Karlsruhe Institute of Technology

Welcome to GridKa School 2014

Achim Streit

Karlsruhe Institute of Technology

5 Jahre KIT
jung, innovativ, erfahren!

Karlsruhe Institute of Technology

The Merger of Forschungszentrum Karlsruhe and Universität Karlsruhe

RESEARCH – TEACHING – INNOVATION

KIT –
One Legal Entity, a Double Mission, Three tasks

One Entity

Karlsruhe Institute of Technology

Double Mission

University

HELMHOLTZ ASSOCIATION

Three Tasks

Research

Innovation

Higher Education

KIT – Facts and Figures 2013

157 Institutes, 7 Centres

24 528	**Students**
9 439	**Employees***
346	Professors
6 021	Scientists
3 200	PhD students

795 Mio. €	**Budget****
249 Mio. €	Federal funds
212 Mio. €	State funds
334 Mio. €	3rd party funds

129	**Invention disclosures**
52	Patent applications
18	Spin-offs
2.2 Mio. €	Income from KIT licenses

* Heads 2013

** Budget 2013

Broad Range of Educational Offers

- Over 80 modern degree programs in 11 departments:
  - Civil Engineering, Geo- and Environmental Sciences
  - Mechanical Engineering
  - Informatics
  - Electrical Engineering and Information Technology
  - Chemical and Process Engineering
  - Economics and Business Engineering
  - Chemistry and Biosciences
  - Mathematics
  - Physics
  - Architecture
  - Humanities and Social Sciences
- Envisaged student-scientist-ratio 5:1

Energy	7 Topics 1250 Empl.
Climate and Environment	7 Topics 500 Empl.
Mobility Systems	7 Topics 900 Empl.
Materials · Structures · Functions	14 Topics 1100 Empl.
Humans and Technology	6 Topics 400 Empl.
Elementary Particle and Astroparticle Physics	9 Topics 400 Empl.
Information · Systems · Technologies	10 Topics 450 Empl.

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Introduction to the Steinbuch Centre for Computing (SCC)

Achim Streit

Steinbuch Centre for Computing

Facts and Figures

- Founded on January 1st, 2008
  - Merger of the Computing Centers of former Karlsruhe University (URZ) and Research Center Karlsruhe (IWR)
- Karl Steinbuch
  - Professor at Karlsruhe University, creator of the term “Informatik”, co-founder of the first German faculty of informatics
- Two locations at KIT Campus South and North
- ~190 employees in total
  - 60% scientists, 40% technicians, administrative personnel, trainees
  - 7 departments and 5 research groups
- Board of directors
  - Prof. Dr. Hannes Hartenstein
  - Prof. Dr. Bernhard Neumair
  - Prof. Dr. Achim Streit



Steinbuch Centre for Computing (SCC)

- The Information Technology Center of KIT

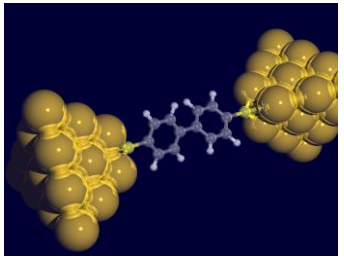
Science for Services – Services for Science

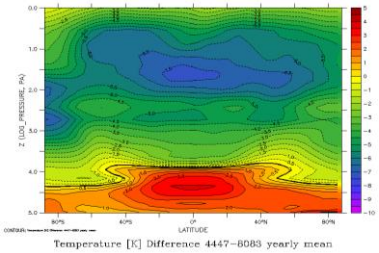
- Promotion of research, innovation, teaching, studying, higher education and administration at KIT by excellent IT-services

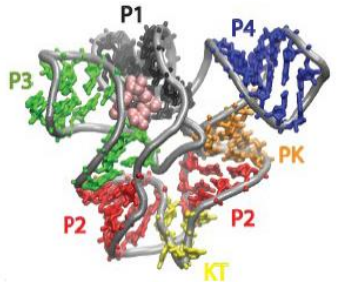
- R&D&I in Supercomputing, Secure IT-Federations and Big Data
  - For KIT, the State of Baden-Württemberg, and national and international research communities
  - Covering HPC & Data Intensive Computing, Computational Science and Engineering, Grids, Clouds, Large Scale Data Management & Analysis

Supercomputing

- SCC operates large HPC systems for KIT and the State of Baden-Württemberg
  - HC3, IC2, bwUniCluster, ForHLR
  - Overall 2900 + 6500 + 8500 + 10700 cores and 30,8 + 135,5 + 176 + 216 Tflop/s
- Simulation Labs for joint R&D with scientific communities
  - **NanoMikro, Climate and Environment, Energy, Elementary Particle and Astroparticle Physics**
  - Application enabling and scaling of simulation codes on modern HPC architectures
  - Support in access and usage of facilities of most powerful HPC infrastructures in Europe
- R&D on exa-scale technologies, e.g. DFG project DASH
- Helmholtz Young Investigator Group at SCC on **Multiscale Biomolecular Simulation**







Secure IT-Federations

- **Grid** DevOps
  - Operation of Grid Services for worldwide usage
  - GGUS: Global Grid User Support
    - Central helpdesk framework for global Grid users
    - Synchronization of more than 20 regional helpdesk systems worldwide
    - Developed at and operated by SCC since 2003
- **bwIDM**: Federated identity and access management in the state of Baden-Württemberg
  - A basis for location-independent use and provisioning of IT services incl. uplink to national and EU level
  - Basis for access to various state-wide services, e.g. bwUniCluster, bwForCluster, bwSync&Share
- **Cloud** Research
  - HPC as a Service, Inter-Cloud, Brokering, Hadoop

Big Data

- Our asset: **GridKa**
  - German Tier-1 center in the Worldwide LHC Computing Grid
  - Current status: 11,600 CPU cores, 11 PB disk, 17 PB tape, Grid services
  - Enables German and European research groups to explore LHC data
- The next “big thing”: **LSDF** – Large Scale Data Facility
  - BaWü storage facility, available to all scientific disciplines
  - Current use: systems biology, satellite and synchroton data
  - Current status: 6 PB installed, 110 TB Hadoop, extension to > 10 PB
- R&D: **Large Scale Data Management and Analysis**
  - Joint R&D in Data Life Cycle Labs (DLCL)
  - Research on general methods and tools development
    - Data management, AAI/IDM, archiving
  - Consortium: 4 Helmholtz, 6 Universities + DKRZ
- **Smart Data Innovation Lab**
  - National R&D platform serving as a Data Hub for Industry