Assistant Professorship of Coding for Communications and Data Storage
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Master's Thesis

Concatenated Codes for Error Correction in DNA Storage

Encoding information into synthetic DNA is a novel approach for data storage. Due to its natural robustness and size in molecular dimensions, it can be used for long-term and very high-density archiving of data. Since the DNA molecules can be corrupted by thermal processes and the writing/reading process of DNA molecules can be faulty, it is necessary to encode the data using error-correcting codes. Due to the channel model concatenated codes are a suitable candidate for efficient error correction.

The student will analyze existing schemes for error correction in DNA storage based on concatenated codes and develop improved methods using soft information in the outer code, unequal error protection and list recovery. The improvements will be analyzed anlytically and by simulations.

Prerequisites

- Channel coding, basic probability theory, experience in programming

- Optional: Coding theory for storage and networks

Advisors

Andreas Lenz, Lorenz Welter, Sven Puchinger