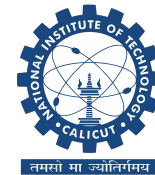


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- ★ **~2m NSF Funding**
- ★ **NSF CAREER 2022**
- ★ **REU site@NC State – Algorithms & Theory**
- ★ **Mentor@ EPSCoR Research Infrastructure Improvement (RII) Track-4 award**
- ★ **3 PhD graduates (all assist. profs)**

# Algorithms & Theory Research

- String Algorithms
- Compressed Data Structures
- Bioinformatics
- ...

## Proceedings

### Proceedings of the 2024 Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)

#### Near-Optimal Quantum Algorithms for Bounded Edit Distance and Lempel-Ziv Factorization

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Pages 3302 - 3332 • <https://doi.org/10.1137/1.9781611977912.118>



## Abstract

Measuring sequence similarity and compressing texts are among the most fundamental tasks in string algorithms. In this work, we develop near-optimal *quantum* algorithms for the central problems in these two areas: computing the edit distance of two strings [Levenshtein, 1965] and building the Lempel-Ziv factorization of a string [Ziv & Lempel, 1977], respectively.

Classically, the edit distance of two length- $n$  strings can be computed in  $\mathcal{O}(n^2)$  time and there is little hope for a significantly faster algorithm: an  $\mathcal{O}(n^{2-\epsilon})$ -time procedure would falsify the Strong Exponential Time Hypothesis. Quantum computers might circumvent this lower bound, but even 3-approximation of edit distance is not known to admit an  $\mathcal{O}(n^{2-\epsilon})$ -time quantum algorithm. In the *bounded* setting, where

