bionano™

Strategy Day

February 02, 2023

Disclaimers:

Preliminary Financial Results

This presentation includes preliminary financial information of Bionano for the fourth quarter and full year of 2022. Bionano has not completed preparation of its financial statements for these periods and the information presented (including preliminary revenue and the corresponding breakdowns of revenue by product/service and geography) in this presentation for such periods is preliminary and unaudited, based on management's initial review of the information presented, and are thus inherently uncertain and subject to change as Bionano completes its end-of-period reporting process and related activities for the fourth quarter of and full year 2022. Bionano is in the process of completing its customary year-end close and review procedures for these periods, and the final results for these periods may differ from these estimates. During the course of the preparation of Bionano's consolidated financial statements and related notes as of and for the quarter and year ended December 31, 2022, Bionano's independent registered public accountants may identify items that could cause final reported results to be materially different from the preliminary financial estimates presented herein. Additional information and disclosures would be required for a more complete understanding of Bionano's financial position and results of operations as of and for the fourth quarter and year-ended December 31, 2022. Accordingly, undue reliance should not be placed on this preliminary information.

Disclaimers:

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This presentation (and accompanying oral commentary) contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as "may," "will," "can," "expect," "plan," anticipate," "estimate," "intend," "should," "believe," "would," "could," "potential," "outlook," "projects," "predicts," "guidance," "goal" and similar expressions (as well as other words or expressions referencing future events, conditions or circumstances and the negatives thereof) convey uncertainty of future events or outcomes and are intended to identify these forward-looking statements. Forward-looking statements include statements regarding our intentions, beliefs, projections, outlook, analyses or current expectations concerning, among other things: (1) the impact and utility of optical genome mapping (OGM) in oncology and genetic disease research, and expected improvements to OGM over time; (2) the impact and utility of OGM for bioprocessing, including gene editing and genome integrity analysis; (3) the ability and utility of applying OGM and sequencing data to reveal entire genome variation; (4) the ability and utility of OGM to be complementary to, or used in lieu of, traditional cytogenomics methods for analysis of structural variations; (5) the ability and utility of OGM to increase success rates for finding potential pathological events; (6) anticipated goals and milestones for OGM and Bionano; (7) our ability to stay in front of competitors' improvements in technologies; (8) the anticipated benefits and ultimate success of our collaborations; (9) our preliminary financial results for the quarter and full year ended 2022; (10) our growth prospects and estimates regarding future financial performance and operating results; (11) our potential market opportunity and estimates of its size; (12) our future products and features, including the performance of these products and their sample processing capacity; (13) our anticipated growth strategies and anticipated trends in our business and (14) other statements that are not historical facts.

Each of these forward-looking statements involves risks and uncertainties. Actual results or developments may differ materially from those projected or implied in these forward-looking statements. Factors that may cause such a difference include the risks and uncertainties associated with: (1) the impact of geopolitical and macroeconomic developments, such as the ongoing Ukraine-Russia conflict, related sanctions and the COVID-19 pandemic, on our business and the global economy; (2) challenges inherent in developing, manufacturing and commercializing products; (3) our ability to further deploy new products and applications and expand the markets for our technology platforms; (4) third parties' abilities to manufacture our instruments and consumables; (5) our assumptions, expectations and beliefs regarding future growth of the business and the markets in which we operate; (6) the completion and success of our clinical studies; (7) the success of products competitive with our own; (8) changes in our strategic and commercial plans; (9) the application of generally accepted accounting principles, which are highly complex and involve many subjective assumptions; (10) study results that are different from or contradict the results presented in this presentation; (11) completion of our customary year-end close and review procedures as well as our fiscal 2022 audit; (12) our assumptions and estimates regarding our future financial performance and results of operations; and (13) our ability to obtain sufficient financing to fund our strategic plans and commercialization efforts. We are under no duty to update any of these forward-looking statements after the date they are made to conform these statements to actual results or revised expectations, except as required by law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date the statements are made. Moreover, except as required by law, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements contained in this presentation. More information about these and other statements, risks and uncertainties is contained in our filings with the U.S. Securities and Exchange Commission, including, without limitation, our Annual Report on Form 10-K for the year ended December 31, 2021 and in other filings subsequently made by us with the Securities and Exchange Commission. All forward-looking statements speak only as of the date on which they were made and are based on Bionano's assumptions and estimates as of such date. We do not undertake any obligation to publicly update any forward-looking statements, whether as a result of the receipt of new information, the occurrence of future events or otherwise except as required by law.

This presentation (and accompany oral commentary) also includes statements made by third party presenters related to their research and experiences with OGM and Bionano products. Such statements are not statements by Bionano, and Bionano disclaims any such statements.

Welcome

Erik Holmlin, PhD
President and Chief Executive Officer

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Agenda

1:30 PM	CEO Welcome and Introduction to Event – Erik Holmlin, CEO
1:45 PM	Financial Growth Plan – Christopher Stewart, CFO
2:10 PM	The OGM Difference – Alex Hastie, VP Scientific and Clinical Affairs
2:25 PM	Product Portfolio & Development Roadmap – Mark Oldakowski, COO
2:45 PM	Clinical Development for Transforming Medical Practice – Alka Chaubey, CMO
3:05 PM	**BREAK** (15 min.)
3:20 PM	Meet Bionano Customers in Fireside Chats with Dan Brennan, Cowen & Co
3:20 PM	Clinical Research Panel featuring Drs. Adam Smith, Ravindra (Ravi) Kolhe and Gordana Raca
3:45 PM	Q&A with Clinical Research Panel
3:55 PM	Translational Research Panel featuring Drs. Ben Finlay, Rashmi Kanagal-Shamanna & Catherine Brownstein
4:25 PM	Q&A with Translational Research Panel
4:35 PM	Fireside Chat with Erik Holmlin
4:55 PM	Q&A with Bionano Management
5:15 PM	Reception

