Accelerating the Transformation in How We Analyze the Human Genome

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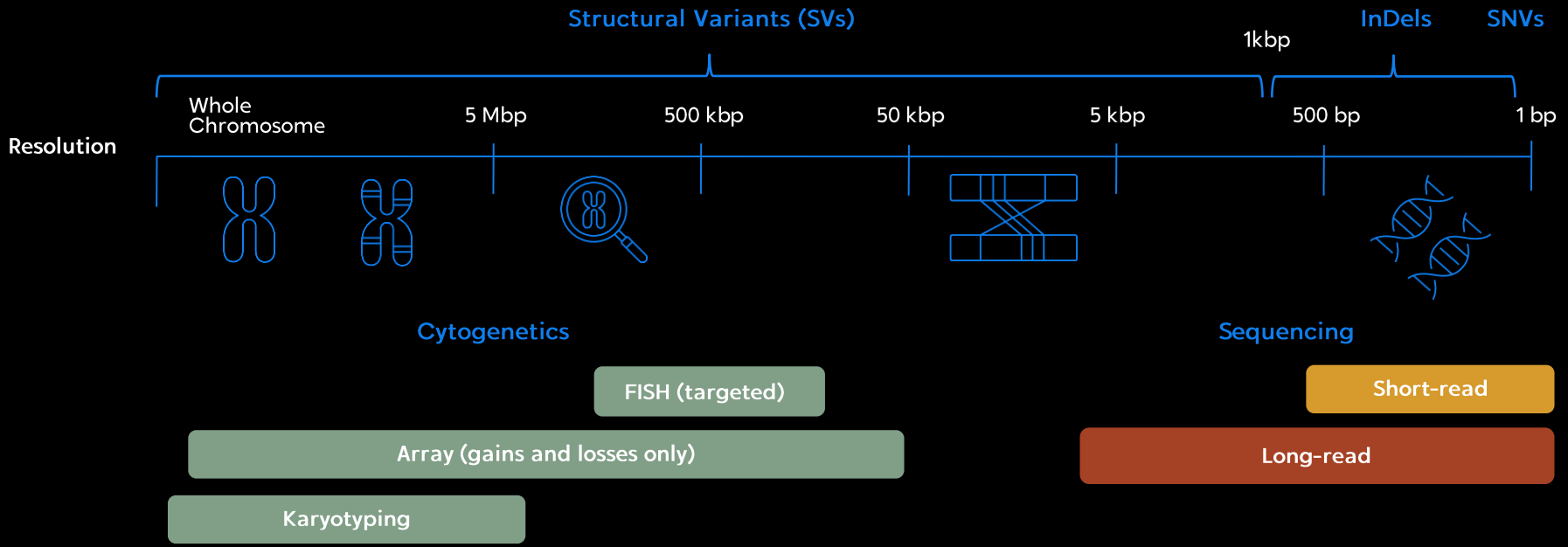
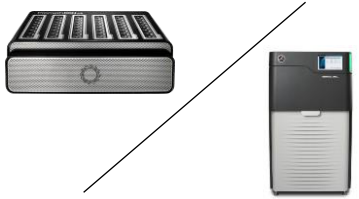
bionano

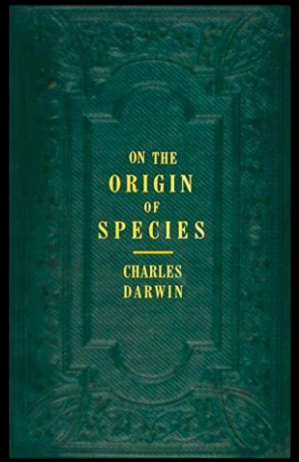
The Unmet Need in the Genome Continuum

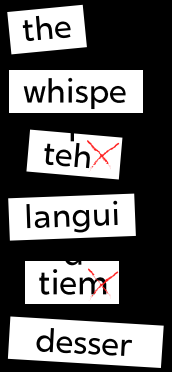


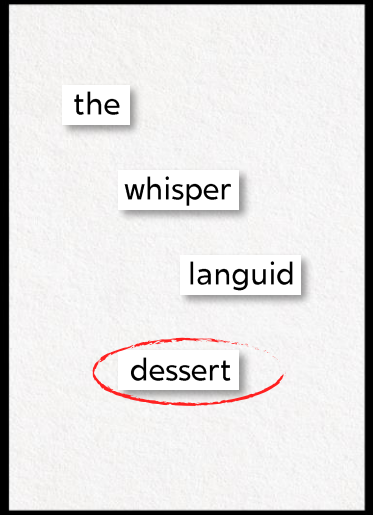
Two Decades of NGS Have Not Closed the Gap

