Social Science and Humanities Research & HPC: opportunities & challenges for these minority end users

Prof. dr Julie M. Birkholz

KBR

GHENT CENTRE FOR DIGITAL HUMANITIES

GHENT UNIVERSITY

EUROHPC summit 2024

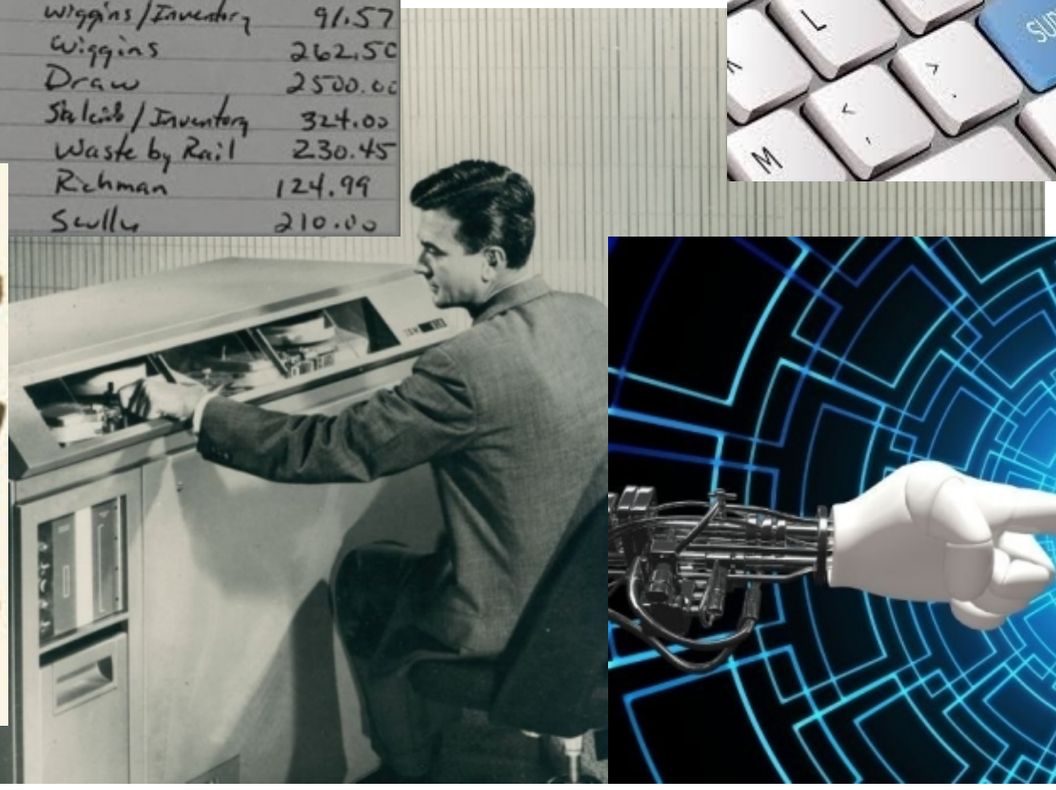
CLARIAH-VL
Open Humanities Service Infrastructure

language and translation technology team

CENTAL
centre de traitement automatique du langage

VUB


West Coast Marine Electr. Waste by Rail 402.11
Seawide Widder 102.28
The Mail Box Richman shipping 34.55
MARVAC Wiggins / Inventory 144.78
Business Card Richman / Office Supplies 1287.12
Newport Auto Sound Wiggins 141.38
Seawide Wiggins 39.38
Staples Wiggins / Inventory 91.57
Seawide Wiggins 262.50
Stu Frazer Draw 2500.00
Sunrise Marine Stalcup / Inventory 324.00
West Coast Marine Electr. Waste by Rail 230.45
Richman 124.99
Scully 210.00




