



**BIOMEMORY**  
Sustainable Storage Solutions

2023 BIOMEMORY

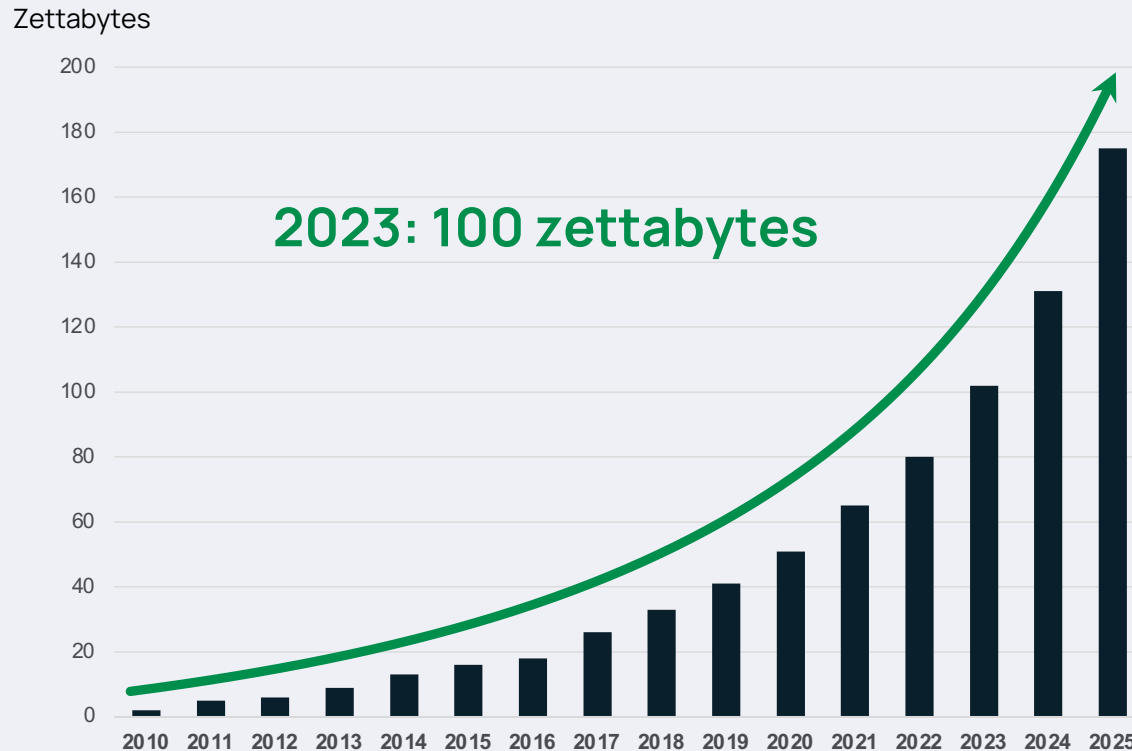
# Making DNA Data Storage a Reality



Erfane ARWANI, CEO and Co-founder - erfane@biomemory.com

Current digital media are limited and **storage** needs will **explode**

We produce twice as much data every 3 years



We are less and less able to store the huge amounts of data we produce



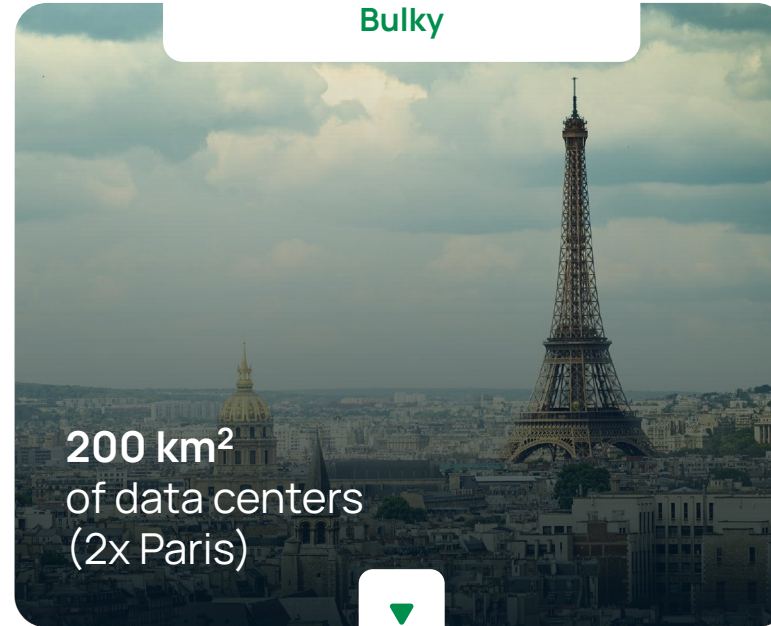
“If today we are capable of storing about 30% of the information we generate, by 2030 we’ll be able to store about 3%”