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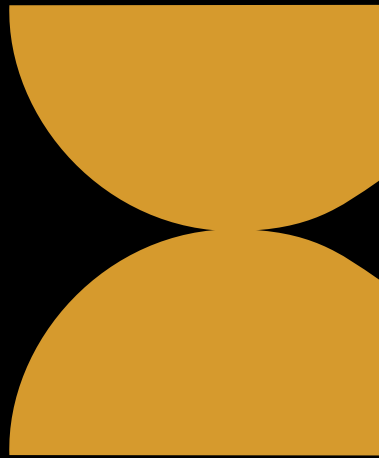
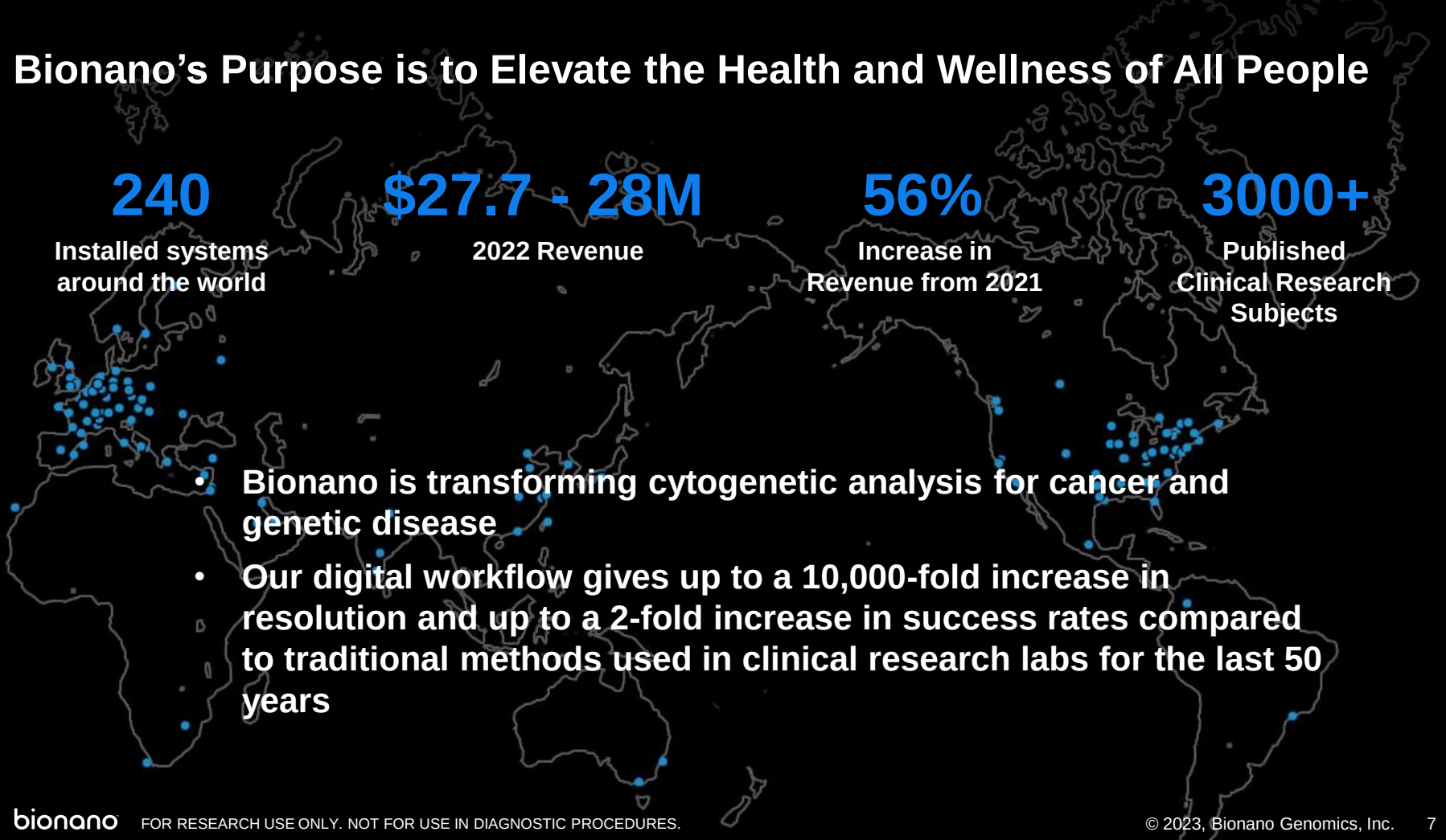
What We Hope You Take Away from Strategy Day

A clear understanding of:

- Where Bionano fits in the genome analysis landscape
- Who’s using Bionano solutions today and why
- What our target markets are and who our customers are
- What our financial growth plan is
- How OGM compares to sequencing and why sequencing will not obsolete OGM
- How we are overcoming remaining hurdles to transform medical practice
- What our product development plan is to continue innovating and achieve our financial goals