 Roche/454	 Solexa/Illumina	 SOLiD	 Helicos
 Complete Genomics	 Ion Torrent	 MGI	 Singular
 Element	 Ultima	 Illumina/Novaseq	 Oxford Nanopore / PacBio

NGS is Unable to Reliably Tackle SVs for Fundamental Reasons

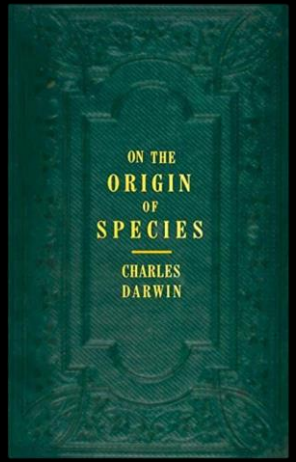


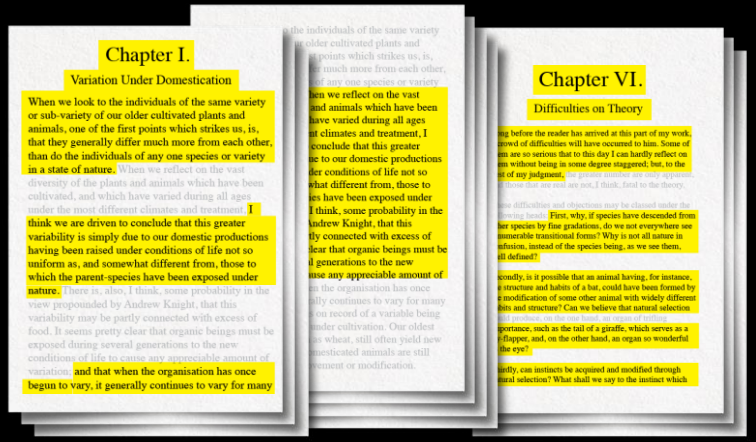


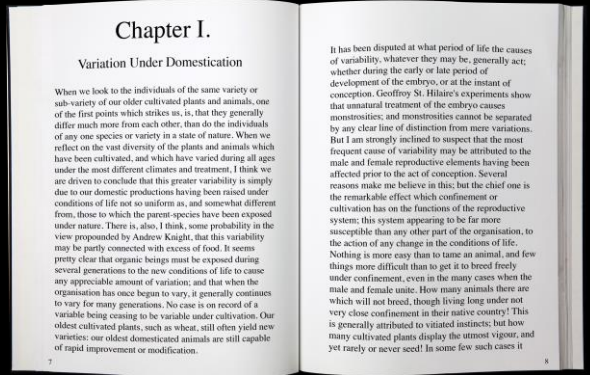


Chaisson, et al. *Nat Commun.* 2019;10(1):1784.

