

# **Advancements in Next-Generation Sequencing Technology: Current Trends and Future Directions**

## **Abstract**

The introduction of next-generation sequencing (NGS) has revolutionized genomics research by enabling efficient and cost-effective analysis of DNA and RNA molecules at unprecedented scales. This technology has rapidly advanced various fields of genomics by allowing simultaneous sequencing of millions of DNA fragments, offering insights into genome structures, genetic variations, gene expressions, and epigenetic modifications. NGS platforms have broadened the scope of research in rare genetic diseases, cancer genomics, microbiome analysis, infectious diseases, and population genetics. Furthermore, NGS has facilitated the development of targeted therapies, precision medicine strategies, and enhanced diagnostic techniques. This talk presents an overview of current trends and recent advancements in NGS technology, emphasizing its potential impact across diverse genomic research domains. Additionally, the talk discusses challenges in NGS, such as improving sequencing data accuracy and sensitivity, developing advanced data analysis algorithms, and striving for more efficient, scalable, and cost-effective solutions in the future.