Bionano's Purpose is to Elevate the Health and Wellness of All People



240
Installed systems around the world

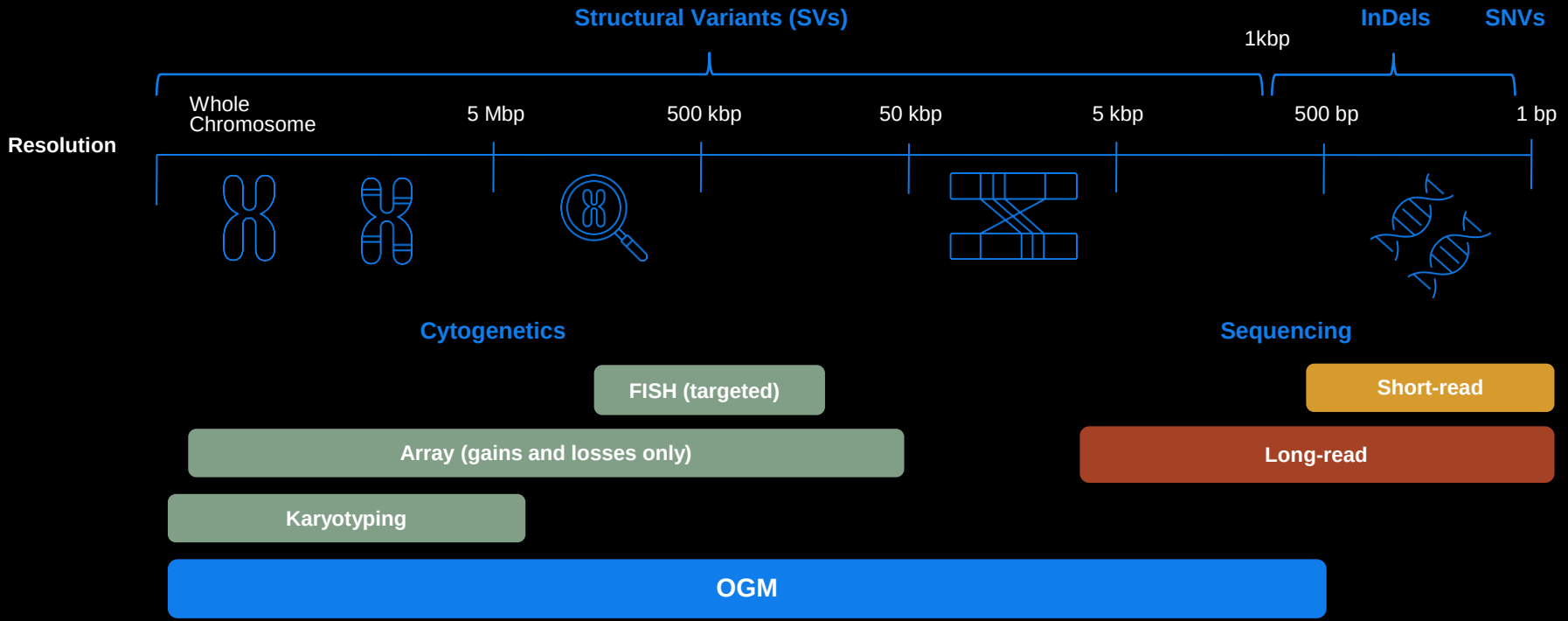
$27.7 - 28M
2022 Revenue

56%
Increase in Revenue from 2021

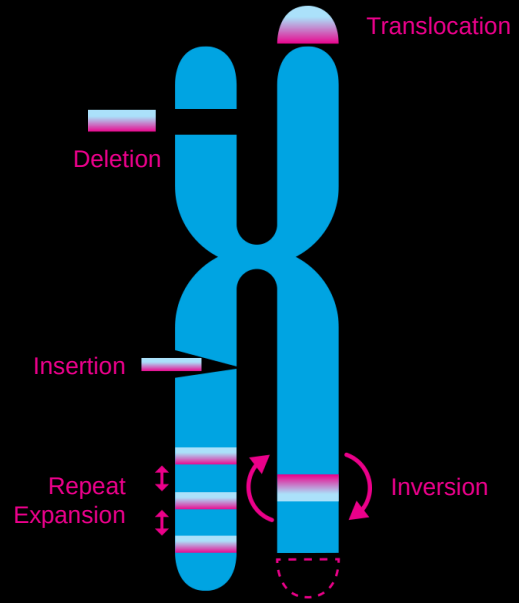
3000+
Published Clinical Research Subjects

- Bionano is transforming cytogenetic analysis for cancer and genetic disease
- Our digital workflow gives up to a 10,000-fold increase in resolution and up to a 2-fold increase in success rates compared to traditional methods used in clinical research labs for the last 50 years

We Believe Optical Genome Mapping will Transform Cytogenetics



Large Structural Variants (SVs) are Vital to Patient Stratification and Therapy Selection



Cytogenetic Analysis is the Recommended First-Line Test for Patients Diagnosed with Genetic Disease and Cancer According to Global Medical Guidelines

