



OTTO VON GUERICKE  
UNIVERSITÄT  
MAGDEBURG



Brief Overview

# General



- Focus on
  - engineering
  - economics and management
  - medicine
- Over 14,000 students from 98 countries
- 16 per-cent of students from international backgrounds



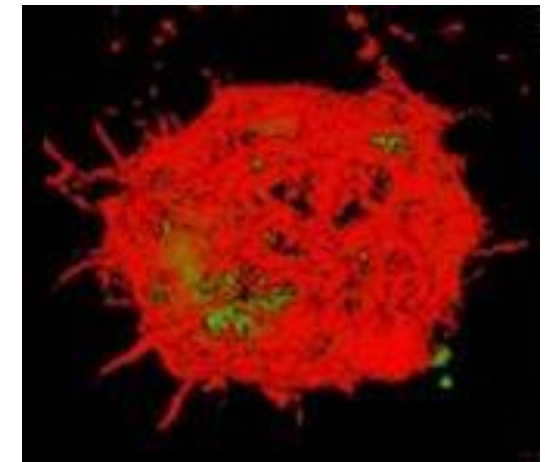
# Research

- International and interdisciplinary
- Core research areas:



**Neuroscience**

## **Dynamic Systems and Biosystems Technology**

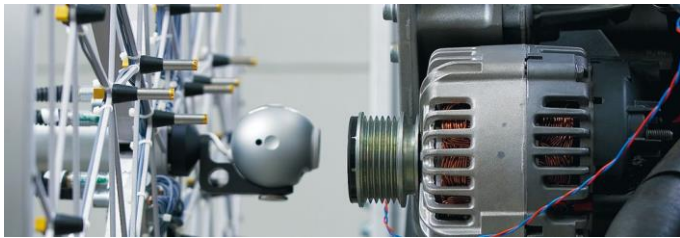


**Immunology and  
Inflammation**

# Research

- Applied research in

## Automotive



## Medical engineering



## Fluidised Bed Technology



## Digital Engineering



## Renewable Energies

# Institute for Medical Engineering

- Within the Faculty for Electrical Engineering and Information Technology
- Total 5 Chairs
- Director: Prof. G. Rose, PhD
- Focus of my chair:
  - Interventional Medical Imaging: X-Ray, CT
  - Medical Signals Analysis
  - Brain-Machine-Interfaces
  - Telemedicine
  - Forschungscampus *STIMULATE* (next slides)





