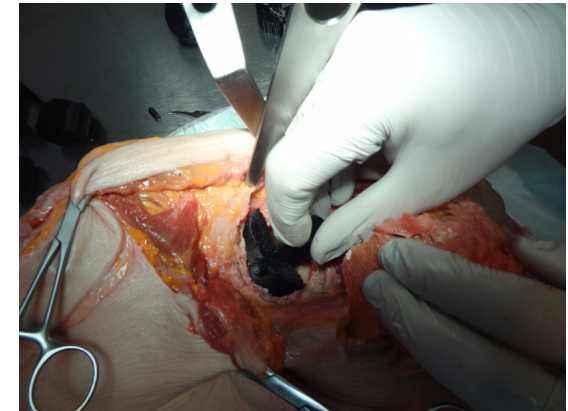
# PhysioLogic Hip (PLH)

- Consortium of



- Improvement of hip surgeries

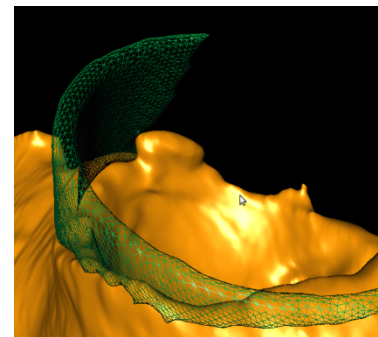
- Role of Welfenlab:  
automatic hip segmentation



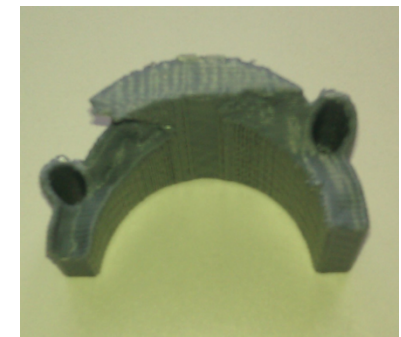
3D Scan  
(Radiologie MHH)



Segmentation  
(Welfenlab)



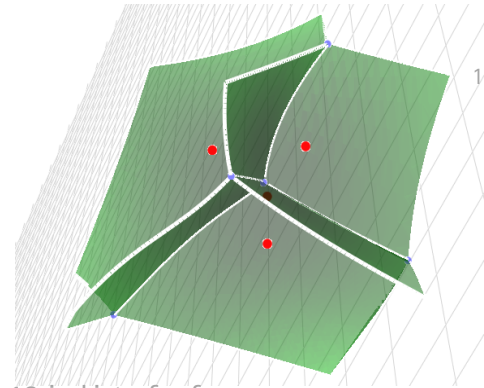
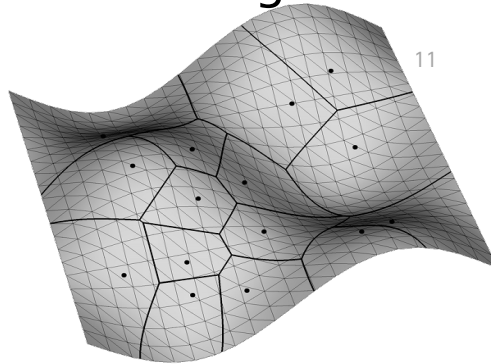
Stencil  
Generierung  
(Welfenlab, IMES)



3D Print  
(IMES)