ACOG The American College of Obstetricians and Gynecologists

ACMG American College of Medical Genetics and Genomics

World Health Organization

NCCN National Comprehensive Cancer Network®

American Academy of Neurology

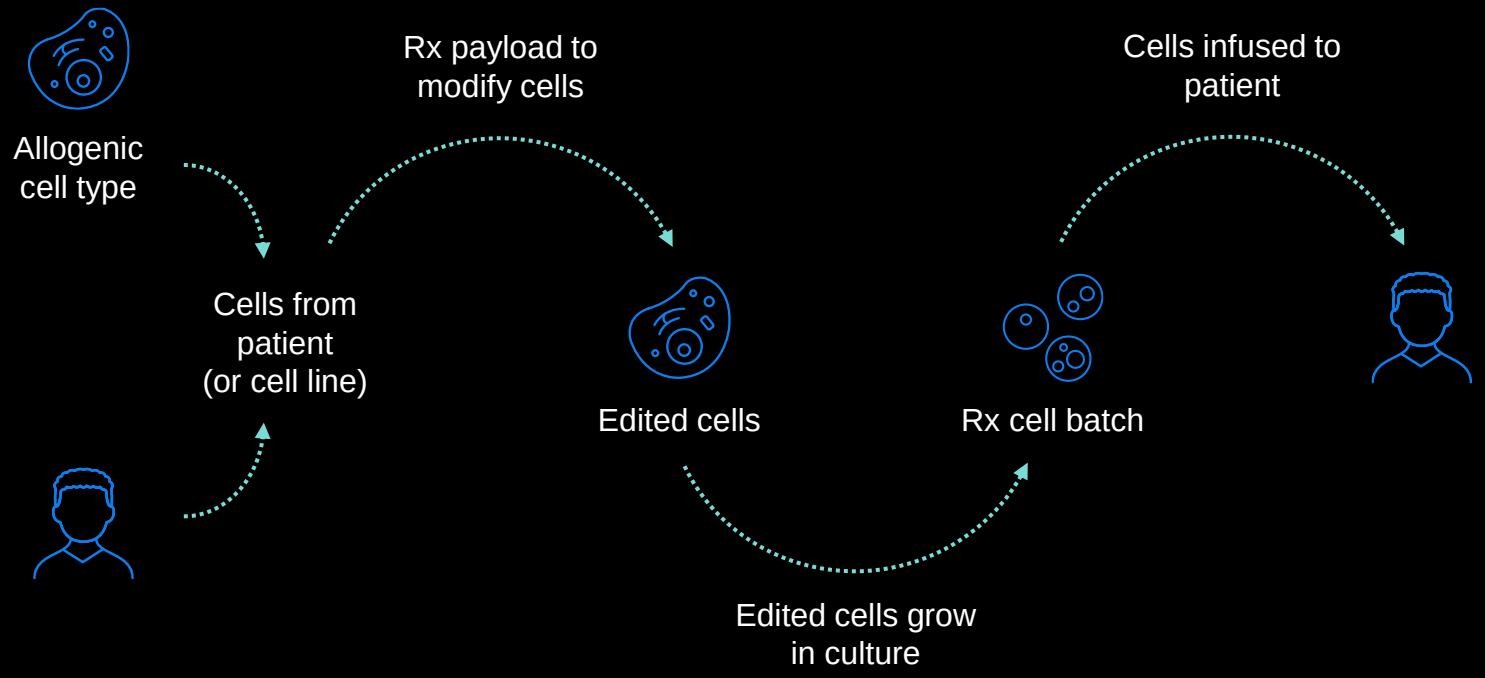
isuog.org

American Academy of Pediatrics DEDICATED TO THE HEALTH OF ALL CHILDREN®

ASCO® American Society of Clinical Oncology

NHS

Emerging Cell Therapies are Dependent on Cytogenetics for QC



We Believe the Opportunity in Cytogenetics is Large

10K
Labs Worldwide

10M
Patient Samples

1.4K
Rx Cos in Cell Rx

$10B
Estimated TAM

We Believe our Products Enable a Cytogenetics Revolution

Saphyr ® System

- G1 Saphyr (released in 2017)
  - 384 human genomes per year
  - $1500 per genome
  - $350k per system
- G2 Saphyr (released in 2020)
  - 13-fold increase in throughput
  - $450 per genome
  - $150k per system
- New mapping system under development
  - Anticipate up to 13-fold increase in throughput

Acquisitions Added Powerful Solutions to Help Create the End-to-End Workflow

Bionano Ionic® Purification System

Automated extraction, purification and concentration of DNA& RNA

- Acquired Purigen in Nov 2022
- $32M in cash upfront + up to $32M in cash based on development & commercial milestones
- Adds strategic business & we believe will accelerate OGM adoption

VIA™

N_xClinical™ → VIA™

Comprehensive analysis, interpretation & reporting tool for data including microarray, NGS & OGM

- Acquired BioDiscovery in Oct 2021
- $90M in cash & stock upfront + potential $10M in cash based on achievement of development & commercial milestone
- Adds strategic business & we believe will accelerate OGM adoption

bionano™ laboratories

CLIA-certified and CAP-accredited* lab in San Diego

CLIA-certified service in Salt Lake City

6 ABMGG-certified lab directors

15 certified genetic counselors

Clinical test menu of 10 LDTs

Nearly 10,000 clinical tests reported annually

*CAP-accreditation in process

Bionano Laboratories is a Platform for LDT Development that Addresses the Needs of New OGM Users

1

RUO Testing Services

- Supports proof-of-concept studies
- Enables potential users to experience the power of OGM across a number of applications

