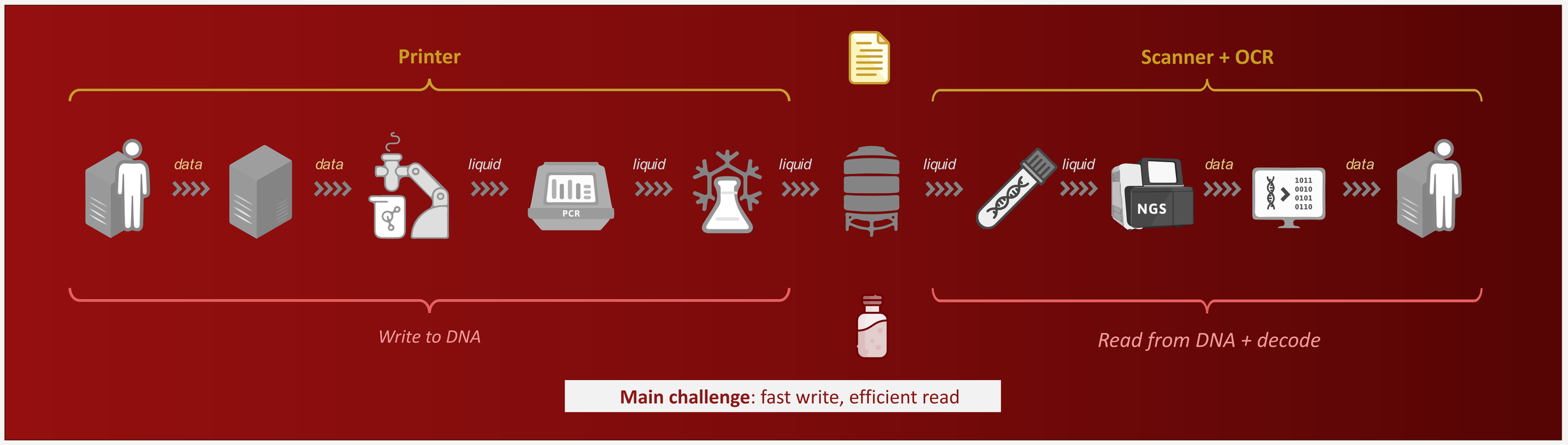
PEARL-DNA — Revolutionizing Sustainable DNA-Based Data Storage

Stephanie Kristin Schröder[1], Yeremia Gunawan Adhisantoso[1], Tjaša Stare[2], Marthe Colotte[3,4], Jörn Glökler[5], Marcus Frohme[5], Gioele Balestra[6], Jan Voges[7], Tomaž Karčnik[2]

[1] Leibniz Universität Hannover [2] BioSistemika [3] Imagene [4] DNA Data Storage Alliance [5] TH Wildau
[6] iPrint, HEIA-FR, HES-SO University of Applied Sciences and Arts Western Switzerland [7] CIMA University of Navarra



