DNA DATA STORAGE ALLIANCE

A SNIA Community

DNA Data Storage

2025 Library of Congress DSA

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Chair, DNA Data Storage Alliance

DNA Data Storage Alliance

Mission

- Create an interoperable storage ecosystem based on DNA as a data storage and compute medium

Scope

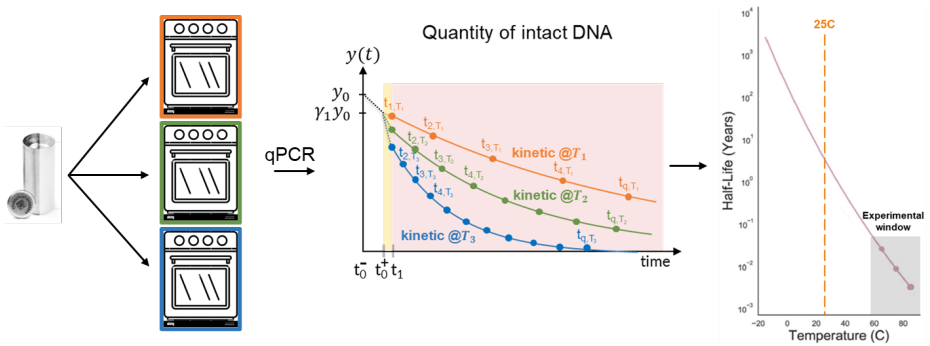
- Educate the market to create awareness and adoption of DNA data storage and compute
- Influence and drive R&D and funding
- Develop standards and specifications to encourage ecosystem evolution

DNA Data Storage Alliance - 2024

- Publications
  - DNA Stability Evaluation Method for DNA Data Storage Containment Systems v1.0
  - DNA data storage chapter in 2023 IEEE Mass Storage Roadmap Update
- Presentations
  - Industry Events (FMS, SDC, Storage Technology Showcase, Library of Congress…)
    - DNA Data Storage - An Overview
    - End-to-End DNA Data Storage System Concept
    - End-to-End DNA Data Storage System Concept (video)
    - DNA Data Storage Alliance Technical Roadmap
    - Data Retention Metrics in a DNA Storage System
  - Other
    - SNIA Podcast: DNA, The Future of Data Storage
- Events
  - Satellite workshop at ISIT 2024: Coding Theory and Algorithms for DNA-based Data Storage
    - 60 attendees; 9 plenary talks; 16 posters
    - Interesting topics for further review came out of the workshop discussions