2

OGM-Based Clinical Testing Services

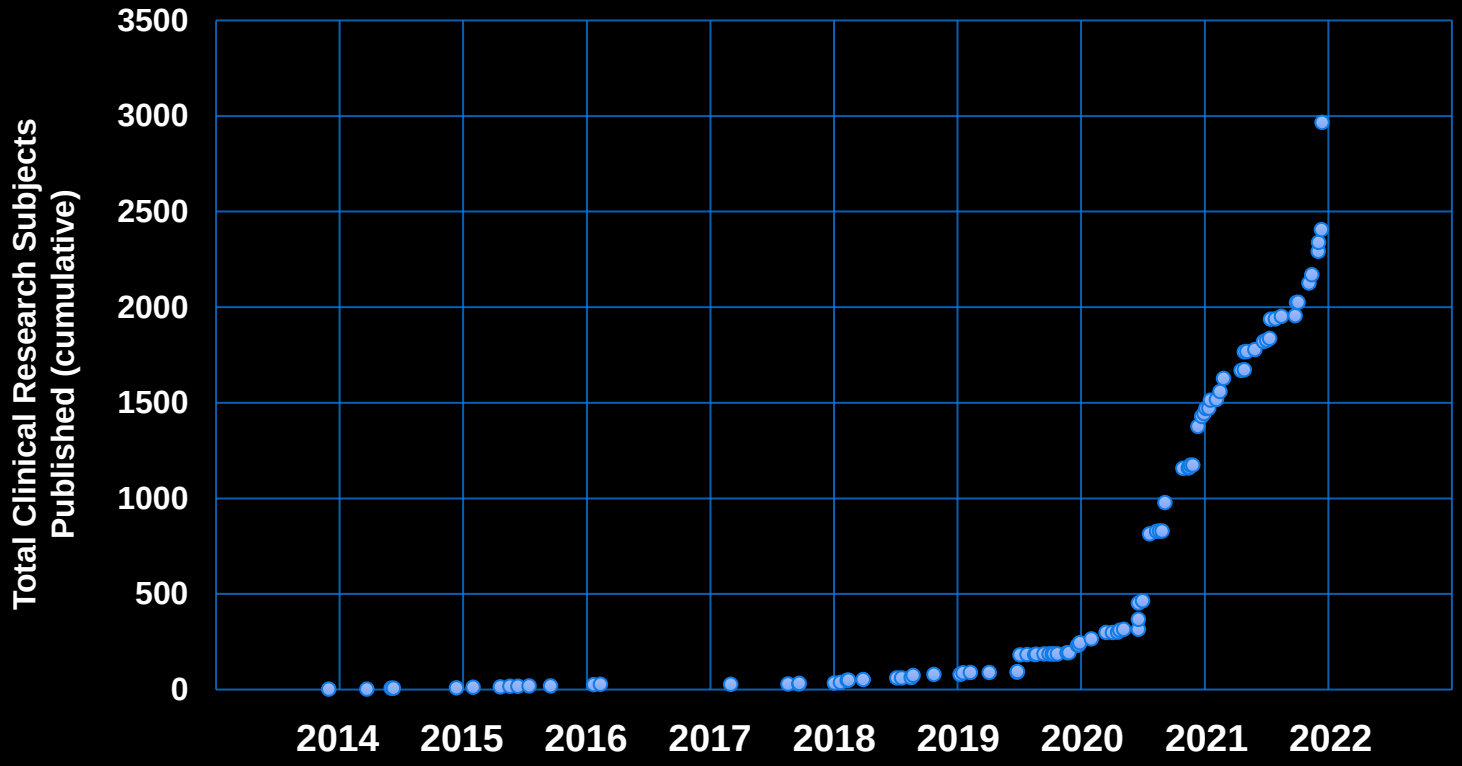
- OGM-Dx™ HemeOne™ and OGM–Dx™ FSHD1
- Allow health care providers to explore the clinical utility of OGM-based assays
- Supports coding and reimbursement efforts through payor engagement
- Developing best practices for OGM while supporting the global OGM community

3

Traditional Clinical Testing Services for Genetic Disease

- Whole Exome Sequencing, Chromosomal Microarray, Fragile X, Pharmacogenomics for pediatric neurodevelopmental disorders
- Direct avenue to engage with health care providers, including pediatric genetics and neurodevelopment delay specialists
- Potential source of patient samples for clinical trials

Are We Making Progress? YES! We Believe We Are!



Hear it From Our Leaders

Chris Stewart
Chief Financial Officer

Alex Hastie, PhD
VP Scientific & Clinical Affairs

Mark Oldakowski
Chief Operating Officer

Alka Chaubey, PhD
Chief Medical Officer

& Meet Bionano Customers in Fireside Chats

Dan Brennan, Moderator

Managing Director- Research, Healthcare
Cowen & Co.

Adam C. Smith, PhD, FCCMG, FACMG, erCLG

University Health Network, University of Toronto

Ravindra Kolhe, MD, PhD, FCAP

Georgia Cancer Center, Medical College of Georgia

Gordana Raca, MD, PhD, FACMG

Children's Hospital Los Angeles

Darren "Ben" Finlay, PhD

Sanford Burnham Prebys Medical Discovery Institute

Rashmi Kanagal-Shamanna, MD

The University of Texas MD Anderson Cancer Center

Catherine Brownstein, MPH, PhD

Boston Children's Hospital

Financial Growth Plan

Christopher Stewart
Chief Financial Officer

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Bionano Overview

$27.7 – $28.0M
Preliminary FY 2022 revenue

240
Installed systems around the world

165
Software customers

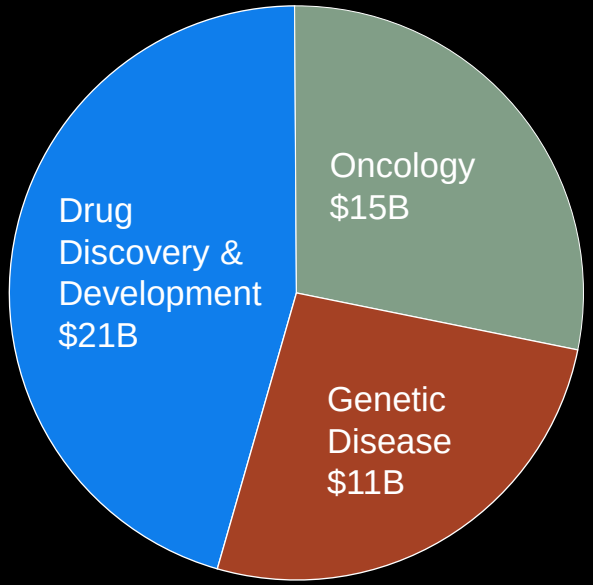
48k
Flowcells sold

406
Employees

4
Sites

As of 12/31/2022; flowcells sold is inception through 12/31/2022.