SUPERCOMPUTING
Ctrl
AltGr

EUROHPC SUMMIT 2024

ANTWERP

Introduction to

Successes and continuing challenges

Panellist: Prof. Fred Mendonça

ANNOTATION

UNLEASHING THE POWER OF EUROPEAN HPC AND QUANTUM COMPUTING

EUROHPC
SUMMIT 2024

ANTWERP
18-21 MARCH

TO EXASCALE
AND BEYOND

Welcome to

EuroHPC
Joint Undertaking

beEU
belgium24.eu

Strengths

- **More than 1-order of magnitude performance acceleration**, using
  - Improved I/O – Industry Award
  - CPU/GPU combinations
  - Benchmark profiling
  - Industry benchmarks provided by
    - OEMs, SMEs
    - End-users in Industry
    - Computer industry partners

Base on pre-exaFOAM benchmark of 0.1-petaFlops

SWOT

- **Weaknesses**
  - **General-purpose CFD involves**
    - **Several Physics** demanding different acceleration techniques
      - Liquid, gas, solid, particulate physics and radiation heat transfer
      - Load balancing
- **Opportunities**
  - **New Architectures**
    - GPUs
- **Threats**
  - **To existing / legacy code** unable to take advantage of new technologies or written in older languages

Thank you!

EUROHPC SUMMIT 2024

ANTWERP

Some Background on HLRS

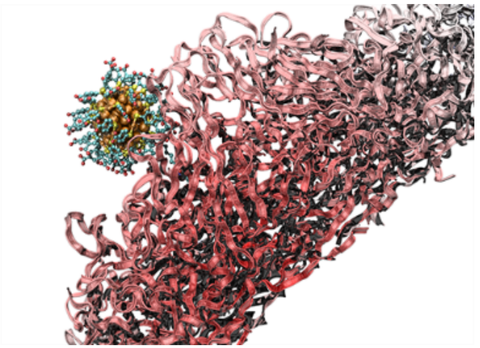
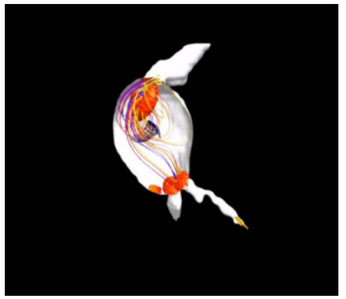
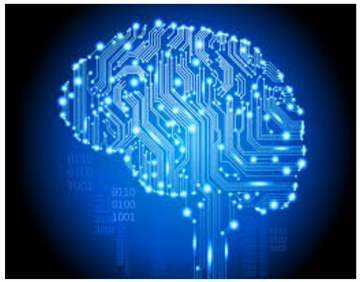
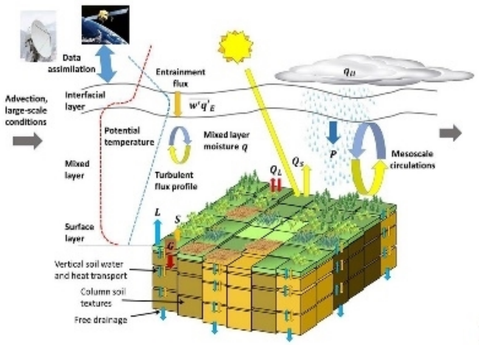
Bastian Koller, Managing Director

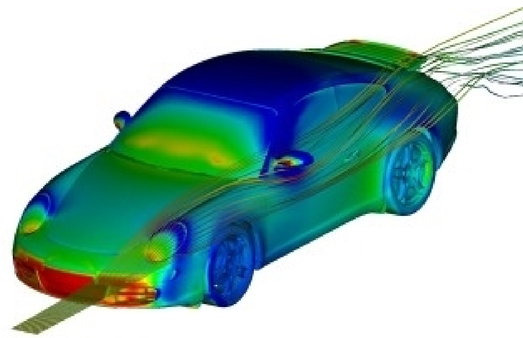
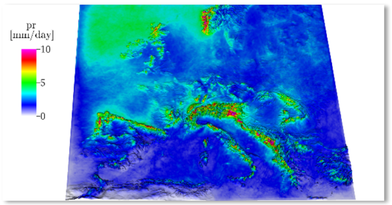
UNLEASHING THE POWER OF EUROPEAN HPC AND QUANTUM COMPUTING