Dr Karin STRAUSS,  
Microsoft Research



# Problems with current digital **media**

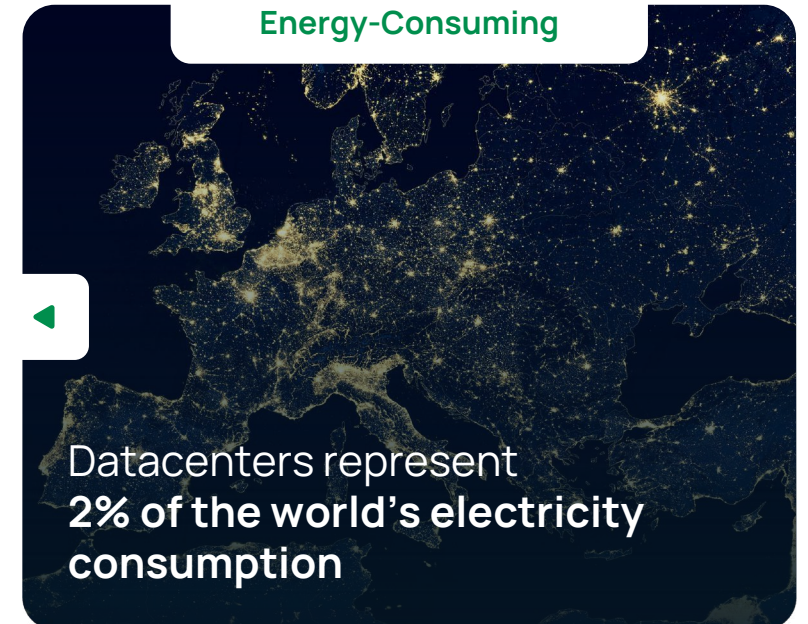
## Bulky



## Fragile



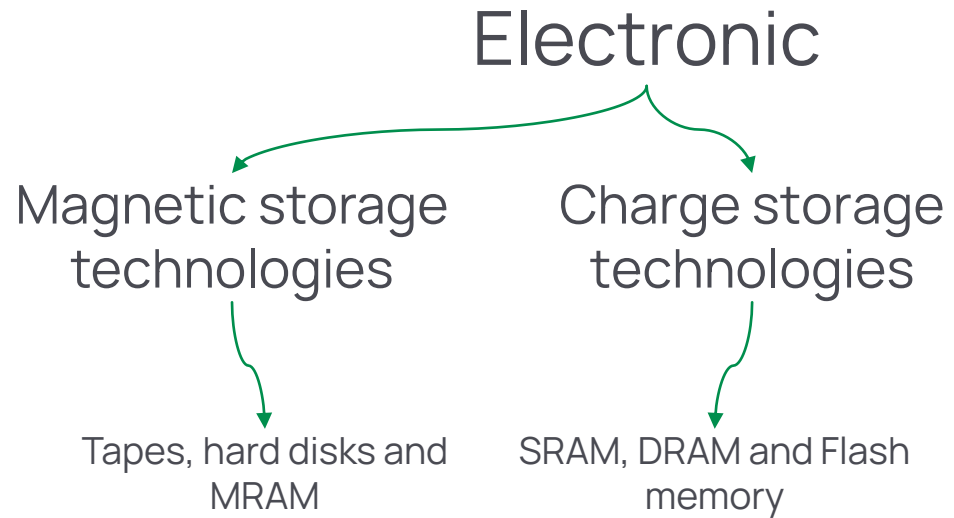
