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Launch of an exploratory Priority Research Programme and Equipment for data storage on DNA

The *MolecularXiv*¹ exploratory Priority Research Programme and Equipment (PEPR), under CNRS leadership, aims to invent new data storage devices in molecular media, including both DNA and artificial polymers. It was launched on 30 May 2022 with a budget of 20 million euros over 7 years, funded as part of PIA 4.

The quantity of data stored worldwide is estimated to increase to 175 zettabytes² by 2025. If we were to store this data on Blu-ray discs, it would require 23 stacks from the Earth and the Moon. The growing quantity of data is exceeding storage capacity, requiring alternative storage solutions that are both durable and consume little energy, given that some data centres have a carbon footprint equal to that of an entire city. To meet these challenges, chemically synthesized DNA, which offers extensive and lasting storage capacity with no energy consumption, has emerged as a solution for the future.

The objective of the MolecularXiv PEPR is to develop an ambitious acceleration programme—from conception to market—for new data storage devices in molecular media. Its activity will begin with research at 16 selected laboratories, in an effort to expand knowledge relating to the chemical synthesis of DNA; the coding and sequencing of DNA; and the structure of data within the DNA. This interdisciplinary research will rely on chemistry, microfluidics, signal processing, bioinformatics, the biology of sequencing, and polymer chemistry. The PEPR is designed to bring together national know-how, to support technology transfer via increased TRL—which is to say the transition from conception to manufacture—to create start-ups, and to secure a European Future and Emerging Technologies (FET) Flagship programme on the subject.

The PEPR will allocate its budget within the 16 laboratories that are directly involved, which will pursue four target projects: new generation DNA synthesis technology; efficient storage based on different coding and sequencing strategies; the spread of synthetic polymers as information-storage media; and practical, reliable, and exploitable molecular storage. Another portion of the budget will be devoted to calls for projects and calls for interest addressed to laboratories, along with scientific events and programming.

The CNRS is joined by partners such as the French National Audiovisual Institute (INA), the European Parliament, the National Library of France (BnF), and Software Heritage, with which it would like to conduct real experiments with data archiving on a large scale.



Notes

1 Exploratory PEPRs target emerging scientific or technological sectors identified by the government, with a view to structuring these communities. They are funded as part of the research component of PIA 4 and the France Recovery plan. Exploratory PEPRs are the result of an exacting selection process conducted by an international jury.

2 A zettabyte equals one sextillion bytes.

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