We are Focused on Three Segments of the Genomics Market

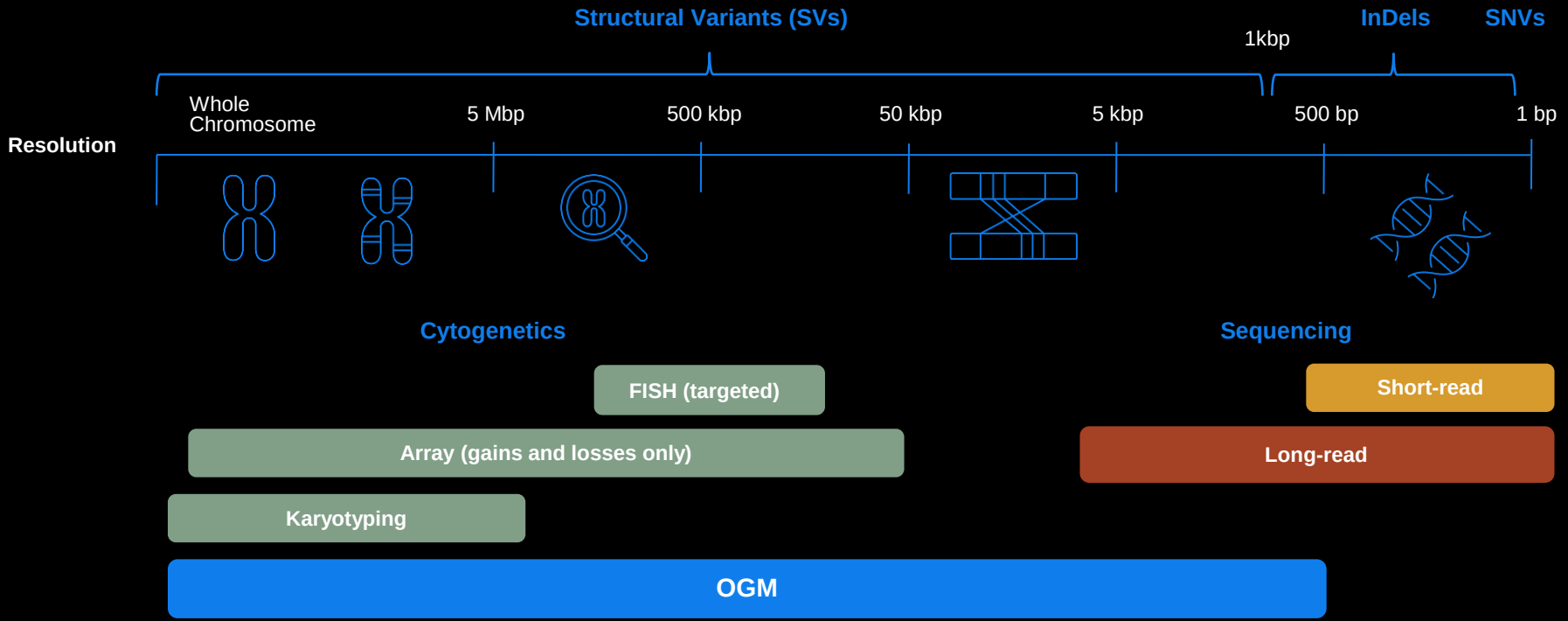


$47B Segments of the Genomics TAM

- We believe millions of people could benefit from genome analysis
- Access to genomic technology and knowledge of the genome is increasing every year
- Optical Genome Mapping plays a unique and critical role in genome analysis by reliably revealing relevant structural variants
- How Bionano will participate in this market:
  - Conversion of existing testing volume to OGM
  - Addition of OGM to NGS testing

Source: MarketsandMarkets Genomics Market Global Forecast to 2025

We Believe Optical Genome Mapping will Transform Cytogenetics



We Estimate Our Target Markets Include 10,000 labs and 1,400 Therapeutics Companies

	Worldwide Markets*			China Cytogenetics		Cell Therapy
						
	Large AMC's & Hospitals	Regional reference labs	Ultra-large reference labs	Tier 3 Hospitals	ICL	Pharma & Biotech
# of Labs	1,000	4,000	40	3,275	2,000	1,400
Avg Samples Per Year	3,000	1,000	24,000	3,000	1,000	TBD

*Excludes China, India, and developing countries

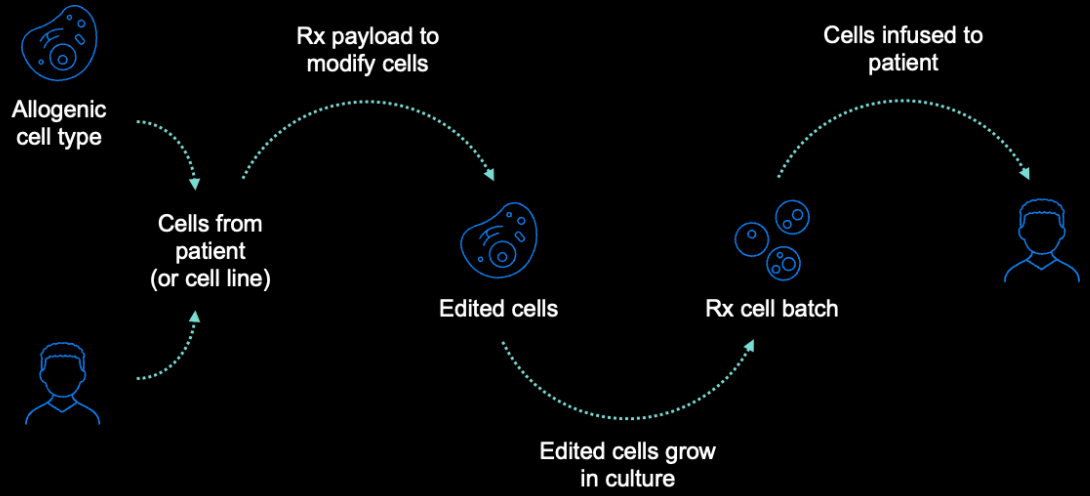
Source: L.E.K interviews, research and analysis; Statistical Bulletin on Health Development in China 2021; Department of Woman and Child Health Services of the NHC; management estimates