## Energy-Consuming



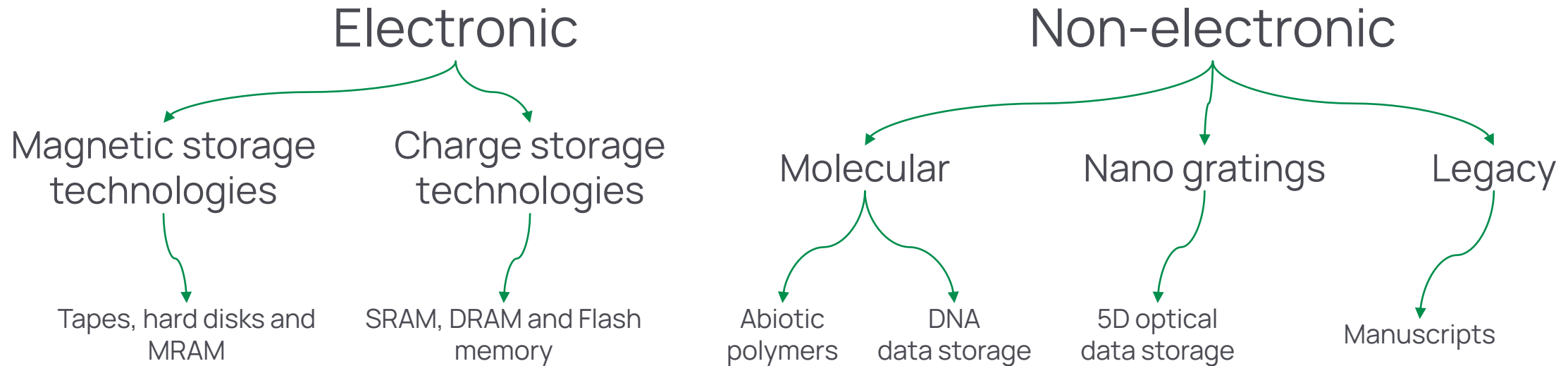
# Main storage devices in **datacenters**



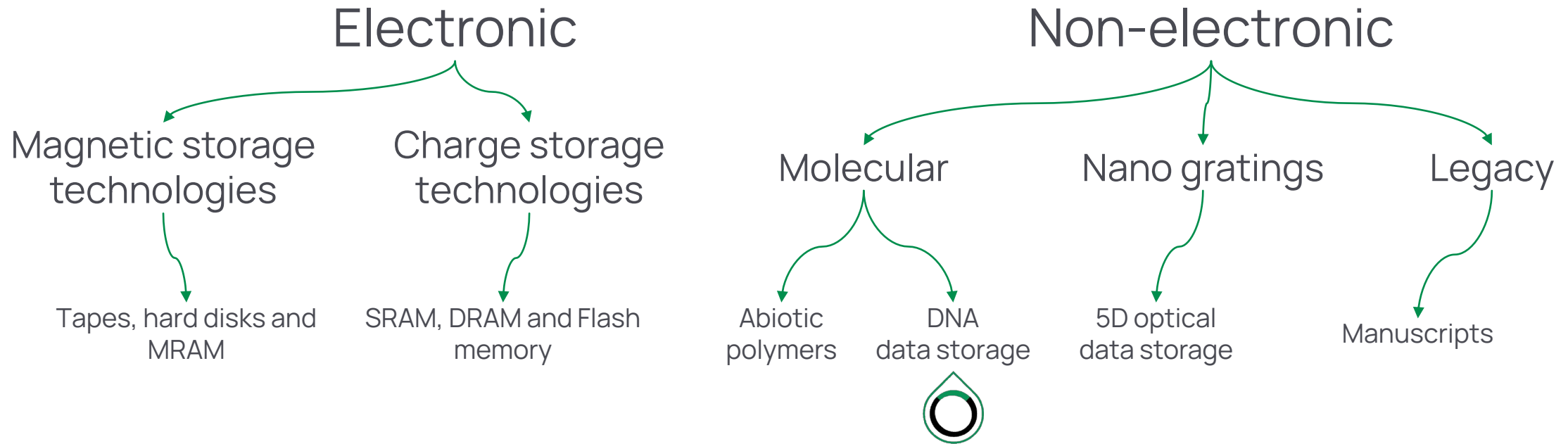
# Categories of Data Storage Technologies



