DNA DATA STORAGE ALLIANCE
A SNIA TECHNOLOGY AFFILIATE

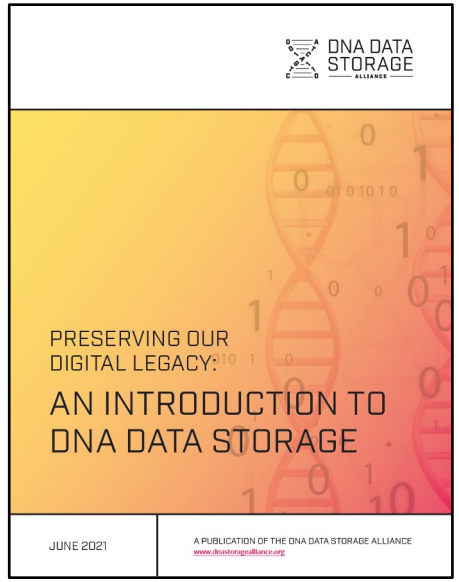
DNA DATA STORAGE ALLIANCE UPDATE

SNIA Preview

January 18, 2023

DNA Data Storage Alliance - At a Glance

- History
  - Formed on October 12th, 2020 by illumina, Microsoft, Twist and Western Digital
  - Joined SNIA as a Technology Affiliate group as of Jun-2022
  - 40+ members, including leading storage and biotech companies
- Mission
  - Create and promote an interoperable storage ecosystem based on DNA as a data storage medium
- Scope
  - Educate the market to create awareness and adoption of DNA data storage
  - Develop a DNA data storage industry technology roadmap to drive R&D and funding
  - Develop standards and/or specifications as needed by ecosystem

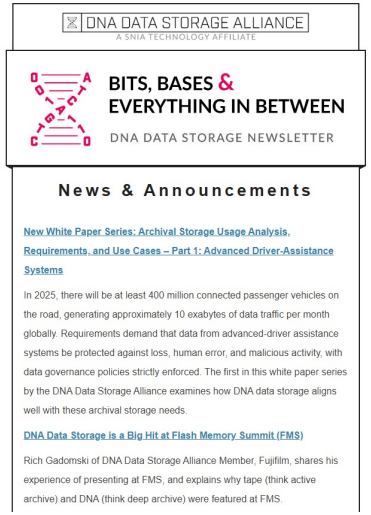


Marketing & Educational activities

- Educating the market through social media
  - LinkedIn: 1200 Followers, thousands of impressions for each post
  - Twitter: 550 Followers

- Launched DNA Data Storage newsletter – “Bits, Bases & Everything in Between”
  - Goes out every 2-3 months
  - Covers the latest news, and educational content about the technology
  - Great venue for the public audience to keep up to date with the progress of the field
  - 275 Subscribers

- Conference presence and presentations
  - Presented at the major storage conferences
  - Created a first of its kind DNA Data Storage Track at SDC, FMS and iPres



DNA TWG: DNA Archive Rosetta Stone (DARS) Subgroup

- **Goal**: Define a simple and minimal reserved area in a DNA archive that will function like a "Rosetta-Stone" and will give the reader/user an idea about how to read the rest of the archive
- Very similar to Master Boot Record (MBR)
- DNA has no organized physical structure like HDD (Sectors, Partitions) and the media doesn't contain the reader/writer (like optical) and raises interesting challenges for the group
- DNA reading costs time and money

Sector 0 – Very minimalistic piece of DNA (~20 bytes) used to identify the vendor and the codec used to read Sector 1 by using a pointer to externally persisted database

Sector 1 – Rich information about the archive that serves three functions:
- **Give the user a clear description of the archive contents**
- **Give the sequencer (reader) detailed instructions that can save time/money**
- **Provide "boot" instructions to the decoder for the decoding process**