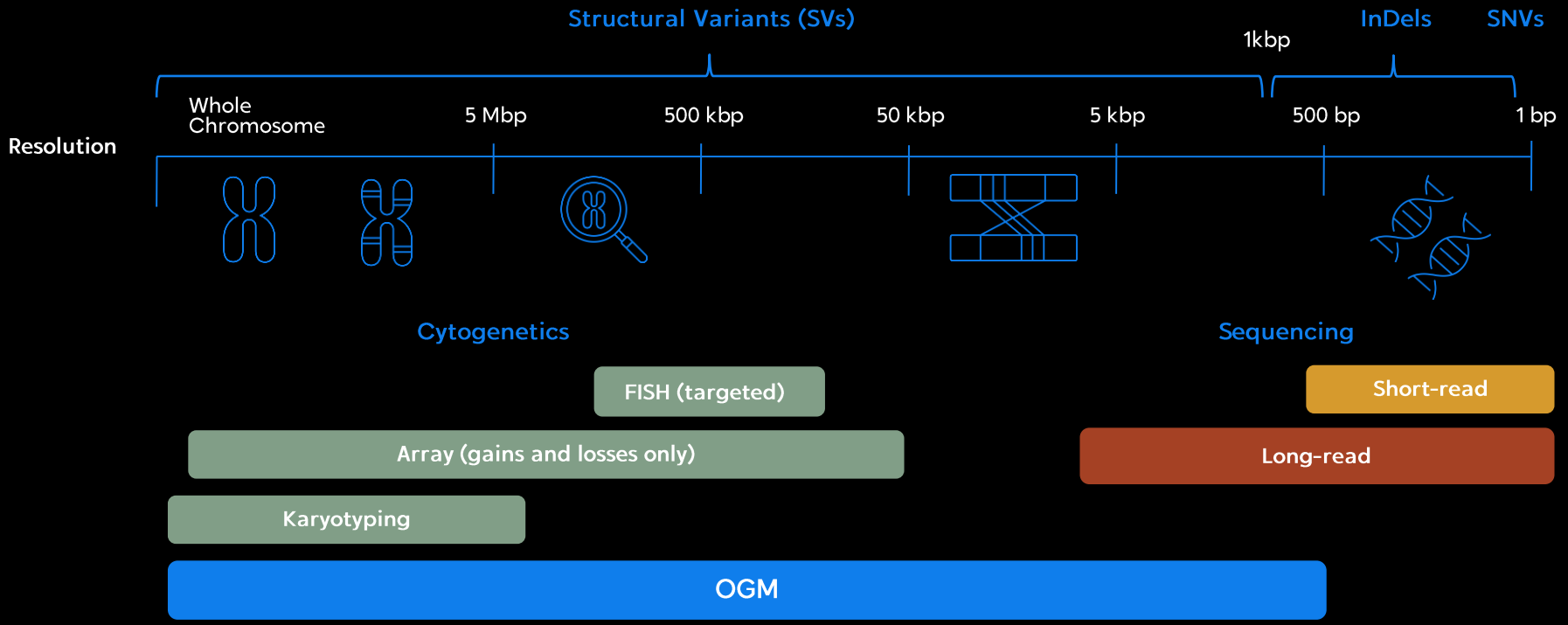
The OGM Difference is Context from Ultra Long Reads