# Categories of Data Storage Technologies



# Categories of Data Storage Technologies



# The DNA Data Storage

## High Storage Density

Complete humanity  
data in **100g**  
of DNA

## Longevity & Stability

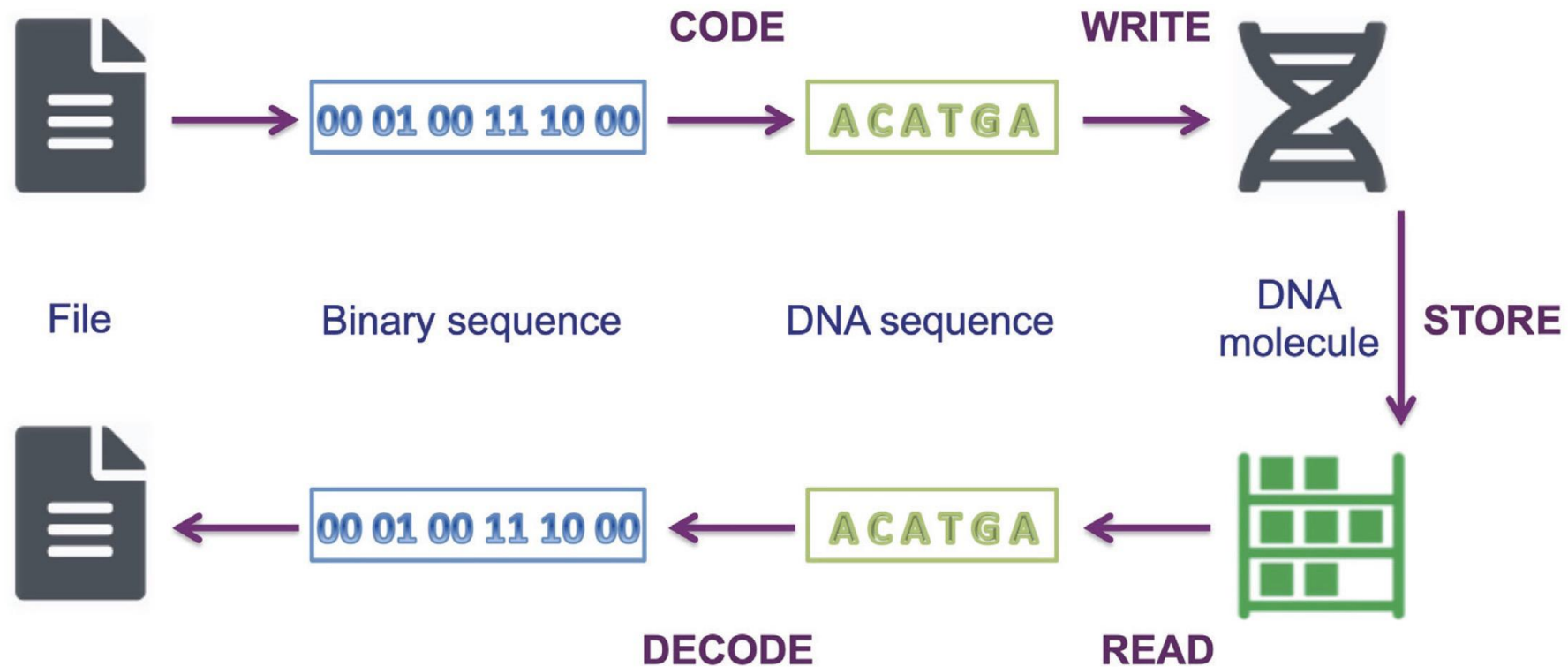
Stable  
for **millennia**

## Zero Power Upkeep

Stable at room temperature  
without energy input

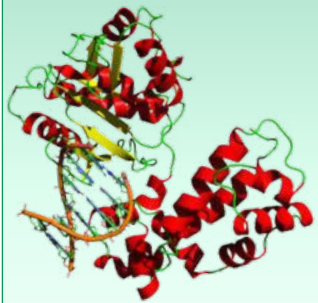


# End to end DNA Data Storage



Rapport de l'Académie des technologies. François Képès. Octobre 2020

## Need for **more efficient** DNA data storage systems



### Our vision

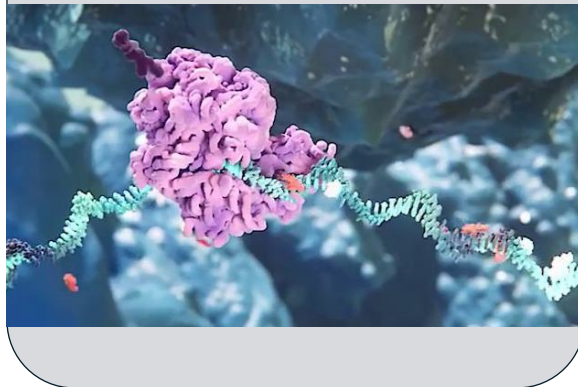
- ✓ Exploiting the potential of Nature
- ✓ Employing biological approaches to overcome DNA storage constraints