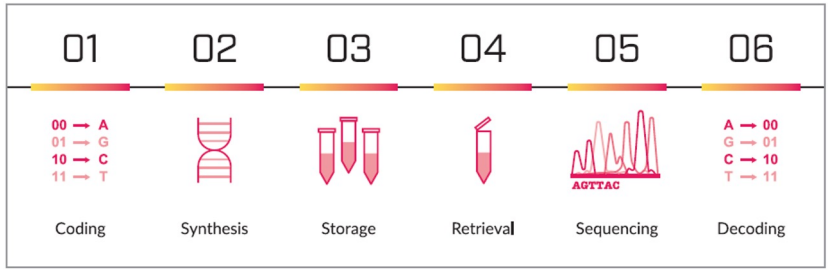
Sector 1 is limited to the size of a QR code (3KB)

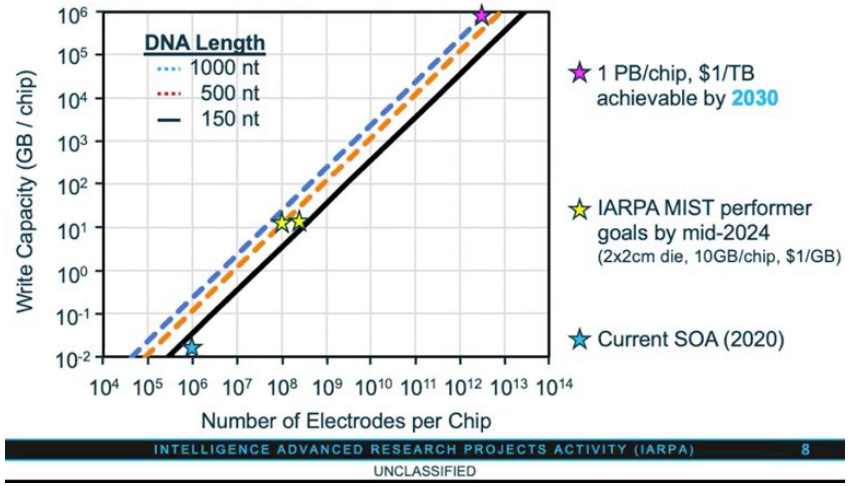
Industry Technology Roadmap SIG

Guide for academic/industry research and investment

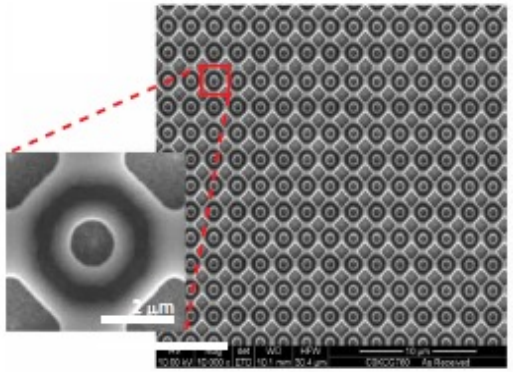
Roadmap for how DNA data storage can scale to commercial viability

- Key technologies and challenges in the pipeline
- Success metrics: capacity, transfer rates, cost, …

