

HEIBRiDS Lecture Series – Wednesday 6th February, 16.00 - 17.00
@ Einstein Center Digital Future, RKF, Wilhelmstrasse 67

Programme

Location: Room 104/105/106

16:00 – 16:30 The Integrated Positioning System - from science to market and back

Speaker: Anko Börner, DLR (see next page for **Abstract**)

16:30 – 17:00 Scalable Processing of Scientific Data in the Age of Data Science

Speaker: Johann-Christoph Freytag, HU-Berlin (see next page for **Abstract**)

Next Lecture Series – Spring Semester start on: Wednesday, April 10th

Abstract 1

The Integrated Positioning System - from science to market and back

DLR has developed the Integrated Positioning System (IPS) which uses data of a stereo camera system and an inertial measurement system for localization without any external reference, e.g. GPS. Needed hardware components will be presented, computer vision and data fusion approaches will be introduced, calibration and registration of the sensors will be explained in the presentation. The system was designed from the scratch, built, evaluated and brought to market. Such a process from an idea to a product is far from self-evident in research institutions. This success on one hand and the emergence of novel computer vision approaches such as deep learning opened up new challenges and opportunities for IPS. Currently, DLR is investigating how learning methods can be implemented and be used for improving the quality of deterministic algorithms. Preliminary concepts and results will be presented.

Abstract 2

Scalable Processing of Scientific Data in the Age of Data Science

This talk addresses different challenges of data processing in the age of Data Science. In the first part of the talk, I outline how research in natural sciences has changed over the last centuries leading to *data driven science* as we observe it today. I describe a specific example in the astronomy domain exemplifying the new approach to scientific research.

Using massive amounts of data for research has motivated scalable data processing platforms such as Hadoop, Spark, or Flink which only become true due to dramatic changes in computer hardware. Despite these large scale solutions there also exist small scale challenges, for example how to improve the execution of existing algorithms on modern hardware (CPUs). Therefore, the second part of the talk presents a detailed example of how to improve existing B-Tree algorithm by using SIMD instructions. The third part of the talk focuses on challenges of privacy when managing and manipulating personal data in domains such as the health/medical domain. I outline the challenges and briefly describe possible solutions.