Images: Science et Avenir, Wikipédia

# Nature has already figured it out

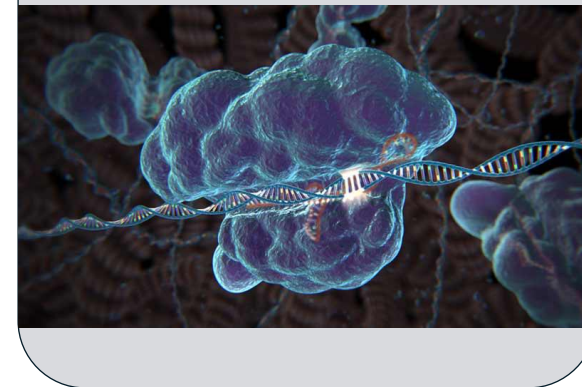
DNA copy



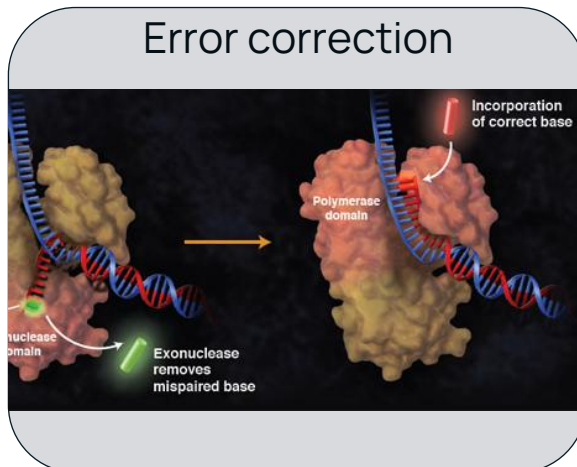
DNA reading



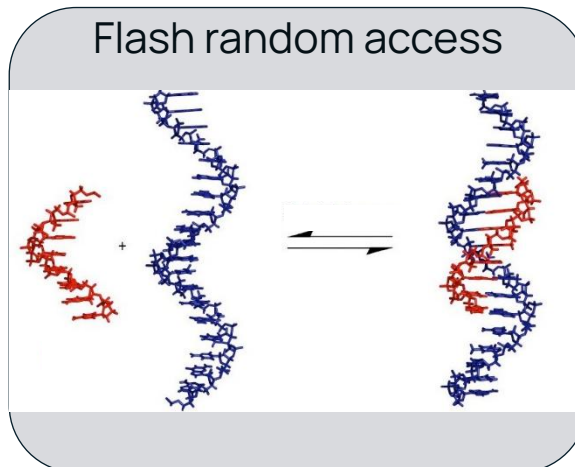
DNA editing



Error correction



Flash random access

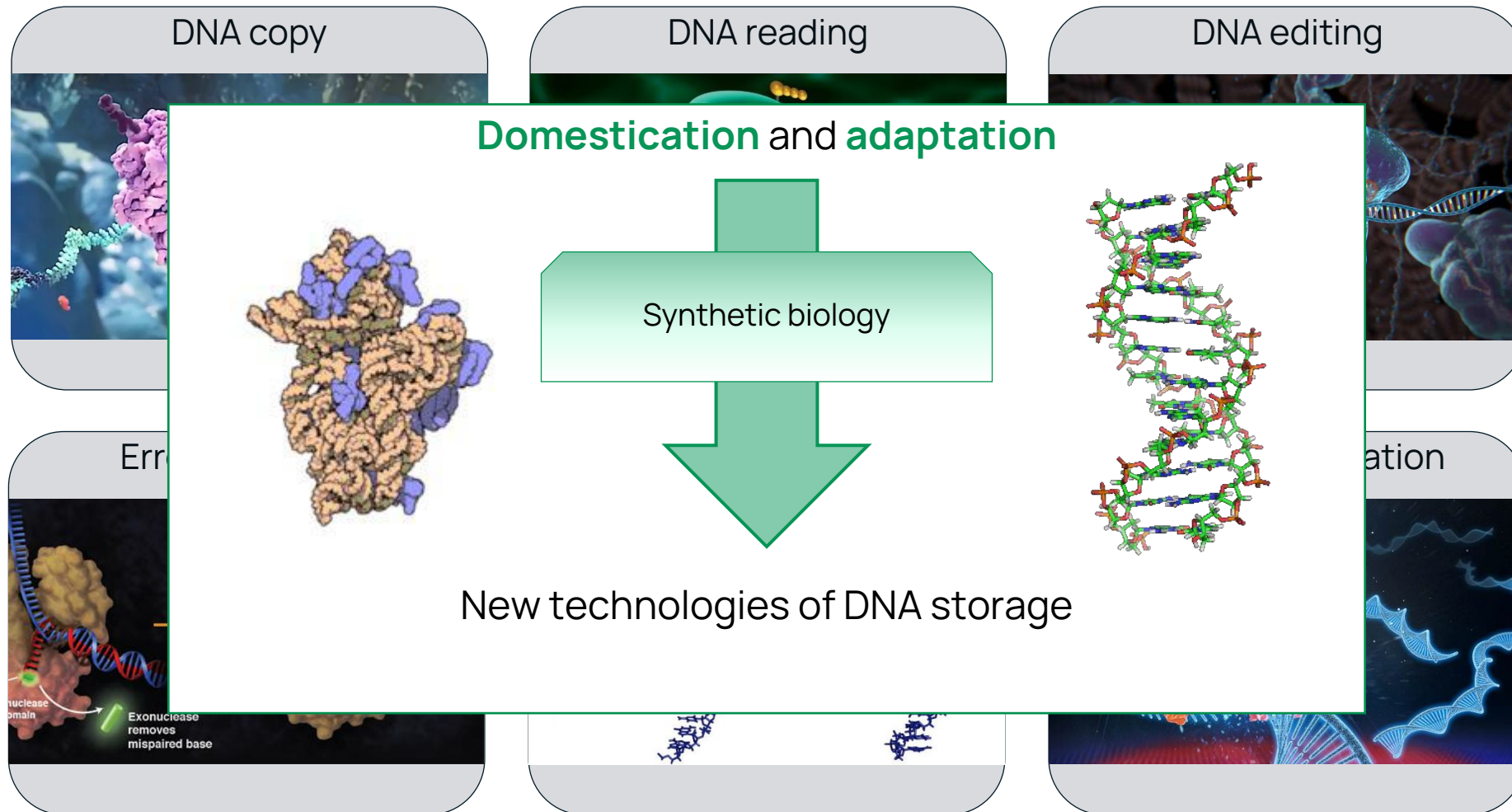


Signal amplification



Images : Random42, Neb, Gesundheitsindustrie, Phys

Nature has already figured it out