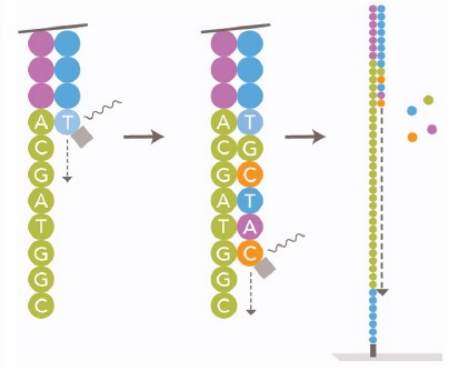




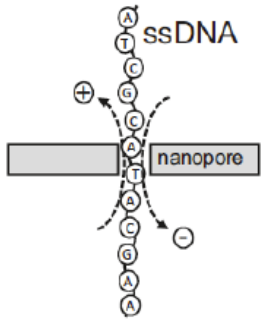
Electrochemical Synthesis



Sequencing by Synthesis



Nanopore Sequencing



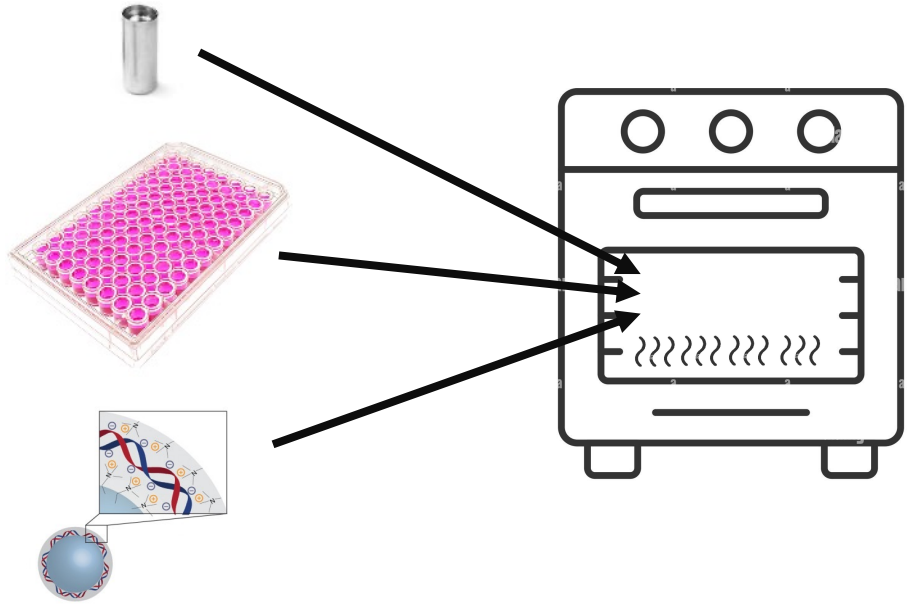
DNA TWG: Data Retention Subgroup

Enable different technologies for storing digital data in DNA to be verified and compared

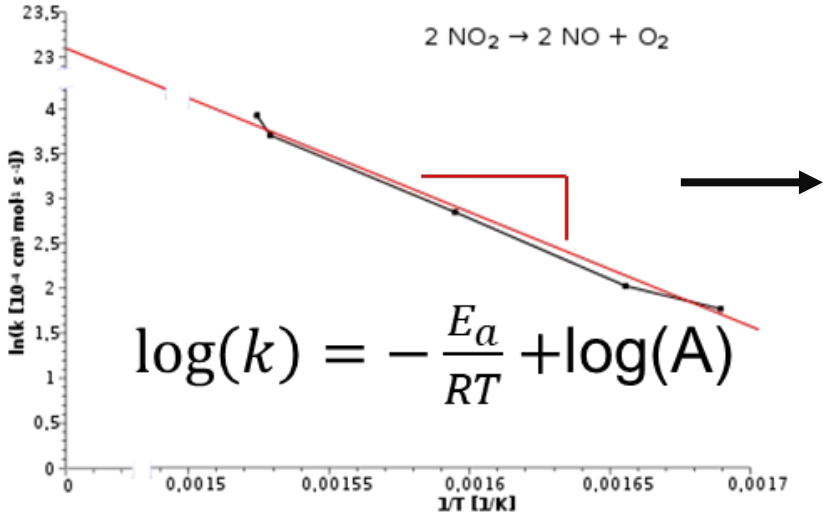
Technology Under Test

Accelerated at various conditions

- **Time, Temp, Humidity, ...**



Model fit



Parameter Extraction

- SNV rate
- Break rate
- Etc.
- Error bars

Participation

- Industry Impact
  - First alliance in this new field; shaping industry as it's being built
- Segment Relevance
  - The storage hierarchy needs a new layer for zettabyte scale storage
- Why join?
  - Multi-disciplinary field requiring experts from software, storage, hardware, biotech and more
  - Opportunity to be part of a birth of a new technology for archival storage
- Contacts
  - Daniel Chadash (dchadash@twistbioscience.com)
  - Dave Landsman (dave.landsman@wdc.com)
  - info@dnastoragealliance.org
- Membership annual fees
  - General Member (Voting) - $2,000
  - Board Member (Voting) - $10,000
  - Academy (Non-Voting) - Free

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