

Information and Coding Theory Aspects of DNA-based Data Storage

Call for papers

DNA-based data storage is a cutting-edge technology that offers exceptional information density and longevity. However, the processes of writing, storing, and reading data in DNA formats are prone to noise and errors at various stages. Achieving reliable storage at a reasonable cost necessitates advanced error-correction methods. Traditional error-correction, which primarily addresses substitution and erasure errors, falls short due to the unique characteristics of the DNA storage medium. This has led to the emergence of new coding challenges and the need for enhancements to existing techniques. These challenges include developing codes and fundamental bounds for handling insertions, deletions, and substitutions, reconstructing sequences, addressing duplication errors, designing constrained codes, and much more. Moreover, ensuring data privacy—a critical requirement for any storage technology—has not been significantly explored in the context of DNA-based data storage.

This Special Issue encourages the research community working on topics related to DNA-based data storage to advance the mathematical foundations of error-correction in DNA storage systems, with an emphasis on data privacy. Contributions are sought on topics related to DNA-based data storage, including but not limited to the following areas:

- Error-correcting codes
- Information capacity of the DNA data storage channel
- Constrained codes
- Sequence reconstruction problems
- Coding techniques for emerging sequencing and synthesis technologies - Coding for polymer-based data storage
- Machine learning approaches tailored to DNA-based data storage
- Data privacy and authentication in DNA-based data storage

Survey papers on any topic will also be considered (potential authors are encouraged to inquire with the Guest Editors).

Important Dates

- *Manuscript Submission Deadline:* 15 March 2025
- *First Notification:* 15 July 2025
- *Acceptance Notification:* 30 August 2025
- *Final Manuscript Due:* 10 September 2025
- *Publication Date:* Each accepted manuscript will be published on IEEE Xplore after finishing its peer-review with a final deadline for publishing the whole Special Issue by 30 October 2025

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