Welcome to GridKa School 2017

Achim Streit

KIT – The Research University in the Helmholtz Association

Prof. Dr.-Ing. Holger Hanselka | President

www.kit.edu

Helmholtz Association

- **Mission:** Systems solutions for grand challenges based on scientific excellence, critical mass and long term research programmes
  - 6 research fields: Energy, Earth & Environment, Health, Aeronautics & Space & Transport, Key Technologies, Matter
- Developing and operating **complex infrastructure** and **large-scale facilities** for the national and international scientific community

KIT Figures and Facts
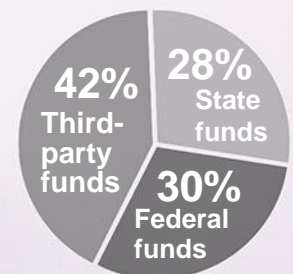

18 Spinoffs and startups

5 Campuses – 200 ha area

470 Trainees

364 Professors and executive scientists

300 Buildings with a usable area of 450,000 m²

25,000 Students

KIT budget
EUR 860 million

3,000 Doctoral students

59 Patent applications

9,300 Employees

1,000 International scientists

42% Third-party funds
28% State funds
30% Federal funds

Status: 2015

KIT Research Profiles

Five Discipline-focused **Divisions**

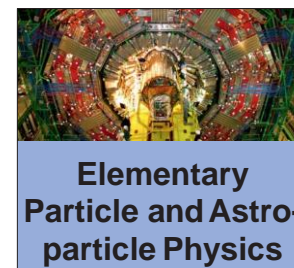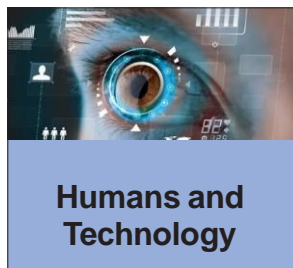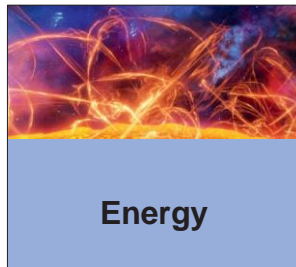|				
Division I **Biology, Chemistry, and Process Engineering**	**Division II** **Informatics, Economics, and Society**	**Division III** **Mechanical and Electrical Engineering**	**Division IV** **Natural and Built Environment**	**Division V** **Physics and Mathematics**

Seven Interdisciplinary **KIT Centers**

Energy

Mobility Systems

Materials Structures Functions

Humans and Technology

Climate and Environment

Elementary Particle and Astro-particle Physics

Information Systems Technologies

Topics Sharpening the Profile of KIT

Renewable Energies

Energy Conversion

Energy Storage and Energy Distribution

ENERGY

Nuclear Energy and Safety

Energy Systems Analysis

Robotics, Automation, Cognition, Anthropomatics

Optics, Photonics, and Quantum Technology

INFORMATION

Supercomputing and Big Data

Security and Dependability

Algorithm Engineering

Energy Sources and Storage Systems

Combustion Engines

Chassis and Body

MOBILITY

Driver and Vehicle Guidance

Infrastructure, Traffic, Mobility Behaviour

Drive Systems

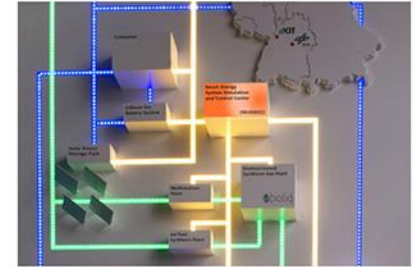# Big Research Infrastructures at KIT

Acoustic Four-wheel Roller Dynamometer

ANKA Synchrotron Radiation Facility

Biomass to Liquid (bioliq®)

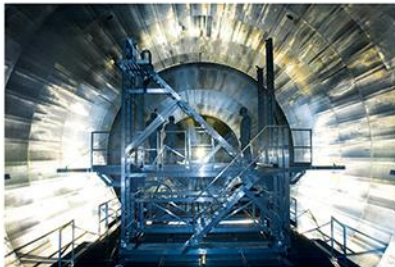**EnergyLab 2.0**

European Zebrafish Resource Center

High-perfomance Computer for Research

Grid Computing Centre Karlsruhe (GridKa)

Karlsruhe Nano Micro Facility (KNMF)

Karlsruhe Tritium Neutrino Experiment

Theodor Rehbock River Engineering Laboratory

Vehicle Efficiency Laboratory

AIDA Cloud Chamber

![KIT - Karlsruhe Institute of Technology]

Steinbuch Centre for Computing (SCC)

www.kit.edu

Steinbuch Centre for Computing

Which demands do we satisfy?