The Indications We are Targeting Generate ~10M Samples Per Year

Application		Specific use case	Target indications	Estimated annual samples
Constitutional genetic testing	Prenatal	Invasive prenatal testing	NIPT positive or no result, abnormal ultrasound, advanced maternal age	300k
	Postnatal	Reproductive testing	Infertility, pregnancy loss & POC	600k
		Developmental disabilities	Developmental & intellectual disabilities, autism spectrum disorder	300k
		Other genetic disorders	Birth defects, RUGD	120k
		China market	NIPT positive or no result, FSHD	370k
			Constitutional genetic testing total	**1.7M**
Heme malignancy		Diagnosis	Lymphomas, myelomas, AML, CLL, CML, ALL, myelodysplastic syndromes	400k
		Tx response		100k
		Surveillance		2.4M
		Clinical trials	OGM testing on enrolled patients in heme cancer trials	60k
		China market	Leukemias and lymphomas	2M
			Heme malignancy total	**5.0M**
Solid tumor		Tx guidance	Breast cancer, lung cancer, colon cancer, prostate cancer	3.2M
		Clinical trials	OGM testing on enrolled patients in solid tumor trials	140k
			Solid tumor total	**3.3M**

Source: L.E.K interviews, research and analysis; Statistical Bulletin on Health Development in China 2021; Department of Woman and Child Health Services of the NHC; management estimates

Cell Bioprocessing QC Can be a $3B Opportunity



- In 2020, there were 176 clinical assets for cancer therapy in development
- By 2025, the FDA is expected to approve 10 to 20 cell and gene therapy products per year
- QC is required in development and post approval to evaluate target effects and to assess genome integrity throughout the production process
- Each approved asset is estimated to generate 50k to 120k samples per year
- Companies are currently using karyotyping for Cell QC; lacks the required performance and will not scale

Source: L.E.K. IP, research, and analysis; ResearchAndMarkets Cell & Gene Therapy Market - Global Outlook & Forecast 2022-2027

What Our Customers are Using OGM for Today

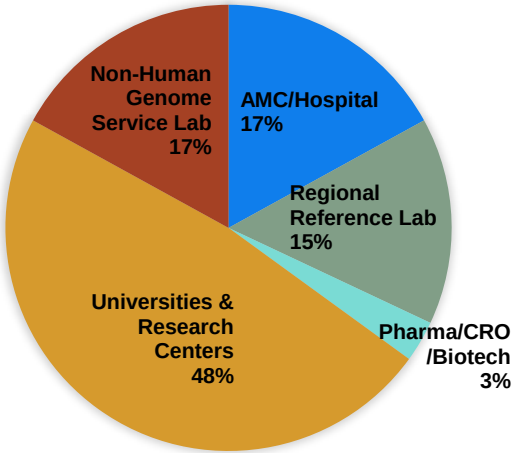
Customer Type	Customer	What are they using OGM for?	Why are they using OGM?	Potential future use
Ultra large reference lab	Large US based central reference lab	Heme testing	Replacing CLL FISH panels for heme	Replace all FISH panels for heme 40,000 samples per year
Academic Medical Center	Memorial Sloan Kettering	Heme testing	Replacing myeloma FISH panels for heme	Replace all FISH panels for heme 5,000 to 10,000 samples per year
Regional Reference Lab	Perkin Elmer	Muscular dystrophy / FSHD	Adjunct to NGS for neuromuscular disorders	Repeat expansion disorders 1,000 samples per year
Cell therapy	Global pharmaceutical company	Cell QC for IPSC and CAR-T production	For measuring target effects in genome editing and genome integrity in production for drug development	Replacement of karyotyping for routine QC for cell therapy

Product and Market Development Initiatives are Driving Penetration of Our Target Markets

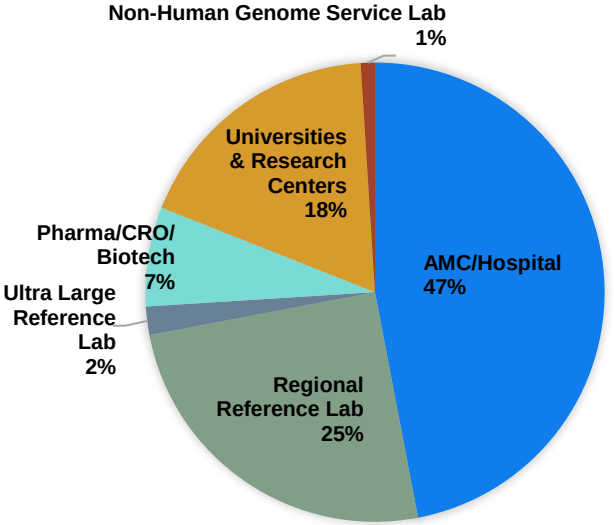
- Increased throughput 13x
- Reduced ASP per genome from $1500 to $450
- Upgrades to analysis & reporting tools
- Initiated clinical studies, interim readouts
- Built a strong commercial team
- Published results on > 1000 human samples

Our Customer Mix is Shifting Toward Routine Use in Cytogenetics Laboratories and Away from Non-Human and Basic Research

- **Through 2019: 32%** of systems installed were at academic medical centers (AMCs) and reference labs
- **2020 through 2022: 74%** of systems installed were at AMCs and reference labs



