

## Microscopic DNA sequence visualization

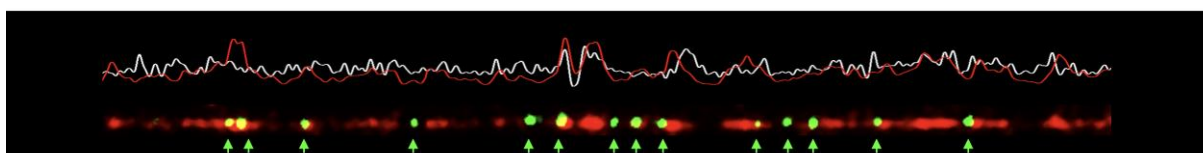
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DNA is the most essential molecule because it stores biological information that shapes our bodies and determines our existence. This information is primarily found in the DNA sequence. As a result, understanding DNA sequences has become indispensable for basic biological research and numerous applied areas. Over the the last two decades, there has been remarkable progress in sequencing technology, commonly referred to as next-generation sequencing. Rapid DNA sequencing methods have greatly accelerated biological and medical research and discovery. Moreover, scientists recently discovered that there is another layer of information above the DNA sequence, called the epigenome. Numerous approaches have

been developed to analyze epigenomes. One promising approach involves using large DNA molecules obtained from the cell to investigate epigenomic information. The rapid advancement of microscopic systems and cameras has made it easier to capture images of these molecules. However, a major challenge lies in determining the sequence of imaged DNA molecules. To address this issue, we have developed several approaches for identifying the DNA sequences from images. In this presentation, I will demonstrate how to identify the sequences of single DNA molecules based on their staining pattern in microscopic images.<sup>1-4</sup>



...ACGTACGT....



### Microscopic DNA sequence determination by AT-specific staining and barcode markers

#### References

<sup>1</sup> Bong, S.;...; Jo, K. *Nucleic Acids Res.* **2023**, *in press*

<sup>2</sup> Jin, Y.;...; Jo, K. *Anal Chem.* **2022**, *94*, 16919-16926

<sup>3</sup> Lee, S.;...; Jo, K. *Nucleic Acids Res.* **2018**, *46*, e108

<sup>4</sup> Lee, S.;...; Jo, K. *Nucleic Acids Res.* **2016**, *44*, e6



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