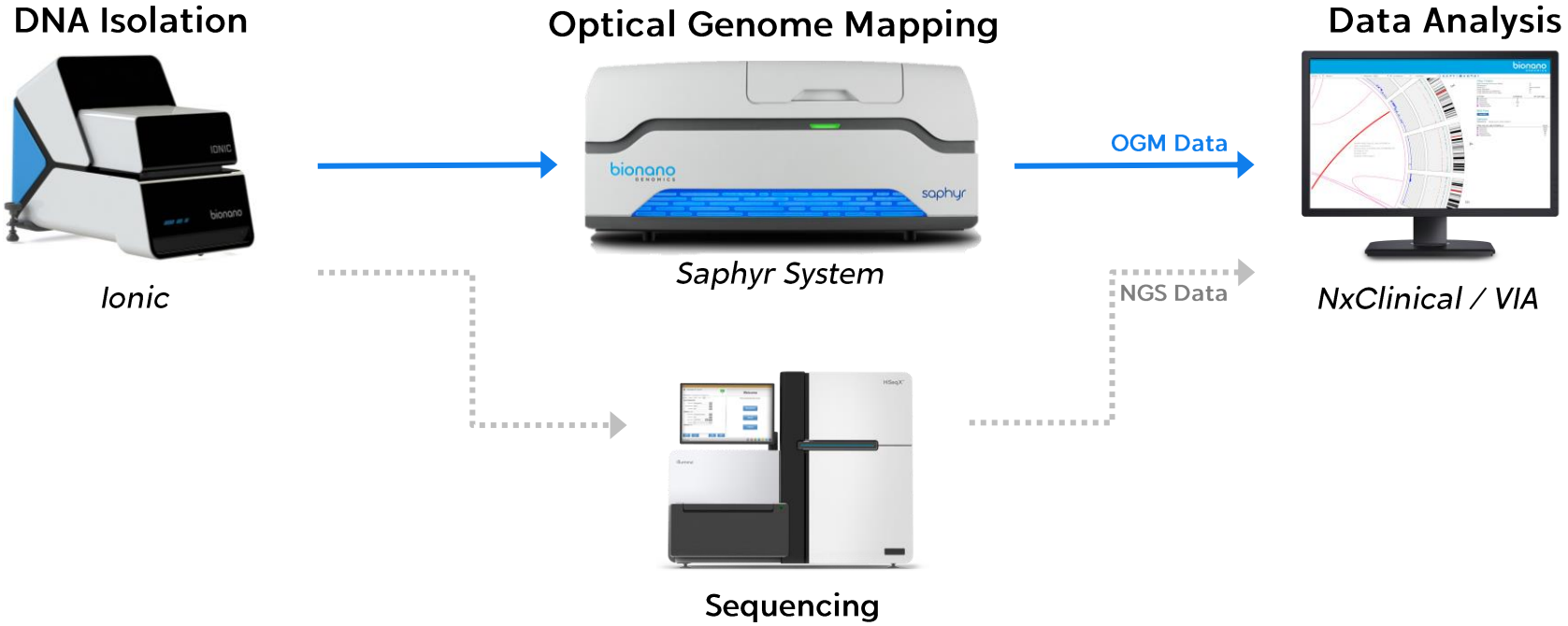




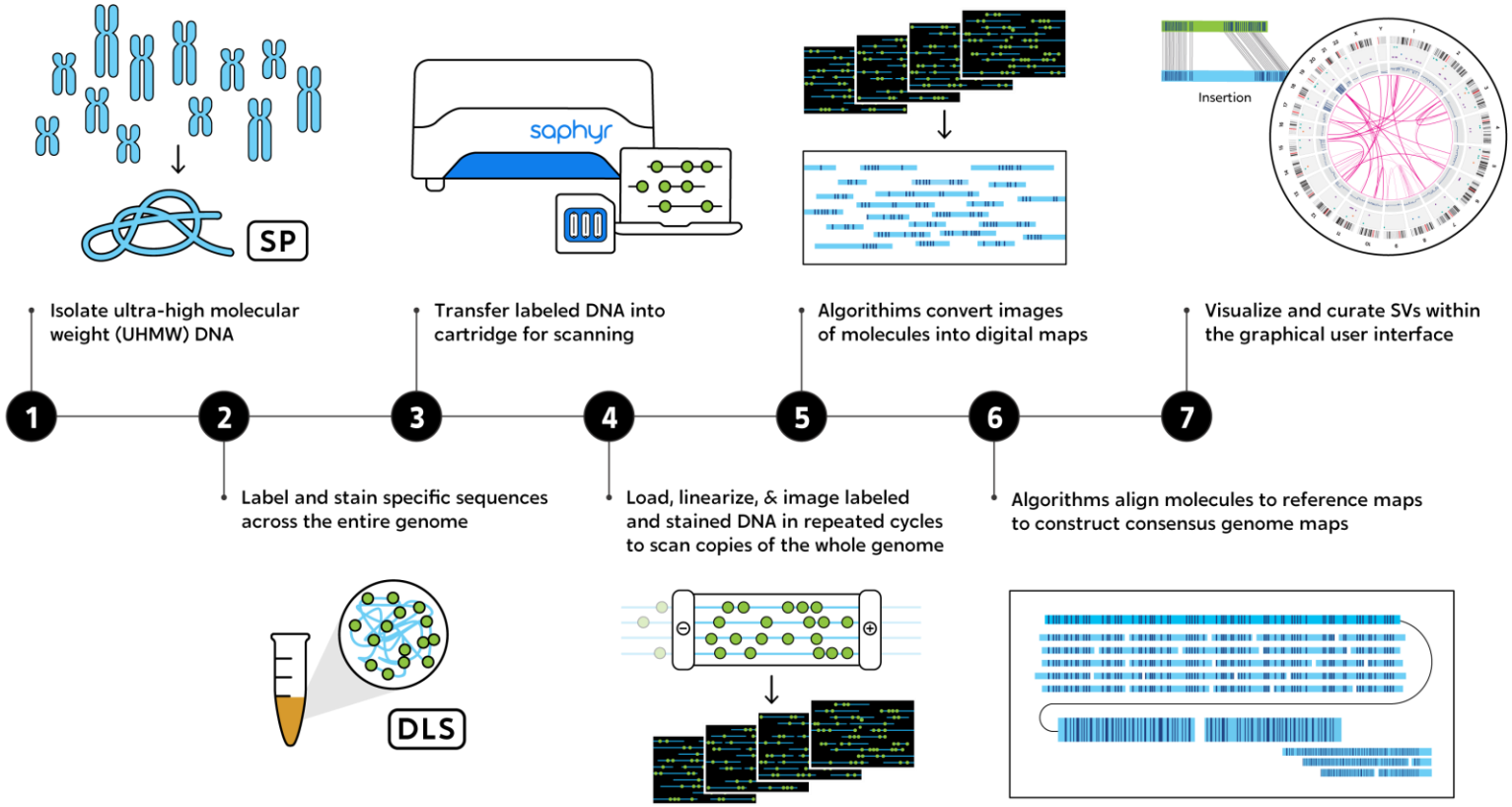
We Believe Optical Genome Mapping (OGM) Closes the Gap