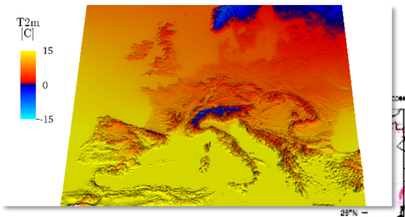
ANNOTATION

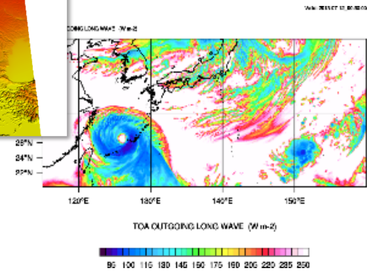
Background on HLRS

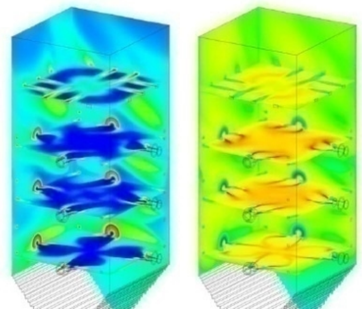
- **Topics/application fields**
  - Energy
  - Climate change and environment
  - Health and the ageing society
  - Mobility in the 21st century
  - Digital societies
  - Various combinations of the themes
- **Technologies**
  - "Data to Solution"(D2S)/AI
  - Cybersecurity
  - Supercomputing
  - Green IT
  - Quantum
- **Customer/User Base**
  - Academia
  - Industry
  - Public Bodies







RECOM SERVICES

Eberspächer

CFD SCHUCK Ingenieurgesellschaft mbH

Miele

FIFTY2

OPTIMA EXCELLENCE IN PHARMA

STIHL

PFINDER CHEMIE

3DEXCITE

Steinbeis

CD-adapco

sidion

MARK

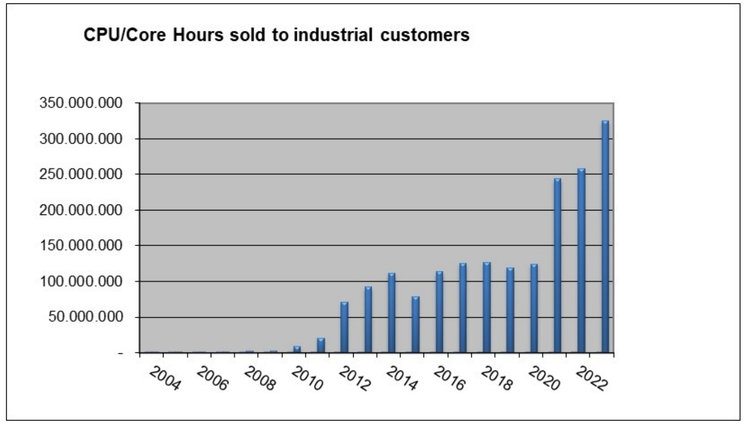
ebmpapst

Porsche

PORSCHE

ingrid cloud by adaptive simulations

GWT forschung+innovation



CFD Consultants ADVANCING TECHNOLOGY!

MANN+HUMMEL

- 244 Mio C-hours (2021)
- 258 Mio C-hours (2022)
- 325 Mio C-hours (2023)
~ 330 Mio C-hours (2024)

