

innovation is everyday

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Research Infrastructures ICT Research and Development

PRACE-LAB



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PSN

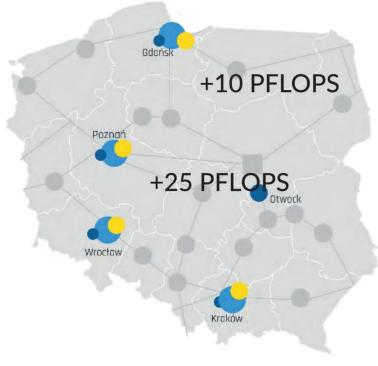
Cooperation on Advanced Computing in Europe



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PRACE-LAB2 pracelab

Cooperation on Advanced Computing in Europe



- Parallel processing on HPC systems
- HPCaaS, GPUaaS
- Emulation of quantum computing
- BigData analytics
- Neural network learning
- Visualization rendering
- Large-scale data transfer
- Blockchain database environment
- Providing gas pedals in the cloud IaaS
- Domain expert consultation
- Commercial usage

National Data Storage



Universal infrastructure for data storage, access, and potent processing of large data volumes in HPC, Big Data, and Artificial Intelligence computing models

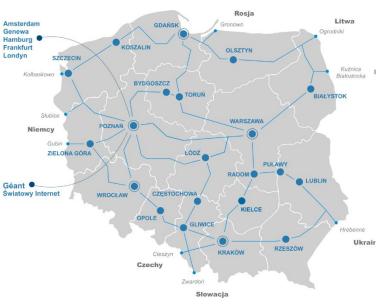


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- Up to 1 Exabyte archivization and longterm storage
- Data storage infrastructure and systems laboratory
- Services embedded in storage laboratory
- Services and applications for data access laboratory
- Repository services laboratory
- Edge computing laboratory

PIONIER-LAB PIONIER TAB

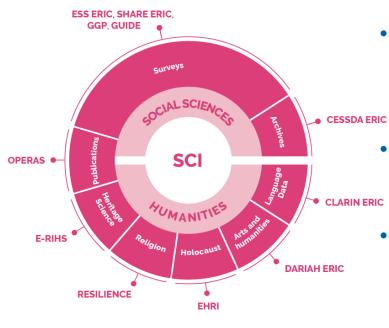
National Platform for Integrating Research Infrastructures with Ecosystems of Innovation



- Laboratory of Innovative Network Technologies
- Distributed Time and Frequency Laboratory
- Smart Campus as Smart City Laboratory
- Regional "Living" Innovation Labs inspired by ICT
- Cloud Services Laboratory
- Multi-scale Simulation Laboratory
- Laboratory and e-Training Services (in the scope of PIONIER-LAB and technologyinspired innovations)
- Preincubation Laboratory

DARIAH-PL Dariah.lab

Digital Research Infrastructure for the Arts and Humanities



- Geoarchaeology, covering broadly understood non-invasive analysis and documentation of soil, landscape, and monuments
- **Cultural data**, including a wide range of interdisciplinary research on culture and phenomena occurring in it
- Musicology, involving research on music as an acoustic, cultural, historical and social phenomenon, and its perception

MOSAIC

The European Center for Bioinformatics and Genomics





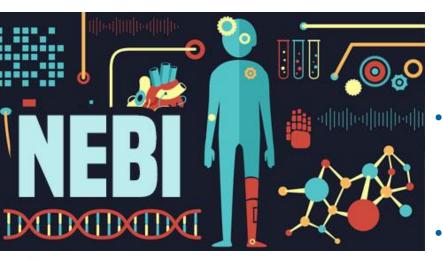
- New infrastructure for largescale and multi-level studies of biological systems
- Precise therapeutic strategies
- Single-cell biology, organoids, and Artificial Intelligence

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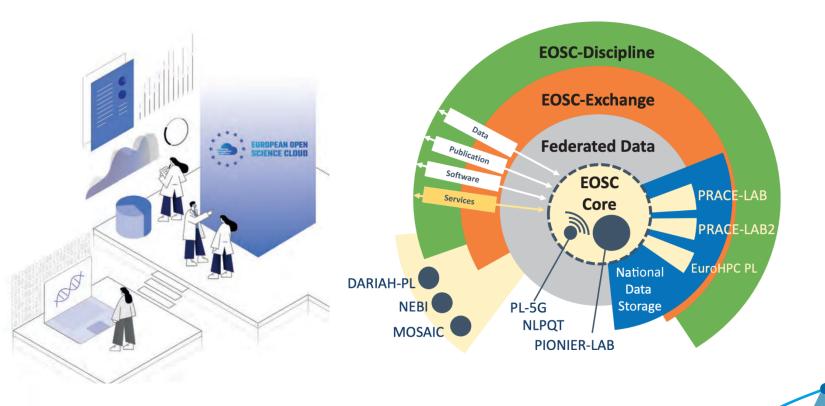