# Computational differential geometry I

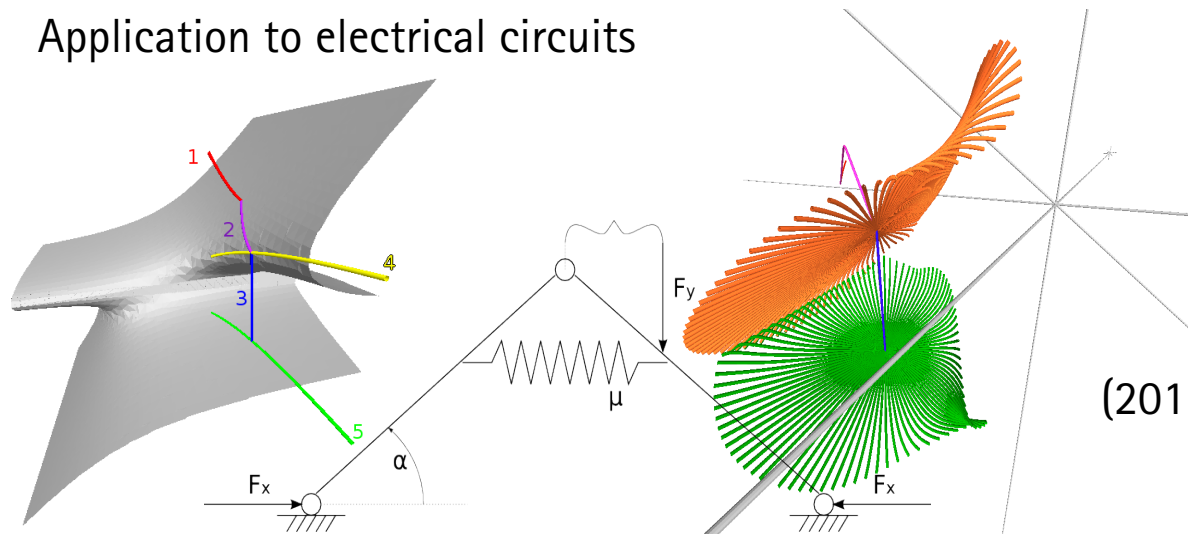
## Geodesic voronoi diagrams



For background cf. 11, 12, 13 in List of references

## Differential Algebraic Equations (DAE)-Systems

### Application to electrical circuits

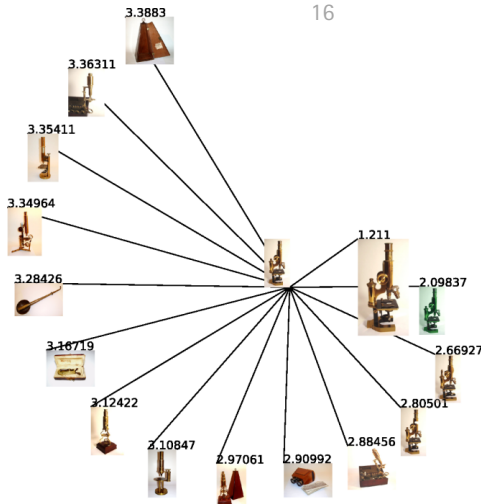


For background cf. 14 in List of references

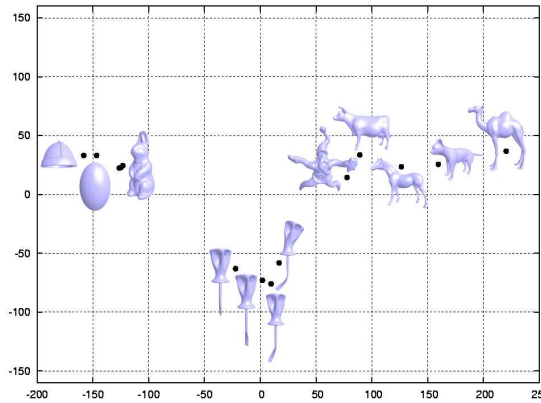
**MISTI:**  
 Project in cooperation  
 with MIT  
 (2015-) Research "Power Grids"

# Computational differential geometry (II)

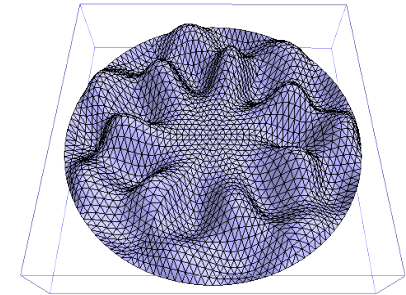
## Laplace-Operator



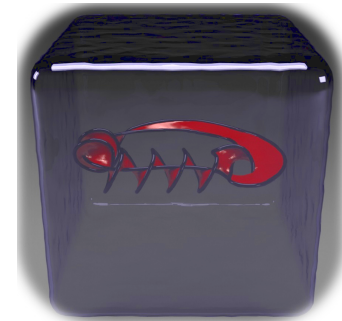
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For background cf. 15, 16 , 17, 18 in List of references  
 For overall background cf. 19

Research Award Hannover  
 2006 and 2014

# List of references

(Please click on the reference to access to the source document)

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