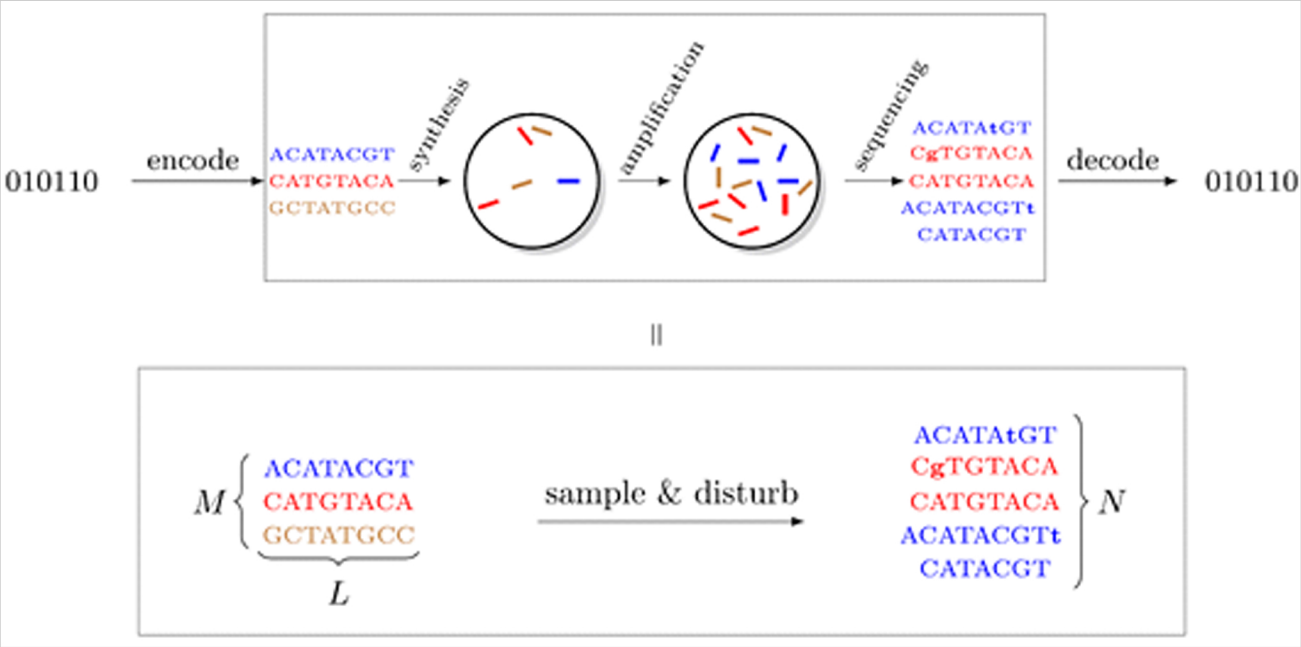
Colloquium on Combinatorial Designs

2021.07.10 14:30-18:00

https://meeting.tencent.com/s/lRJQ8tW5hNBl

ID: 630 503 561



Invited Speakers

Qi Wang Non-overlapping codes

Hengjia Wei Improved Coding over Sets for DNA-Based Data Storage

Xuan He Basis-finding algorithm for decoding fountain codes for DNA storage

Organisers: Tao Feng, Xiande Zhang, Yue Zhou

Colloquium on Combinatorial Designs

Organized by Tao Feng, Xiande Zhang and Yue Zhou

July 10, 2021

Information

Our 4th colloquium will be held via Tencent Voov meeting on 10th July from 14:30 to 18:00. It consists of three invited talks, each of which will take around 1 hour. There will be a 5-minutes break between every two talks.

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Contents

Abstracts

Non-overlapping codes

10 July
14:30pm

Qi Wang
Southern University of Science and Technology, China

Non-overlapping codes have been investigated for decades, and have recently found important applications in DNA storage systems. In this talk, I will first survey important results on non-overlapping codes, and then talk about some recent new results.

Improved Coding over Sets for DNA-Based Data Storage

10 July
15:30pm

Hengjia Wei
Ben-Gurion University, Israel

In this talk, we look at error-correcting codes over sets, which have applications to DNA-based data storage. The DNA-storage channel receives a set of sequences, and produces a corrupted version of the set, including sequence loss, symbol substitution, and symbol insertion/deletion. We study two parameter regimes. New bounds on code parameters are provided, which improve upon known bounds. New codes are constructed, at times matching the bounds up to lower-order terms or small constant factors.

Basis-finding algorithm for decoding fountain codes for DNA storage

10 July
16:30pm

Xuan He
Southwest Jiaotong University, China

Due to its extremely high storage density, longevity, and low maintaining cost, DNA storage becomes a promising candidate for archiving massive data in the future. Up to now, the DNA fountain scheme achieves the highest net information density (1.57bits/nt). However, it adopts a decoding algorithm for fountain codes, which can only work for correct received symbols and is thus not efficient enough for the DNA storage scenario where some received symbols may have undetectable errors. This motivates us to propose a basis-finding algorithm (BFA). The BFA is the only known efficient hard-decision decoding algorithm for fountain codes for the general scenario where there exist some erroneous received symbols. This talk gives a brief review of the DNA storage, DNA fountain scheme, and BFA.