FORSCHUNGS  
**CAMPUS**

*STIMULATE* – Solution Centre for Image Guided Local Therapies

## Medical Engineering at the Magdeburg University: Forschungscampus *STIMULATE*

Prof. Dr. Georg Rose

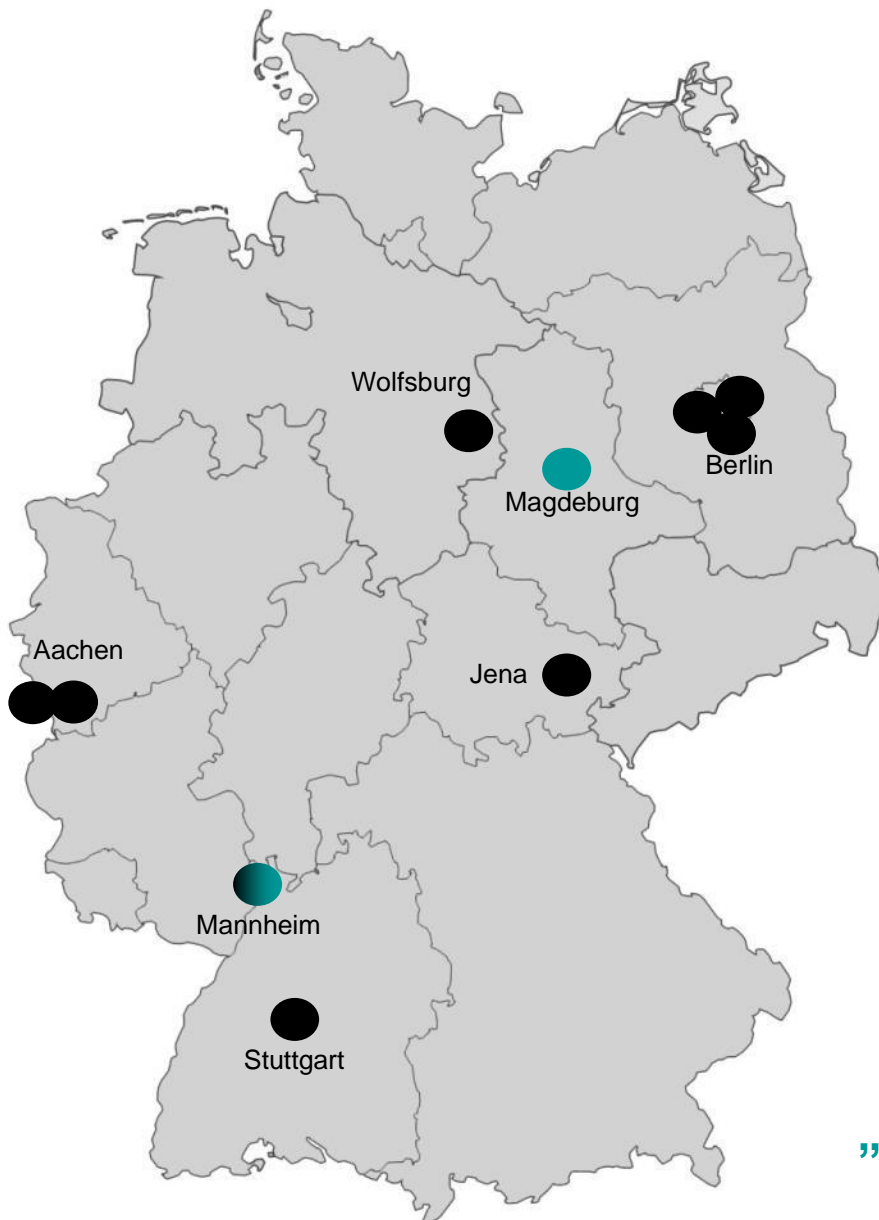
Chairman of the Executive Board of *STIMULATE*

Director of the Institute for Medical Engineering

**Otto-von-Guericke University, Magdeburg**

[www.forschungscampus-stimulate.de](http://www.forschungscampus-stimulate.de)

# The Program „Forschungscampus“



- **Public-Private-Partnership Model**
- by German Ministry of Education and Research (BMBF)
- Funding:
  - 2 Mill. €
  - more than 2 Mill. € by all partners
- Duration: long term (up to 15 years)
- Just 10 Initiatives selected in a competitive process
  - **2 in Medical Engineering**
  - **one of them in Magdeburg**

„Forschungscampus“ = research campus

# Otto-von-Guericke-University - USPs



- Optimal Infrastructure
  - Strong research oriented University Hospital (first 7T MRI scanner in Europe; MRI/PET scanner available)
  - Medical Engineering (ME): since 2010 applied research focus at OVGU
- Support by state and local governments
- excellent facilities (→ images, equipment within Institute for ME)
- Teaching in ME
  - Bachelor Program
  - international Master + PhD program (incl. a scholarship program)
  - Training for engineers from companies
- Established cooperation with industry (Siemens Healthcare, Philips Healthcare, local SMEs)