Ecosystem Setup

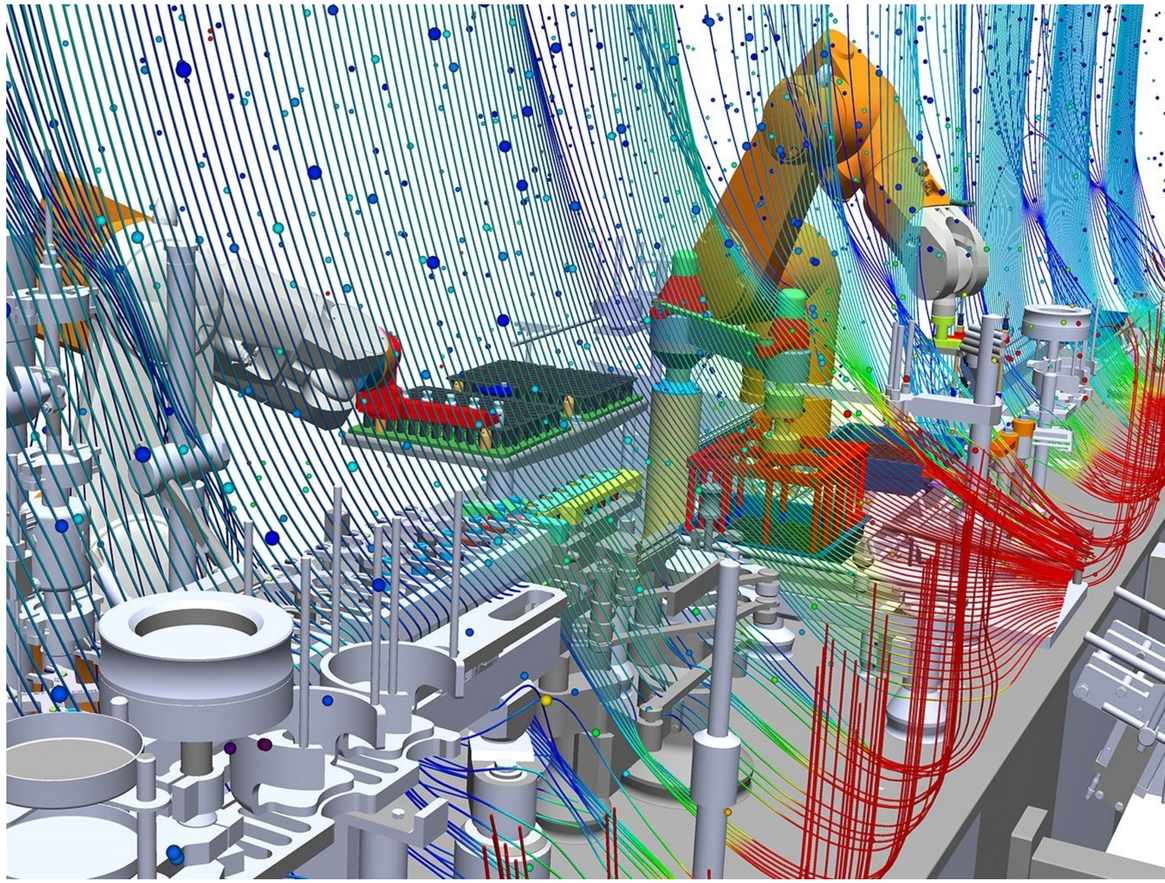
Public-private partnership for HPC in industry