# DNA DRIVE

## A bio-inspired DNA storage strategy



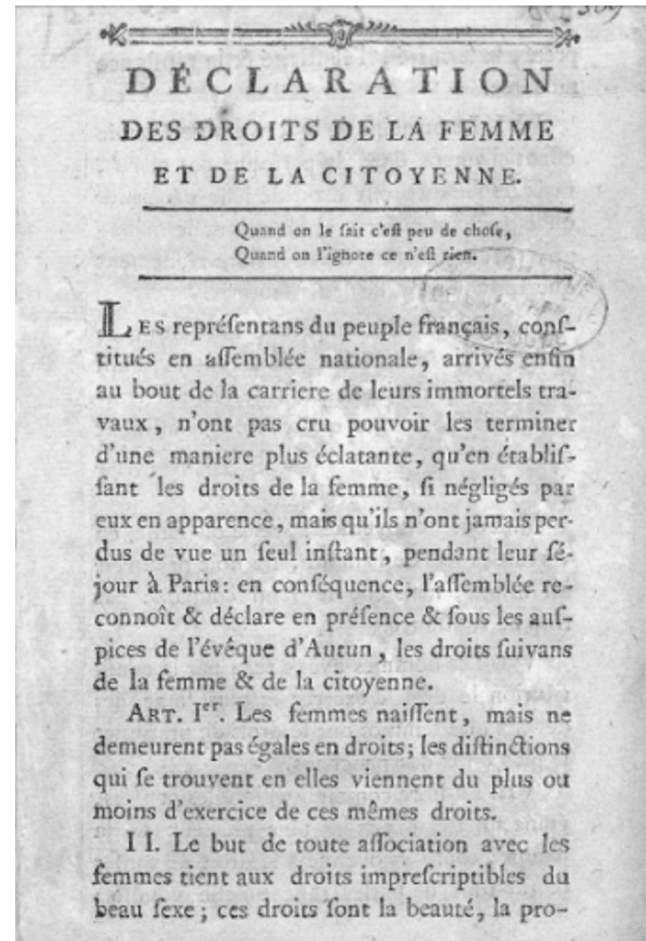
## DNA Drive

The next generation of cold storage media

- Unlimited total capacity
- Low cost copy  
very low copy error rate
- Compatible with all sequencing technologies
- Any binary file system  
organized in physical DNA sectors, tracks, arrays..
- Compression, random access
- Powerful error correction code
- Biosafe  