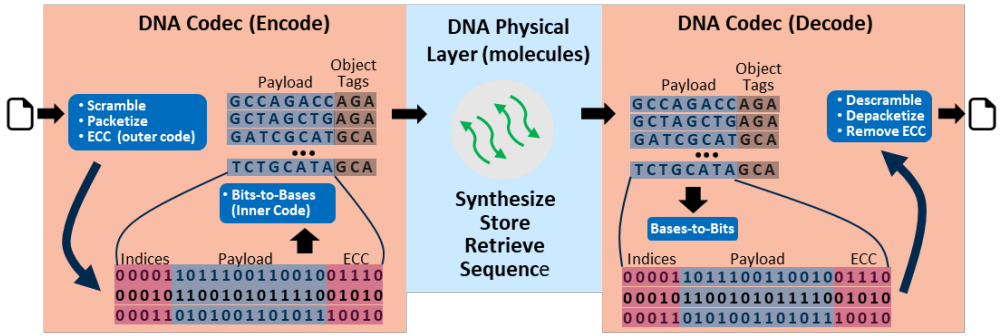
DNA Data Storage Alliance - 2024

1) Data Retention Workgroup



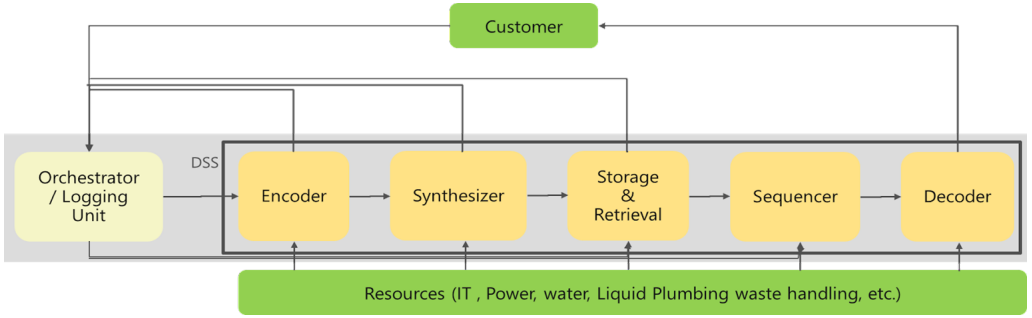
- **Stability Evaluation Method published**
- **Considering "Data Retention Calculator"**

2) Codecs Workgroup



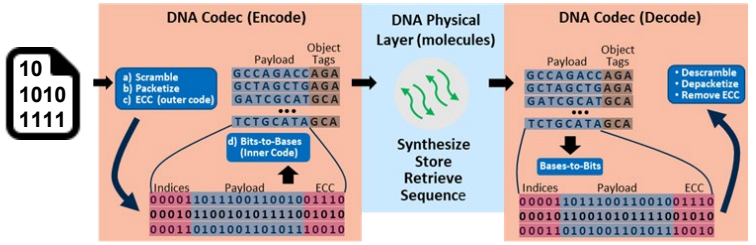
- **Working on "Codec Requirements" white paper**
- **Open source codec TBD**

3) Interoperable Interfaces Workgroup



- **Working on spec integration**

4) Biosecurity Workgroup



- **Initial regulatory position drafted and being socialized**
- **Considering establishing biosecurity standards**

DNA Data Storage Alliance – 2025

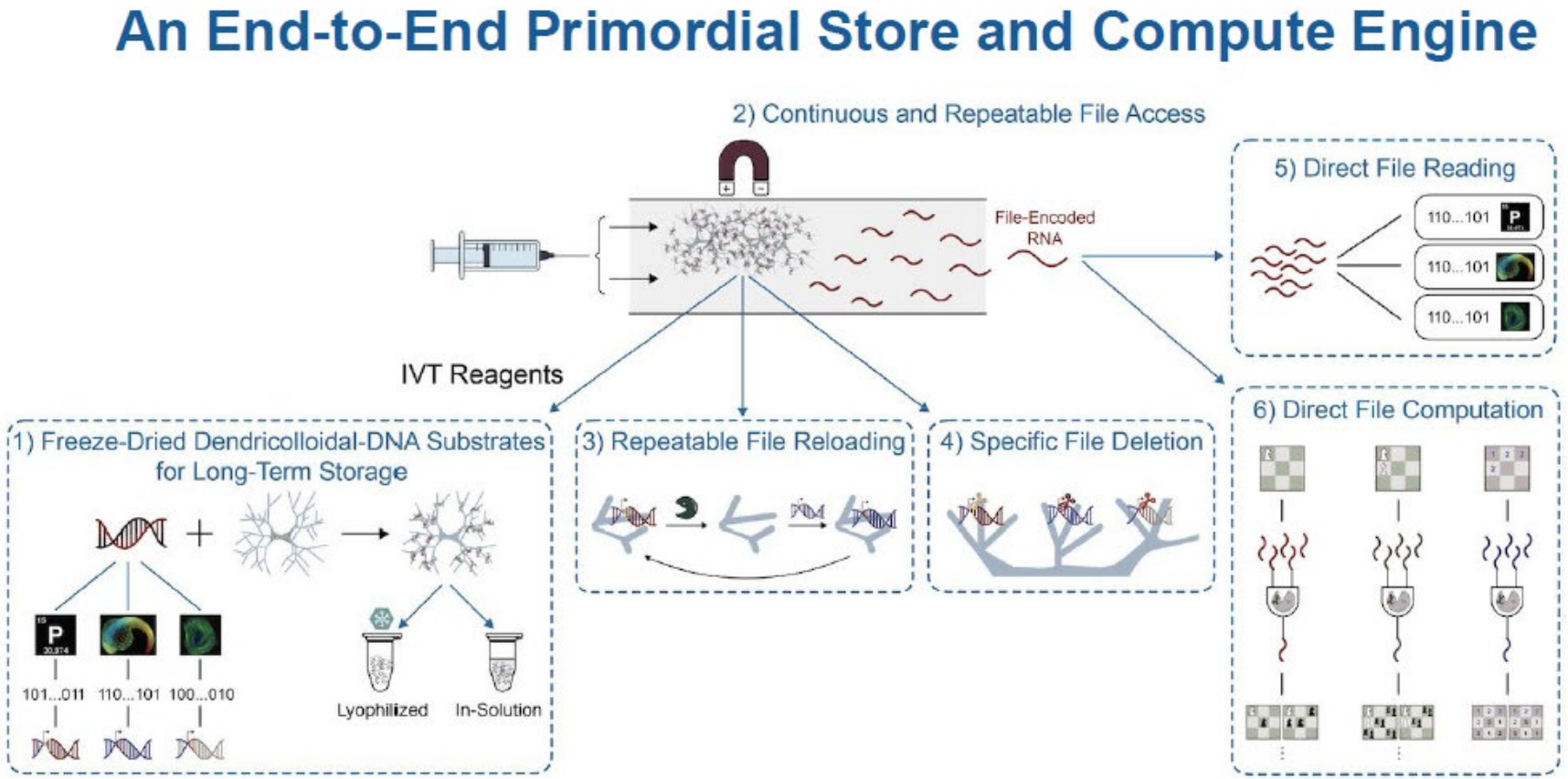
- Storage and Computing with DNA 2025, Paris, June 19-21