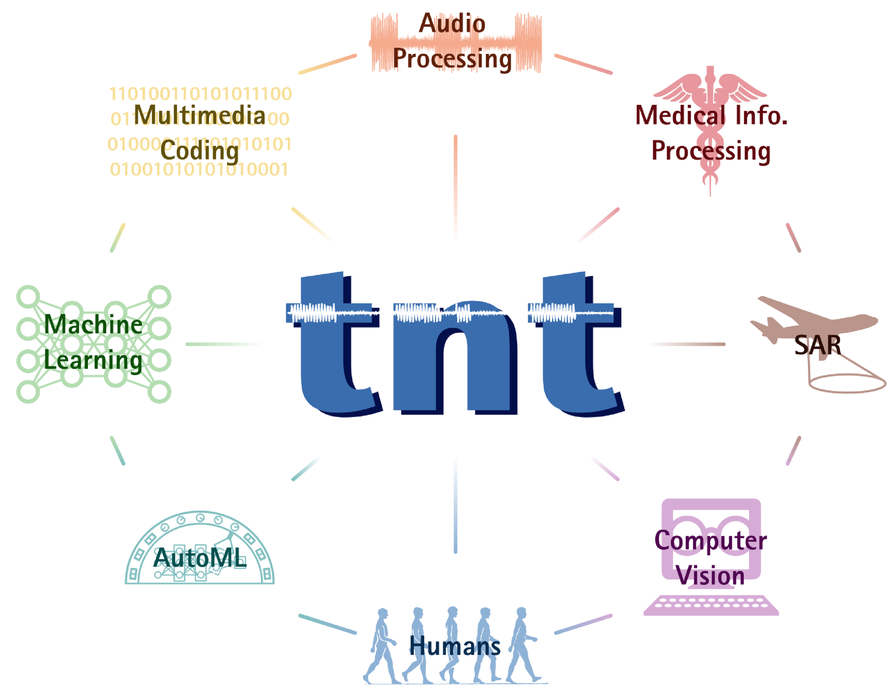
Sustainable DNA-Based Data Storage

Advances in artificial intelligence, health care, astronomy, physics, climate science, pharmacy, and genetics — all depend on storing massive amounts of data to remain competitive and drive scientific discovery. **The world is running out of data storage, as current technologies for digital data storage are reaching various technological and sustainability limits.** Conventional storage media do not have the capacity, longevity, data density, or cost-efficiency to meet global demand.

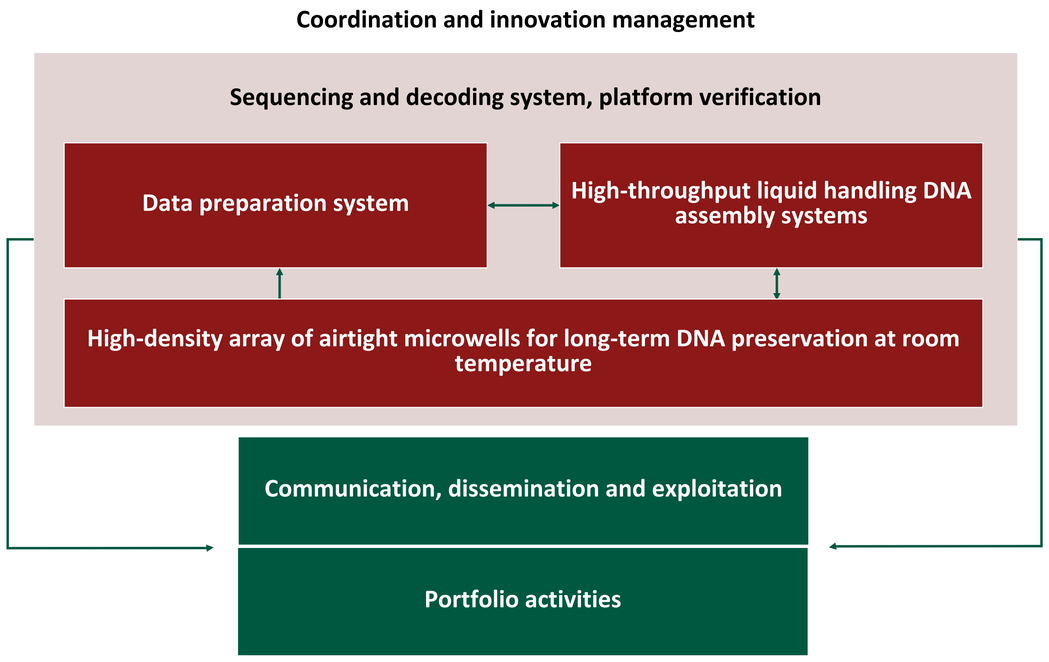
PEARL-DNA will develop and assess a **complete end-to-end chain of innovative solutions** — contributing to improving speed, accuracy, energy efficiency, and costs associated with DNA digital data storage. Using a **block-by-block DNA synthesis** approach, we are pioneering **error correction**, compression, and data standardization modules, alongside a cutting-edge **storage container system**. This system will ensure a maintenance-free, long-term preservation of DNA without any energy requirements. Our fully **modular and interoperable platform** aims to transform data storage and foster collaboration across the DNA-based storage industry, propelling this technology into the future.

The Institute of Information Processing

Within PEARL-DNA, novel error correction mechanisms are developed the the **Institute of Information Processing (tnt)** at **Leibniz University Hannover**.



Work Plan



Key Project Novelties

1. End-to-end data storage and retrieval on DNA
2. Error detection and correction for block-by-block synthesized DNA data storage
3. High-throughput liquid handling systems
4. Block-by-block DNA assembly in small volumes
5. Streamlined DNA processing for storage
6. Storage system for DNA preservation at room temperature
7. Reading platform with random access method and custom decoding software

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Summary

Interoperable end-to-end platform of scalable and sustainable high-throughput technologies for DNA-based digital data storage.

EIC Pathfinder Challenge 2022

€5.04 million funding

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info@pearl-dna.eu
www.pearl-dna.eu