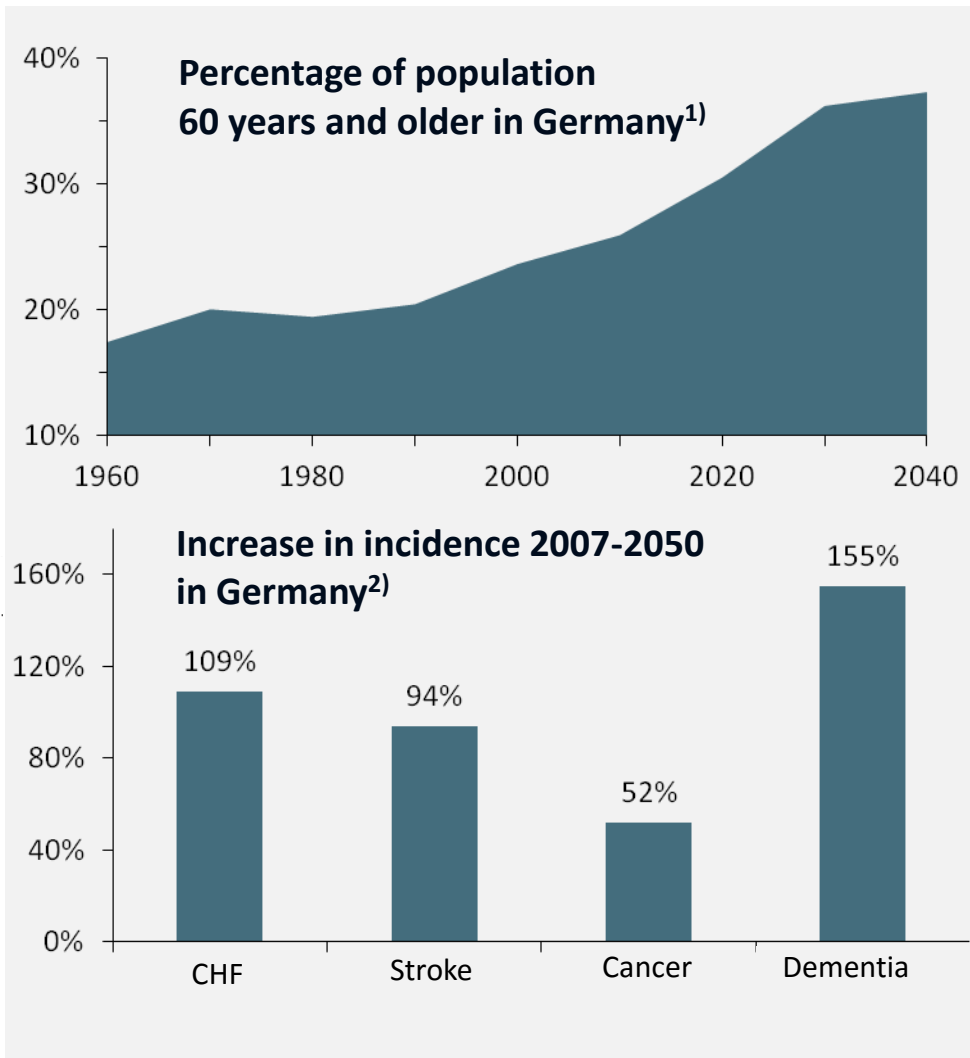


# **STIMULATE** focuses on a major trend in medicine: Image-guided Minimally Invasive Therapy



1. Since times: open surgery
    - Main Tool: scalpel
  2. for approx. half a century: minimally invasive surgery (MIS)
    - Main Tool: endoscope
  3. since approx. 20 years: endovascular and percutaneous procedures
    - also called: micro-therapies
    - more general. image guided minimal-invasive therapies
    - Main Tool: needle, catheter
    - Additionally required: Intra-operative imaging (CT, MR, X-Rayx) for guidance
- Main advantage: **Traumas** are getting smaller and smaller
  - Problem: Demand for **medical technologies** increases
    - opportunity for engineers