- Computational Science & Engineering (CSE)
- Data-Intensive Science (DIS)
- For users in KIT, BaWü, Germany and international

Who are we?

Institute in KIT with service tasks

What do we do?

- Research, education and innovation in Supercomputing, Big Data and secure IT-federations
- Operation of large scale research facilities
- Operation of basic IT services

"Services for Science – Science for Services"

SCC   Steinbuch Centre for Computing

SCC IT-Services

- **Campus-wide IT-services** for > 25.000 students and > 10.000 employees

- **Networks:** 1700 switches/router, 1000 WLAN APs

- **Server virtualisation:** 800 virtual servers

- **HW server:** ca. 400 servers in 80 racks

- **Backup/archive:** 3000 Clients, 6 Libraries, 30000 Slots

- **E-Mail:** 45.000 mail boxes, 450.000 incoming mails/d, 200.000 outgoing mails/d

- **Databases:** ca. 1250 MS-SQL/Oracle DB

- **Web:** 600.000 web pages, 500 virt. web servers

- **Computer rooms:** 400 PCs, 250 courses

- **Portal for students/e-learning:** 8.000 users/d, 26.000 users/a, 8.300 active courses

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Enabling Computational Science & Engineering (CSE)

- Operation of **HPC systems**
  - **ForHLR:** Tier-2 system in Germany
    in total 34.000 cores
    total peak performance > 1,4 PetaFlop/s
    peer-review access for users in BaWü und D
  - **bwUniCluster:** Tier-3 system in the state BaWü
    HPC capacity system with 18.300 cores
    shareholder ownership with all 9 state universities
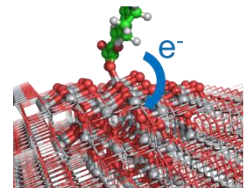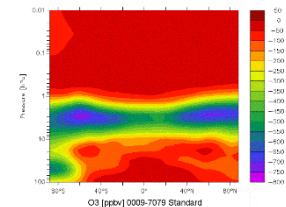- **Joint R&D** with scientific communities & KIT institutes
  - Application optimisation, scaling, model enhancements
  - Simulation Labs in HGF Programme SBD
- **HYIGs** MBS + FiNE
- **Innovation drivers** for SMEs
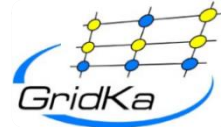- **Architect** for HPC environment in BaWü
- **+ CSMM-Prof.**

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Enabling Data-Intensive Science (DIS)

- Operation of **GridKa**
  - German Tier-1 in WLCG
    for an international community
- Operation of the **Large-Scale Data Facility**
  - Multi-disciplinary data centre for climate research,
    systems biology, energy research, etc. in BaWü
- **Joint R&D** with scientific communities
  - Generic data management research
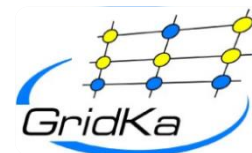 - Data Life Cycle Labs in Helmholtz Programme SBD
- **Innovation driver** for SMEs,
  big industry und start-ups
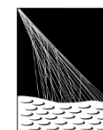- **Active role** in national and international projects & initiatives

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GridKa

- **German Tier-1 High Energy Physics and Astroparticle Data & Analysis Centre**
  - Supports users from all LHC experiments
  - Belle II, Pierre-Auger, several small communities
- **Close interaction** with users through experiment representatives and governance
- **Joint R&D** (PhDs, EXC) for the scalability challenge (e.g. HL-LHC)
- **Resources**
  - Computing: ~ 11.000 physical cores
  - Disk: 20 PB (netto)
  - Tape: 30 PB (used)
  - 100 Gbit/s network connectivity to LHCOPN, LHCONE
- Among the largest and best performing T1s
- Annual international **GridKa School**
  - > 1500 participants in 14 years!

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Thanks, Questions ?

28.08.2017

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