

ICB PhD public presentations

## DIGITAL TWINS AND DATA ANALYTICS FOR (BIO-)CHEMICAL PROCESSES IN DNA DATA STORAGE

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**ETH Hönggerberg, HCI H2.1 and on Zoom**

**(<https://ethz.zoom.us/j/8283415040>)**

**Project Summary:** DNA's favourable properties for storing information have enabled many novel applications, ranging from materials with embedded memory to cryptography. While the (bio-)chemical processes involved in these applications are well-established due to their ubiquity in molecular biology, the understanding of their impact on information integrity is still limited. As a result, this lack of comprehensive data and established workflows restricts experimental planning and the development of error-correction codes, thereby leading to high experimental costs and poor reproducibility. In my research, I experimentally characterize and evaluate these (bio-)chemical processes to build systematic digital twins and appropriate analytical tools. In doing so, this work uncovers a new inhibition mechanism during PCR amplification, establishes workflows for long-term data storage in DNA, and enables systematic comparison of the state-of-the-art in error correction.

**CV.** Andreas earned his B.Sc. and M.Sc. in Chemical- and Bioengineering from ETH Zürich, including a research stay in the group of Prof. Richard D. Braatz at MIT. Before joining the Functional Materials Laboratory for his PhD in 2021, he interned at Roche, working on a novel process to improve flowability of APIs.