Non-biohackable by design
- Fully automatable

# Proof of concept

## historical texts saved for eternity



Officially stored  
at the **French National Archives**  
since November 23<sup>rd</sup> 2021

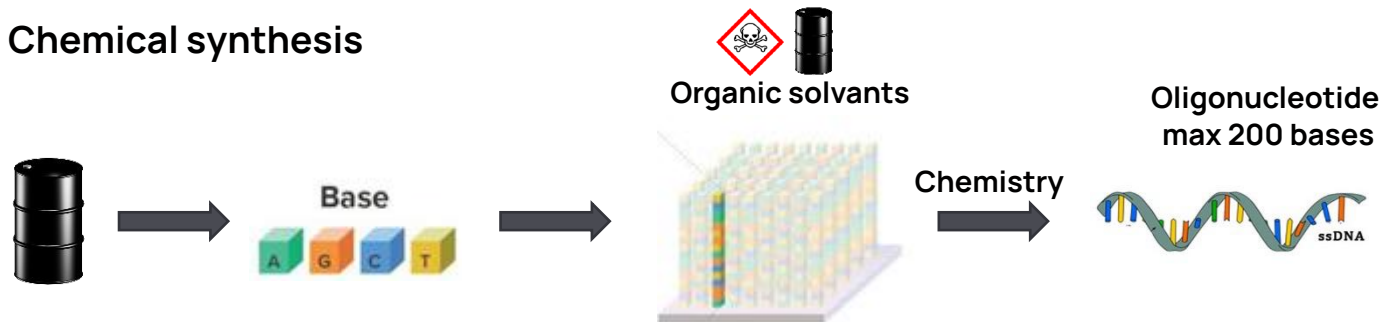
**ARCHIVES  
NATIONALES**  
Fontainebleau - Paris - Pierrefitte-sur-Seine

# DNA writing Synthesis

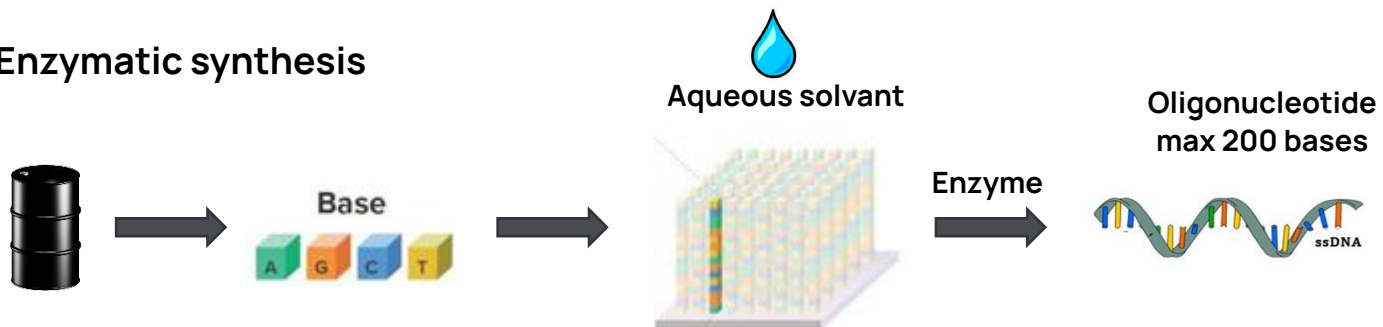
**The mainstream strategy**  
storage on oligonucleotides



