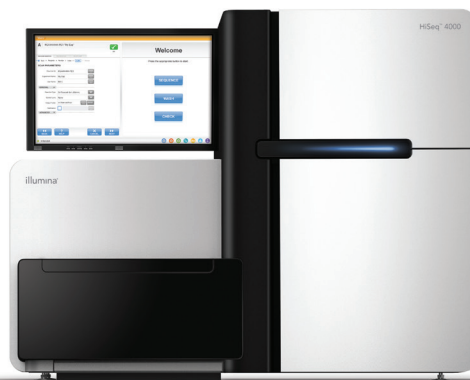


# HiSeq® 3000/HiSeq 4000 Sequencing Systems

## Setting a new standard for cost-effective, high-throughput, production-scale sequencing across multiple applications.

### Highlights

- **Dramatically Increased Data Output and Throughput**  
 Maximize efficiency through innovative patterned flow cell technology
- **Exceptional Data Quality**  
 Leverage proven, industry-leading Illumina sequencing by synthesis chemistry
- **Unsurpassed Capacity**  
 Sequence 12 genomes, 100 transcriptomes, or 96 exomes in fewer than 3.5 days



**Figure 1: The HiSeq 4000 System.** The HiSeq 4000 System provides cost-effective, efficient sequencing for large-scale studies across multiple applications.

### Introduction

Over the last decade, Illumina sequencing by synthesis (SBS) chemistry has revolutionized next-generation sequencing (NGS), establishing the HiSeq Series of sequencing systems as the platform of choice for high-throughput, production-scale sequencing laboratories. Building on the proven performance of the HiSeq 2500 System, and harnessing the patterned flow cell technology originally developed for the HiSeq X™ Ten System, the HiSeq 3000/HiSeq 4000 Systems provide unparalleled speed and performance.

### Higher Throughput, Faster Results

Offering ultra-high throughput, the HiSeq 3000/HiSeq 4000 Systems deliver > 750 Gb per flow cell in 3.5 days. With the highest daily throughput and lowest price per sample across multiple applications, the dual-flow cell HiSeq 4000 System (Figure 1) generates > 400 Gb per day and up to 1.5 Tb per run. This power allows sequencing of more samples at greater depth, generating richer, more meaningful data in less time. Large studies can be completed faster, with less hands-on time and at a lower cost. The HiSeq 3000 System

provides the same throughput per flow cell as the HiSeq 4000 System, but only processes a single flow cell at a time to yield > 200 Gb per day and 750 Gb per run.

### Innovative Patterned Flow Cell

Taking advantage of the innovative patterned flow cell technology first introduced in the HiSeq X Ten System, the HiSeq 3000/HiSeq 4000 Systems offer an exceptional level of throughput. Patterned flow cells contain billions of nanowells at fixed locations (Figure 2). The structured organization of the flow cell provides for even cluster spacing and uniform feature size, enabling accurate resolution of flow cells clustered at extremely high densities. A proprietary clustering method, exclusion amplification, ensures that only a single DNA template binds and forms a cluster within a single well, resulting in high well occupancy and maximum data output. Using this technology, the HiSeq 3000/HiSeq 4000 Systems can sequence up to 6 genomes, 50 whole transcriptome samples, or 48 exomes per flow cell in fewer than 3.5 days.







**Figure 3: A Complete Sequencing Solution.** The HiSeq 3000/HiSeq 4000 Systems are part of a complete sequencing workflow that includes library preparation, sequencing, and data analysis.

## Complete Sequencing Solutions

Illumina offers a comprehensive portfolio that crosses the entire sequencing workflow, from library preparation to data analysis (Figure 3). TruSeq® DNA and RNA Library Prep Kits support whole-genome sequencing, exome sequencing, and RNA-Seq on the HiSeq 3000/4000 Systems. Additional library preparation kits such as, Nextera® XT DNA Library Prep Kit, Nextera Mate-Pair Library Prep Kit, TruSeq Synthetic Long-Read DNA Library Prep Kit, ChIP-Seq DNA Library Prep Kit, and the TruSeq Small RNA Library Prep Kit are also compatible with the HiSeq 3000/4000 Systems.

HiSeq 3000/4000 Reagent Kits provide ready-to-use reagents for cluster generation and sequencing, reducing hands-on time and potential errors. Three different HiSeq 3000/4000 SBS Kits are available for use on the HiSeq 3000/HiSeq 4000 Systems. The SBS kits come in 50-cycle, 150-cycle, and 300-cycle kit sizes and can be used with either the single read (SR) or the paired end (PE) flow cells. Multiple kit sizes provide read length flexibility up to  $2 \times 150$  bp and support dual indexing workflows.

HiSeq Systems are integrated with the cloud-based BaseSpace® computing environment that provides simple, scalable data analysis and storage. The BaseSpace environment includes access to third-party vendor applications for downstream analysis through the App Store. Apps currently available include BWA and Isaac™ for WGS and exome enrichment and

Express and Tophat/Cufflinks for RNA-Seq. BaseSpace computing features real-time data upload, alignment and variant calling, run monitoring, and options to share data instantly with anyone in the world.

## Intuitive System Control Software

The HiSeq 3000/HiSeq 4000 Systems offer easy-to-use, touch screen-operated instrument control software. With optimized step-by-step directions, the control software guides users through each step of the sequencing workflow, including experiment setup, as well as reagent and flow cell loading. The software also generates real-time quality statistics for accurate run monitoring.

## Summary

The HiSeq 3000/HiSeq 4000 Systems combine industry-leading SBS chemistry with innovative patterned flow cell technology to offer the highest daily throughput, fastest turnaround times, and lowest price per sample across multiple applications. With the HiSeq 3000/HiSeq 4000 Systems, every laboratory can access the latest sequencing technology and increase their genomics power.