# This Topic is Highly Relevant

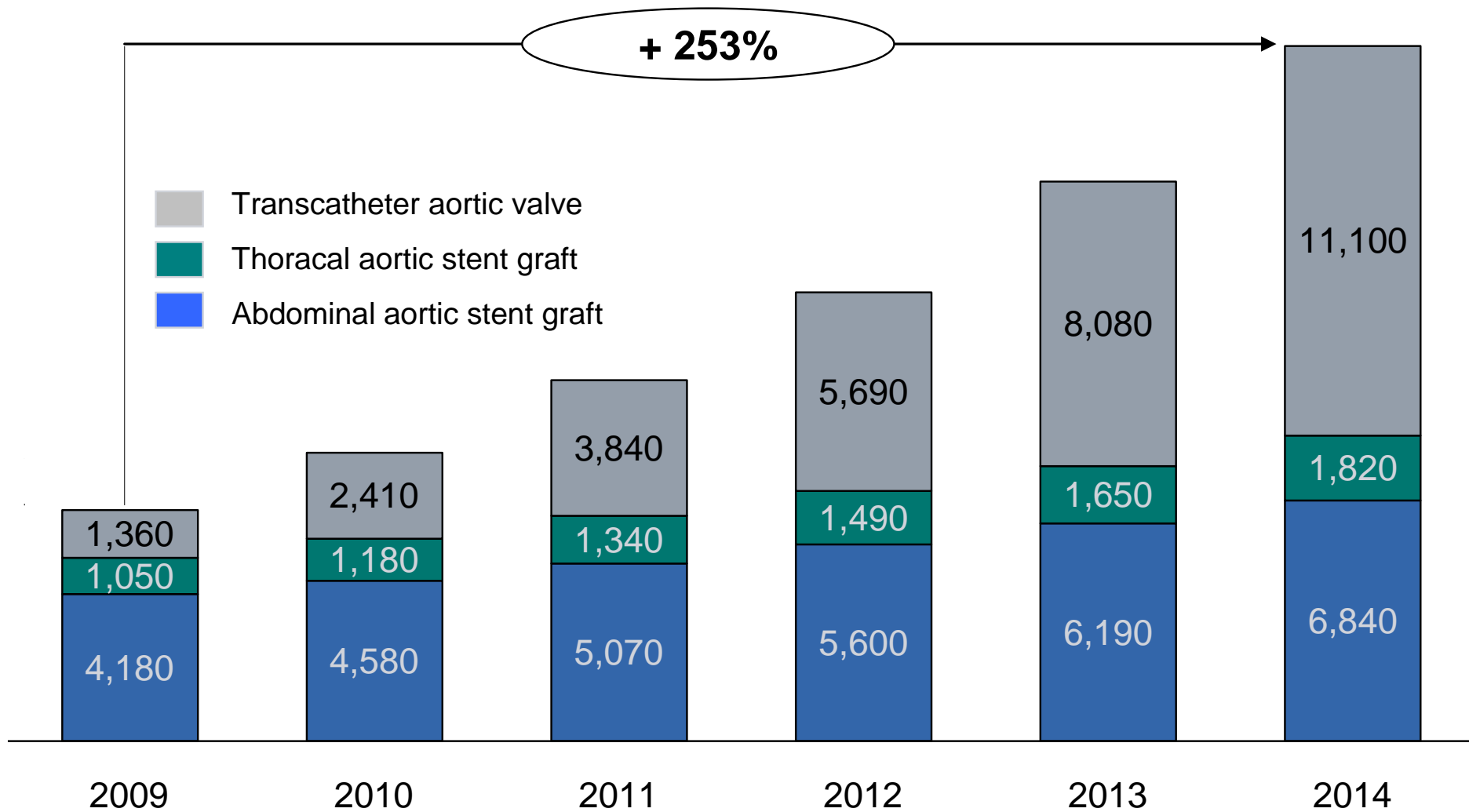


- Average population age will increase significantly within next 30 years
- Incidence of widespread diseases will raise accordingly
- Quality of medical care must be secured
- Image guided minimal-invasive therapies:
  - improve the quality of life
  - for multi-morbid patients often the only treatment option
  - Decrease of overall therapy costs

<sup>1)</sup> Source: Statistisches Bundesamt, 12. koordinierte Bevölkerungsvorausberechnung (Stand: Ende 2010)

<sup>2)</sup> Source: Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz 5/2010

# High growth rates prove clinical relevance of minimally invasive medicine



Millenium Research Group, 2010, EUROPEAN MARKETS FOR HEART VALVE DEVICES  
Millenium Research Group, 2011, EUROPEAN MARKETS FOR PERIPHERAL VASCULAR DEVICES