Consulting and training for SMEs

Solution Centers

Preparing industry and public bodies for HPC/HPDA/AI

Support of public organisations/bodies in Crisis Management



LightOn

Laurent DAUDET

Co-CEO and Co-Founder

March 2024

ABOUT LIGHTON

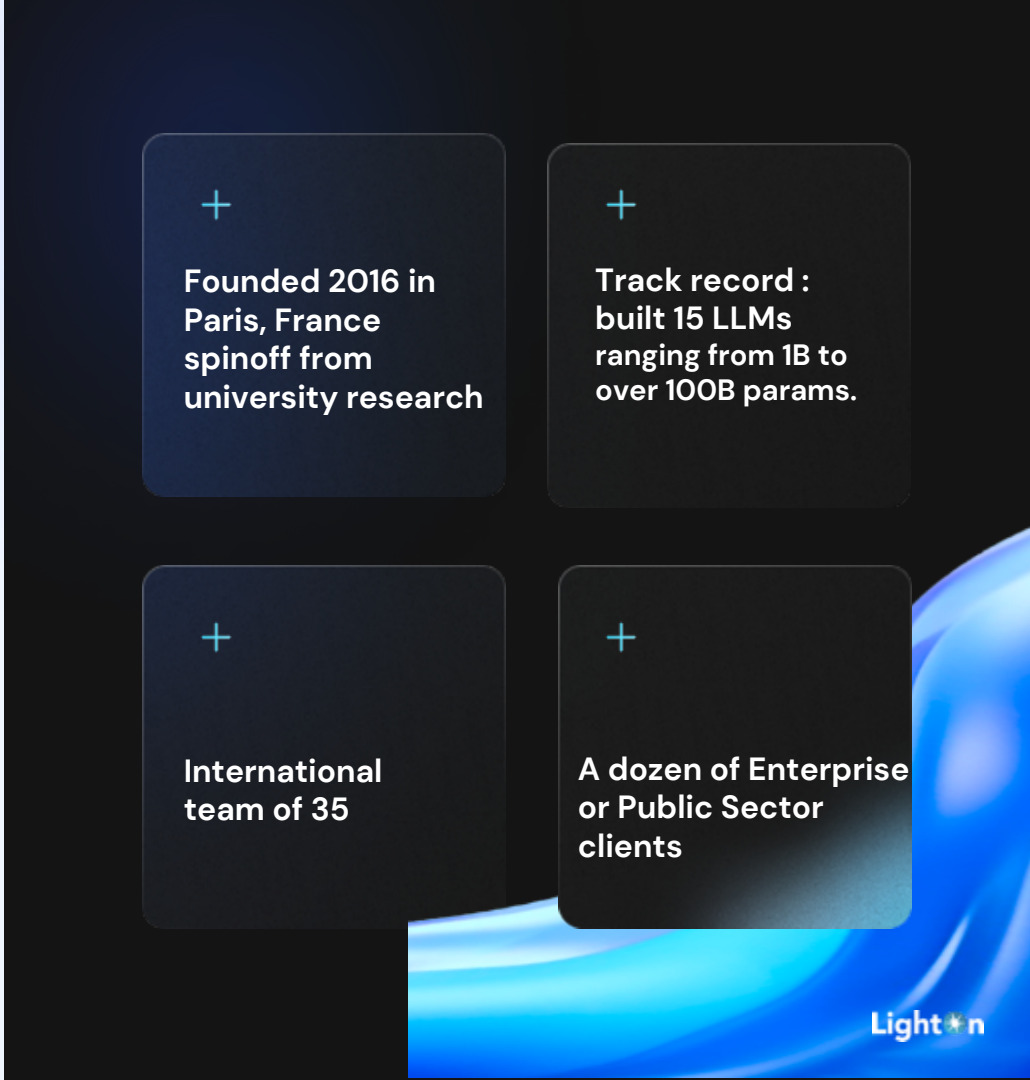
Private, scalable and customizable Gen AI built for the Enterprise

+ Founded 2016 in Paris, France spinoff from university research

+ Track record : built 15 LLMs ranging from 1B to over 100B params.

+ International team of 35

+ A dozen of Enterprise or Public Sector clients



LightOn's dual offering

Forge : Comprehensive tooling to develop some of the **world's best LLMs**

Alfred, optimized for RAG

*Pre-training on **HPC** or cloud provider*

The platform to manage the lifecycle of LLMs for the Entreprise

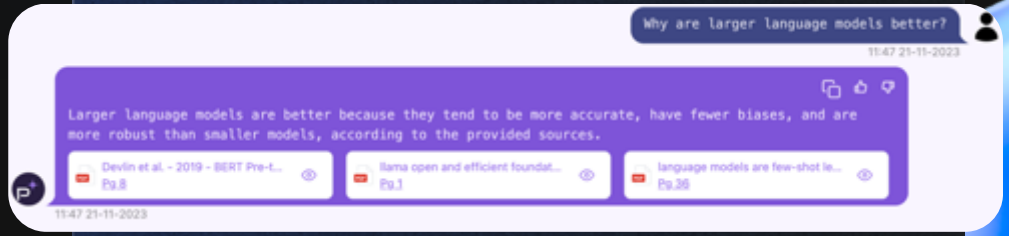
Deployment on private cloud or on-premises

The insight machine

RAG systems

Combining LLM with Search

→ Chat with Documents



Useful across business units :

customer service, legal, HR, engineering...

The impact of GenAI

40% of working hours could be impacted by Large Language Models

Accenture*

Generative AI is poised to unleash the next wave of productivity.

McKinsey**

*Accenture Technology Vision 2023: Generative AI to Usher in a Bold New Future for Business, Merging Physical and Digital Worlds, 2023

**The economic potential of generative AI: The next productivity frontier, McKinsey report, 2023

LightOn