- Finish draft publications
  - Technology White Paper #2
  - Codec Requirements
  - Interoperable Interfaces

- New standards/specs as we think of them

Emerging example: Writing DNA to a substrate

NC STATE UNIVERSITY

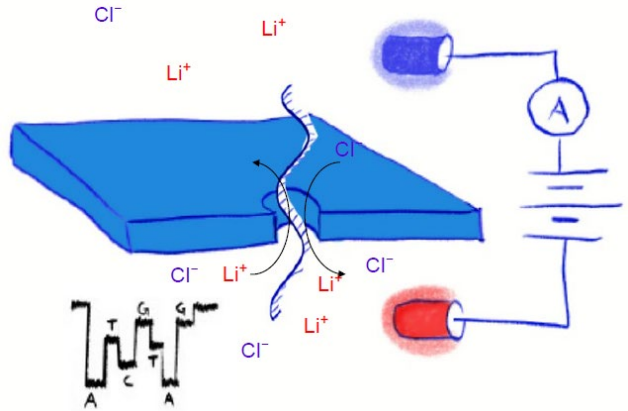


Lin, K.N., Volkel, K., Cao, C. *et al.* A primordial DNA store and compute engine. *Nat. Nanotechnol.* **19**, 1654–1664 (2024). https://doi.org/10.1038/s41565-024-01771-6

Emerging example: Reading w/ solid state nanopores

- Nanopores promising for DNA data storage
  - Long reads
  - Direct base calling so no expensive optics, indirect synthesis
- Nanopores also useful for the detection of molecules and use cases beyond DNA (RNA, Peptides, Proteins, …)
- Demand from many areas for fast molecular read, in data storage and significant existing adjacent markets
  - Proteomics (single molecule protein sequencing)
  - Disease detection (food, virus)
  - Environmental pathogens, natural or manmade

- Solid state nanopores: Less accuracy than biological, but …
  - Cheap fabrication (BEOL compatible)
    - Rely on semiconductor scaling
  - Accuracy can be compensated by coding gain
    - Optimize for retention and/or SNR
- Lots of ecosystem activity (customer and supplier) around SSNP as “fast read” solution



https://www.solidstatenanopore.com/post/nanopore-basics

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THANK YOU

Come join us:

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