## Three Main Partners

University Magdeburg

Siemens Healthcare

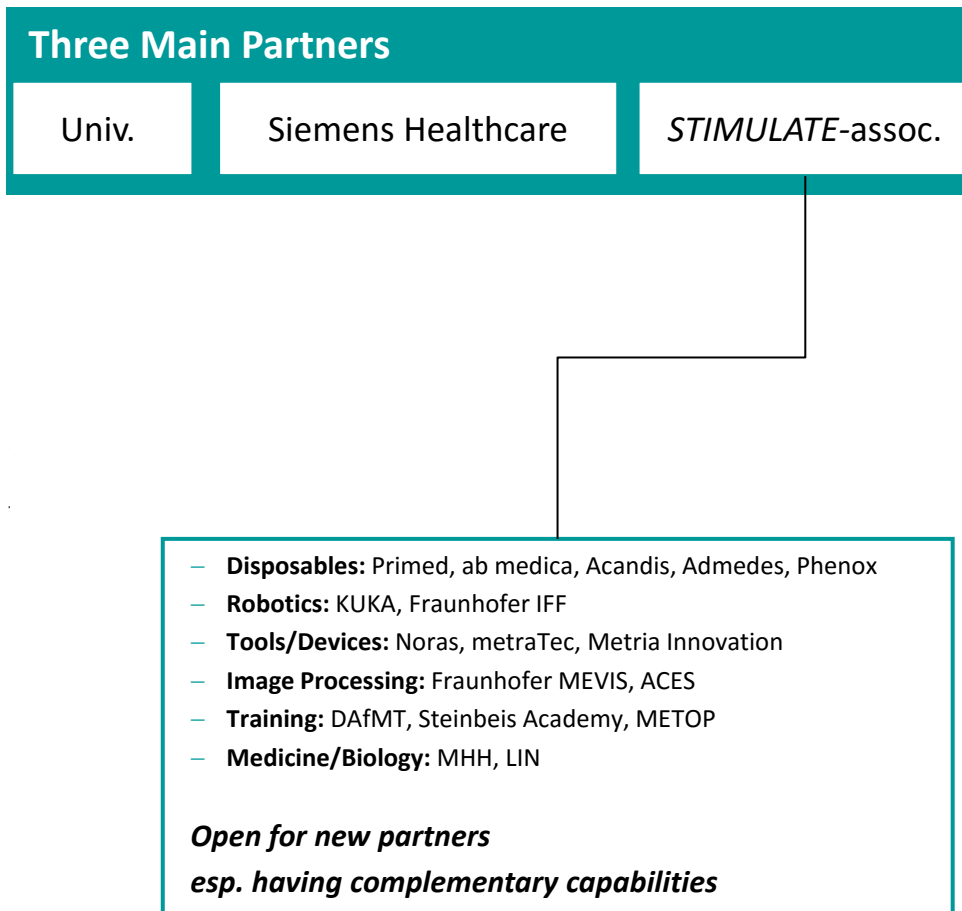
*STIMULATE*-association

### **Members: local SMEs and research institutes**

- **Disposables:** Primed, ab medica, Acandis, Admedes, Phenox
- **Robotics:** KUKA, Fraunhofer IFF
- **Tools/Devices:** Noras, metraTec, Metria Innovation
- **Image Processing:** Fraunhofer MEVIS, ACES
- **Training:** DAfMT, Steinbeis Academy, METOP
- **Evaluation:** IMTR
- **Medicine/Biology:** MHH, LIN

***Open for new partners***

***esp. having complementary capabilities***



- General Agreement (with partners)
- Rules of Procedure (internal)
- Articles of Association
- Contracts on project level
  - IP&R is regulated for each project
  - Allows a trustful co-operation

**In *STIMULATE* we  
focus on well defined applications!**

Not on some technology, tool or methods

**Next 5 Years:**

**Four such applications i.e.**



# STIMULATE focuses on specific diseases



## ■ STROKE

- Speeding-up clinical workflow:  
→ „One-Stop-Shop“
- Participation in daily life of severely disabled:  
→ “Brain controlled prosthesis → “BMI”

## ■ CANCER

- Spine Tumors - Highest Precision  
→ Robot assisted surgery
- Image guided ablation of liver tumors  
→ MRI guidance



In 10 Years:

Establishment of the

**German Center for Image-Guided Medicine**

as worldwide reference center  
for image-guided diagnosis and therapy



# Topics – Technological point of view



- Intraoperative Imaging; for guidance and therapy monitoring:
  - X-Ray, Angiography,
  - MRI, CT (VCT, CB-CT)
  - Ultrasound
  - PET
- Instruments/Devices
  - Smart functions
  - MRI compatibility
  - Visibility in the imaging
- Robotics
  - Physician assistance
  - Patient access (esp. in MRI)
- Image processing
  - Reconstruction (FBP, iterative, ...)
  - 2D/3D segmentation, Cross modalities
  - Signal processing; Classification
- Navigation/Planning



# Complementary Goals:



- **Strengthening Med-Tech companies in Saxony-Anhalt**
- **Support company settlements**
- **Induction and supporting of spin-offs by means of the following Services/Offers:**

- Research

- Applying for common research projects (local / German / EU funding)
- Contract research
- Animal studies, incl. ethics application (own animal lab)
- trustful co-operation due well defined IP&R regulations

- Education

- Trainings for employees (established, successful curses)
- Education of students (skilled workers)

- Business (in cooperation with IMG)

- Evaluation of medical products (in prep.)
- Leasing of *STIMULATE* labs
- Help setting-up a network with local SMEs
- Access to the German market and
- to aging population of Saxony-Anhalt.





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# *STIMULATE* – Solution Centre for Image Guided Local Therapies

## Contact

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[www.forschungscampus-stimulate.de](http://www.forschungscampus-stimulate.de)

**SIEMENS**



**STIMULATE** Verein