## Chemical synthesis

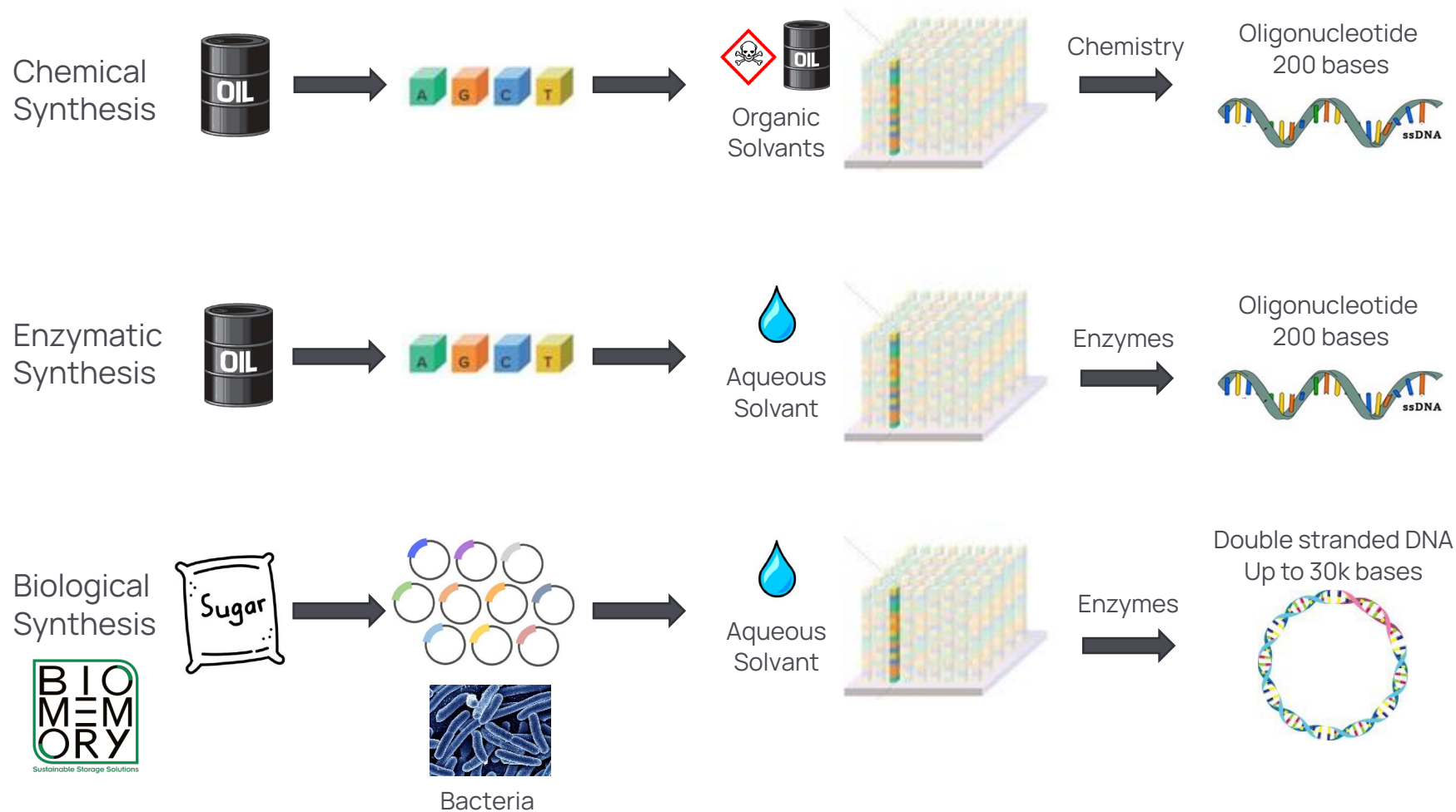


## Enzymatic synthesis



# DNA writing

## Biomemory's DNA synthesis is radically different



- Potential \$1/MB and beyond
- **Renewable** : 100% biosourced
- **Biosafe** : non-biohackable by design



# Our **2030** Vision : A rackable DNA Data Storage Server A business model similar to printers



- ✓ Autonomous
- ✓ Read/Write
- ✓ Exabyte scale
- ✓ \$1/terabyte
- ✓ Removable DNA Drive cartridges
- ✓ Removable DNA ink cartridges
- ✓ 4U rackable server for existing DCs
- ✓ No biological expert on site

# BIOMEMORY

Sustainable Storage Solutions



Pure Player of  
DNA Data Storage



Bio-based  
DNA Storage

Let's build the first  
sustainable data storage solution!

Twitter @BIOMEMORYLABS

Erfane ARWANI, CEO and Co-founder - erfane@biomemory.com