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ADVANCING INFORMATION TECHNOLOGY USING SYNTHETIC DNA AS AN ALTERNATIVE TO ELECTRONIC-BASED MEDIA

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Project Summary: Information technology is growing with a compound annual growth rate of 5%, and the global datasphere of digital records is predicted to be as large as 175 zettabytes by 2025. It is thus more relevant than ever to find solutions for securely handling vast amounts of digital information, and to establish a storage architecture which is able to cope with the increasing volumes of data. As part of this work, we developed a random number generator based on DNA synthesis, a stochastic chemical process producing true random numbers at a speed of 0.3 MB/s. We further wrote a protocol of the exact procedure for storing a digital file of any size in DNA to be accessed by anyone, and appended the existing DNA storage channel with a solution for restoring lost data by using enzymatic repair. With our work we aim for, on the one hand, opening the door to a secure architecture for random number generation, and, on the other hand, for strengthening the robustness of the DNA data storage channel.

CV. Linda received her BSc. and MSc. In Chemical and Bioengineering from ETH Zurich. In 2018 she started her doctoral studies at the Functional Materials Laboratory where she worked in collaboration with Microsoft.