Transforming Genomic Analysis with OGM + NGS

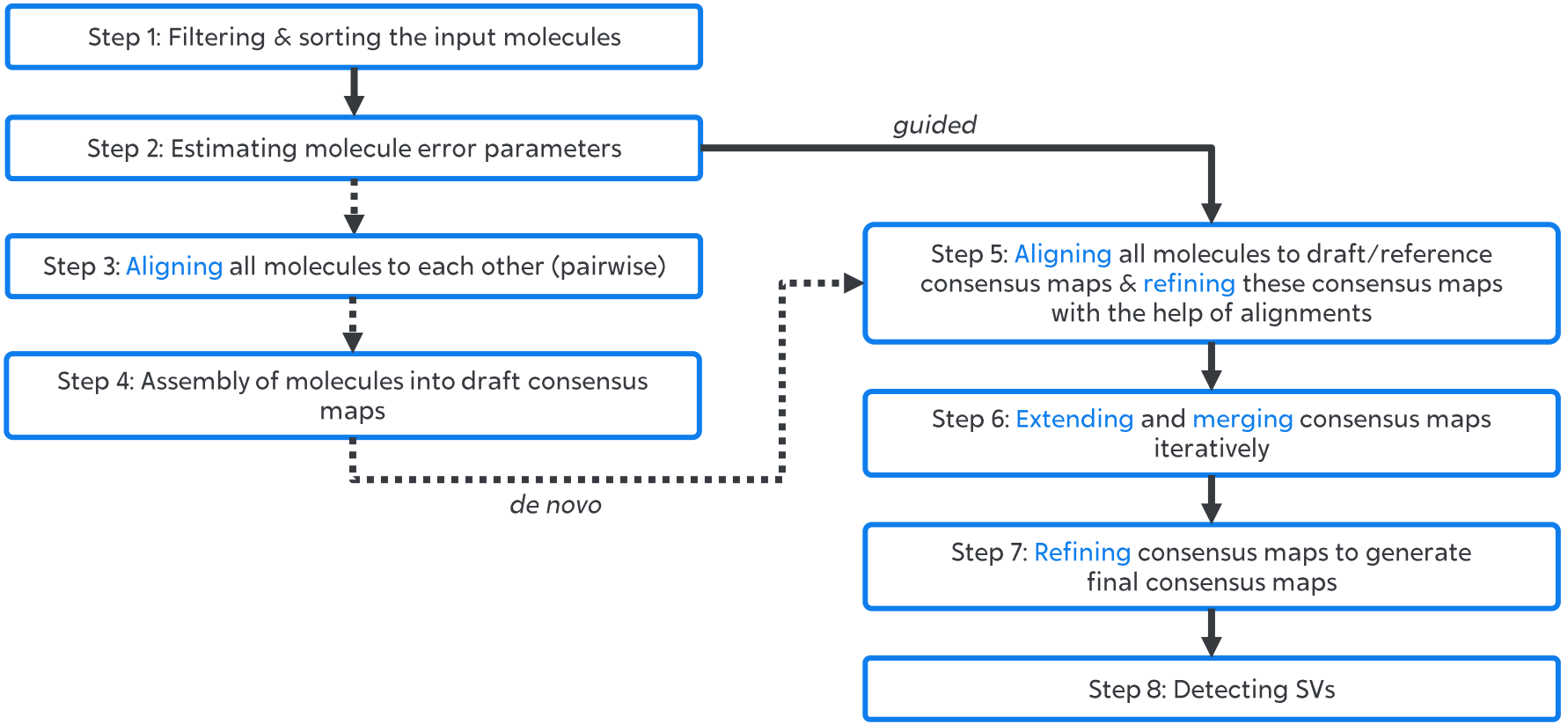


The OGM Workflow is Sample to Answer for SV Detection



[Saphyr® System for Structural Variation Detection | Bionano]

De Novo & Guided Assembly Pipelines with OGM Data



Future Evolution in How the World Sees the Genome

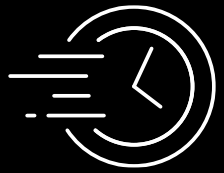
Enhancing throughput, usability, time to results and analysis integration across genomics applications