National Center for Advanced Analysis of Biological and Biomedical Imaging • A new research infrastructur



- A new research infrastructure that offers open access to imaging technologies, training and data services in **biological** and **biomedical imaging**
- Foster the liaison and **cooperation** of all its stakeholders, including scientists, industry, national and European authorities
- Next generation of **microscopes** and bioimaging tools

European Open Science Cloud



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National Laboratory for Advanced 5G Research



- 5G network laboratory will be built using stateof-the-art 5G solutions (wireless and wired access networks, edge cloud computing, core network, and central cloud computing).
- Laboratory of 5G simulators and measurement tools provides 5G simulation scenarios for evaluation of parameters for 5G devices.
- 5G environment laboratory supply a research infrastructure supporting users in developing new 5G-ready network solutions, platforms, and applications.

Quantum Communication EuroQCI and PIONIER-Q



 First quantum key distribution (QKD) system as an operational and secure network and services connecting two PSNC data centers in Poznan (~5 km)

OUANTUM FLAGSHIP

NTUM COMMUNITY NETWORK

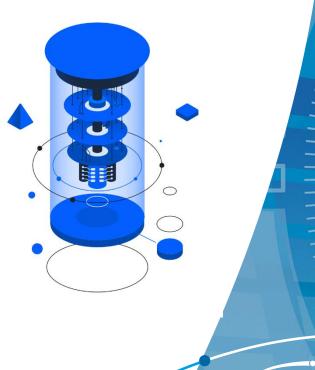
- First QKD cross-border link between Poland and Czech Republic (~60 km)
- PIONIER-Q consortium representing Poland in EuroQCI



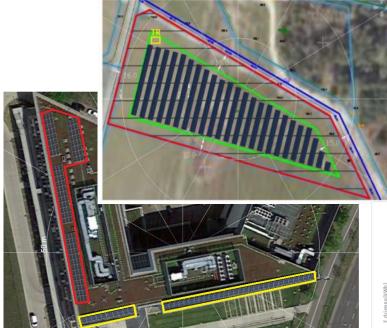
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Quantum IBM Hub First Hub in Central and Eastern Europe

Development Roadmap									
	2019 🥝	2020 🥝	2021 🥝	2022	2023	2024	2025	Beyond 2026	
	Run quantum circuits on the IBM cloud	Demonstrate and prototype quantum algorithms and applications	Run quantum programs 100x faster with Qiskit Runtime	Bring dynamic circuits to Qiskit Runtime to unlock more computations	Enhancing applications with elastic computing and parallelization of Qiskit Runtime	Improve accuracy of Qiskit Runtime with scalable error mitigation	Scale quantum applica- tions with circuit knitting toolbox controlling Oiskit Runtime	Increase accuracy and speed of quantum workflows with integration of error correction into Qiskit Runtime	
Model Developers						Prototype quantum software applications		Quantum software applications	
						Machine learning Natural science Optimization			
Algorithm Developers		Quantum algorithm and a	pplication modules	\odot	Quantum Serverless				
		Machine learning Natural science Optimization				Intelligent orchestration	Circuit Knitting Toolbox	Circuit libraries	
Kernel Developers	Circuits	\odot	Qiskit Runtime 🔗						
				Dynamic circuits 🥹	Threaded primitives	Threaded primitives Error suppression and mitigation		Error correction	
System Modularity	Falcon 27 qubits	Hummingbird 🔗	Eagle 🔗 127 qubits	Osprey 433 qubits	Condor 1,121 qubits	Flamingo 1,386+ qubits	Kookaburra 4,158+ qubits	Scaling to 10K-100K qubits with classical and quantum communication	
					\blacklozenge	•			
					Heron 133 qubits x p	Crossbill 408 qubits			

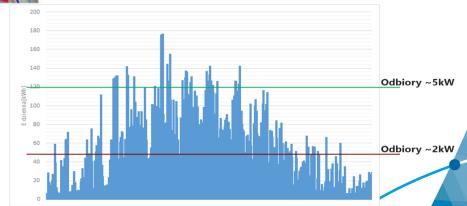


Green IT



Aims to provide energy savings for the infrastructure operation:

- 20 kWp off-grid on the roof PSNC PoC
- 55 kWp on-grid on the roof PSNC
- 50 kWp on-grid on the roof hangar
- 1 MWp on-grid field installation
- 8 MWp on-grid field installation
- Up to 10 MW on-grid field Konin





Thank You !

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