Enhancing Throughput

Sample prep kits yielding cleaner DNA and enhanced stability

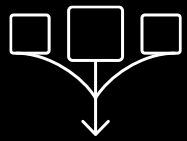
Simplified Sample Prep

Enhanced labeling kits + SW to accelerate analysis



Time to Result

The power of NVIDIA in OGM



Analysis Integration

SW that integrates OGM, NGS, and CMA and speeds interpretation

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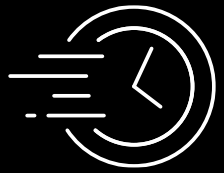

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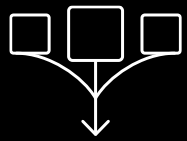

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High Throughput Saphyr

Addressing the needs of high-volume labs and low-cost regions

The next step in the evolution of the OGM workflow:

- Up to 96 cancer or 338 constitutional samples per week
- Designed to scale with multiple systems orchestrated for higher throughputs – "workcell"
- Compatible with current Bionano reagents and software

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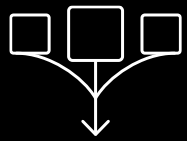

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Bionano's Next-Generation Compute Solution

- **Bionano's Optical Genome Mapping (OGM)** is a scalable genome analysis workflow elevating cancer and complex disease research
- Decreasing the cost of genome analysis is the main goal to be **accessible to more people and get answers quickly and accurately**
- Our next-generation compute solution:

Provides vital data processing capabilities for our high-throughput OGM instruments

Significantly reduces time and cost of the analysis of OGM data to meet the higher throughput need

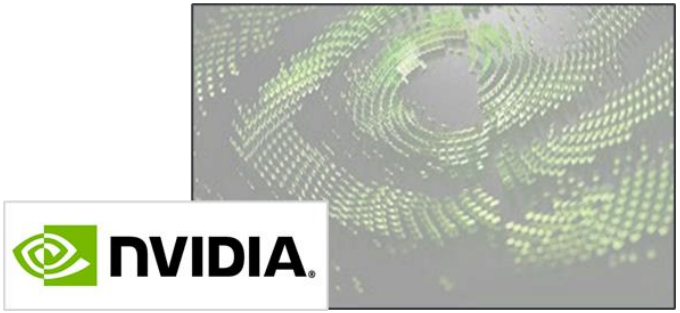
Accommodates clinical testing needs at scale by reducing the pipeline processing time by ~8×

Overview of our New Compute Solution

- **Next-generation NVIDIA technology** to accelerate OGM analysis
- **A standalone workstation** with multiple NVIDIA GPUs networked to the instrument controller
- **An NVIDIA CUDA optimized Bionano Solve pipeline** that accelerates alignment, refinement, and structural variation detection

Instrument Controller Compute

Bionano and NVIDIA Supercharging OGM Analysis



- Bionano, **the pioneer of OGM solutions**, and NVIDIA, **the pioneer of accelerated computing,** combine their industry leading technologies for the next-generation accelerated OGM analysis solution
- **NVIDIA's RTX 6000 Ada Generation** enables HPC power into the lab, and ready for the cloud!
- NVIDIA GPUs provide:
  - Thousands of parallel CUDA cores enable **extreme parallelism**
  - **Efficient floating point-based calculations** in parallel with high processing power
  - **Much higher performance per $** (vs. CPU)
  - **Vertical and horizontal scaling** opportunities with either additional workstations or datacenter solutions with higher count of GPUs

We are accelerating the transformation in how we analyze the human genome!

Bionano & NVIDIA:
Accelerating Analysis for Fast Time to Results

- Technological solution to **support higher throughput**
- **New high-performance algorithms** from Bionano
- **Powered by NVIDIA RTX™ 6000 Ada Generation GPUs**
- Analysis of highly complex cancer whole genomes in **less than 2 hours**
- Workflow tailored for a **small lab and IT footprint**

We are Hiring!

Senior Software Engineer - Hardware Acceleration

At Bionano, we are committed to unlocking understanding of genome biology to advance the promise of genomics in areas including cancer and human disease, agricultural bioengineering and genome discovery. Our optical genome mapping and analysis tools help researchers see true genome structure to fill in what's missing from sequencing-based data.

At Bionano, we are invested in the success of our customers and users around the world, and are dedicated to supporting them with the tools, resources and support they need to achieve their goals and make a real impact on improving quality of life for all.

Apply Now

Application Deadline:
May 23, 2023

Department:
Systems Dev

Employment Type:
Full Time

Location:
SD - San Diego

Workplace type:
Onsite

Watch for More: Bionano Workshop @ AGBT'23

Thank you.

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