Through 2019



2020 through 2022

240 Saphyr Systems Installed

Routine Use Customers Drive Higher Utilization

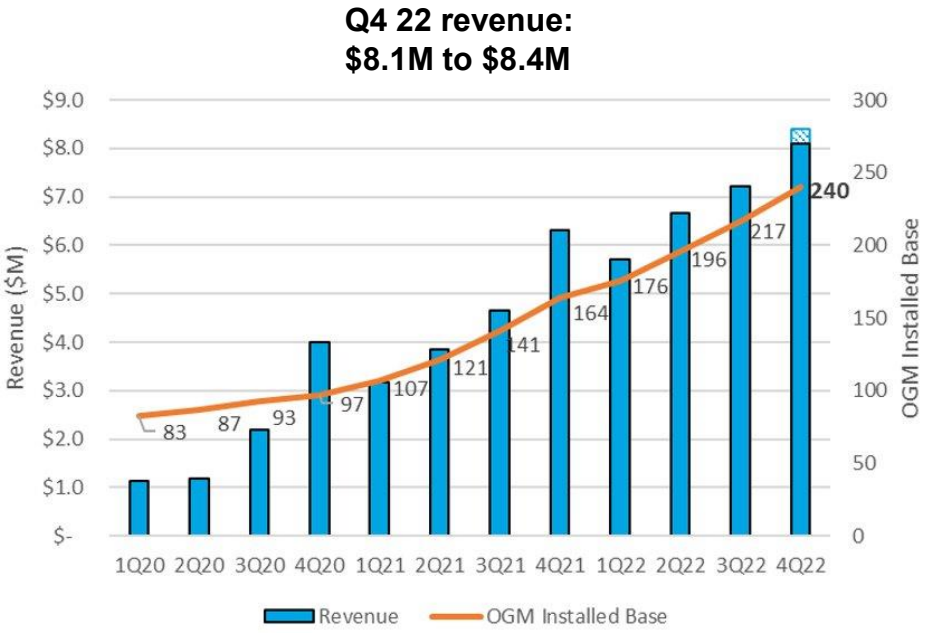
- Academic medical centers, reference labs, pharma, and biotech customers generate more pull-through
- We believe utilization will increase as our customer base matures

2022 Estimated Average Annual Consumable Revenue Per System[1]

$73k	Pharma & Biotech
$60k	Academic Medical Centers
$38k	Reference Labs
$14k	Non-Human Genome Labs
$10k	Universities & Research Centers

1 Using average ASP per flowcell including reagents of $470 and the average number of systems installed by customer type in 2022

Delivering Consistent Growth of Revenue and Installed Base



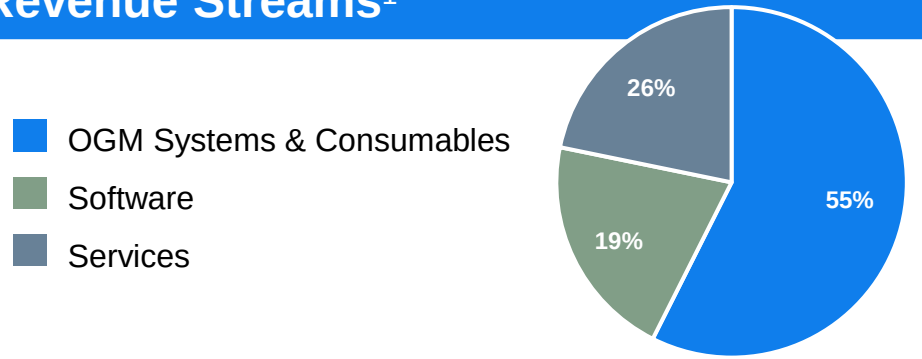
- **Q4 2022 installed base of 240 systems,** up 46% from 164 in Q4 2021
- **Q4 2022 revenues expected to be $8.1 to $8.4 million,** a 27% to 33% year-over-year increase and above prior expectations
- **2022 revenue expected to be $27.7 to $28.0 million** exceeding prior guidance of $24M to $27M
- **Q3 2022 ending cash and cash equivalents balance of $180.2M**
- **Closed Purigen acquisition in Q4 2022**

Recent Revenue Metrics

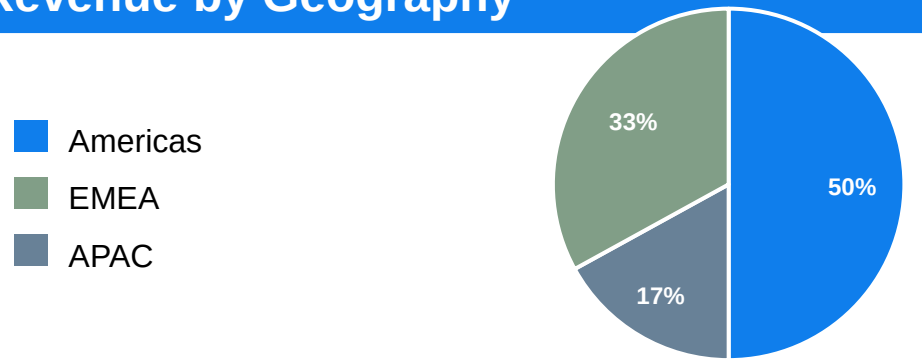
2022E Revenue: $27.7 to $28M

- Diversified revenue base across product lines and geography
- Expected to beat 2022 revenue guidance

Revenue Streams[1]



Revenue by Geography[1]



[1]Prelimary FY 2022 estimates

Commercial Team in Place with Potential to Grow Revenue

135 Commercial Employees

12 Countries with Employees

51 Commissioned Sales Professionals

24 Field Support Professionals

23 Authorized Distributors

As of 12/31/2022

Our Strategy for Key Catalysts as We Drive Toward an Inflection Point

- Increased throughput 13x
- Reduced ASP per genome from $1000 to $500
- Upgrades to analysis & reporting tools
- Initiated clinical studies, interim readouts
- Built a strong commercial team
- Published results on > 1000 human samples

- Increase throughput 13x: launch HT Saphyr
- Expand menu of OGM sample types & automate sample prep with ITP: launch Ionic for OGM
- Deliver analysis & reporting toolset: full commercial release of VIA
- Expand publication of clinical genomes & clinical study results
- Obtain key regulatory approvals including FDA
- Address the needs for reimbursement through coding & coverage

2020 to 2022 **2023 to 2025**

Financial Targets

Revenue:
30% to 50% CAGR through 2025

Target P&L at Scale[1]

50% to 70%
Gross Margin

40% to 60%
Operating Expense

10% to 20%
Operating Income

[1]Non-GAAP; percentages are % of revenue.

The OGM Difference

Alex Hastie, PhD
Vice President of Clinical and Scientific Affairs

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Genes Control Biology and Variants Cause Disease

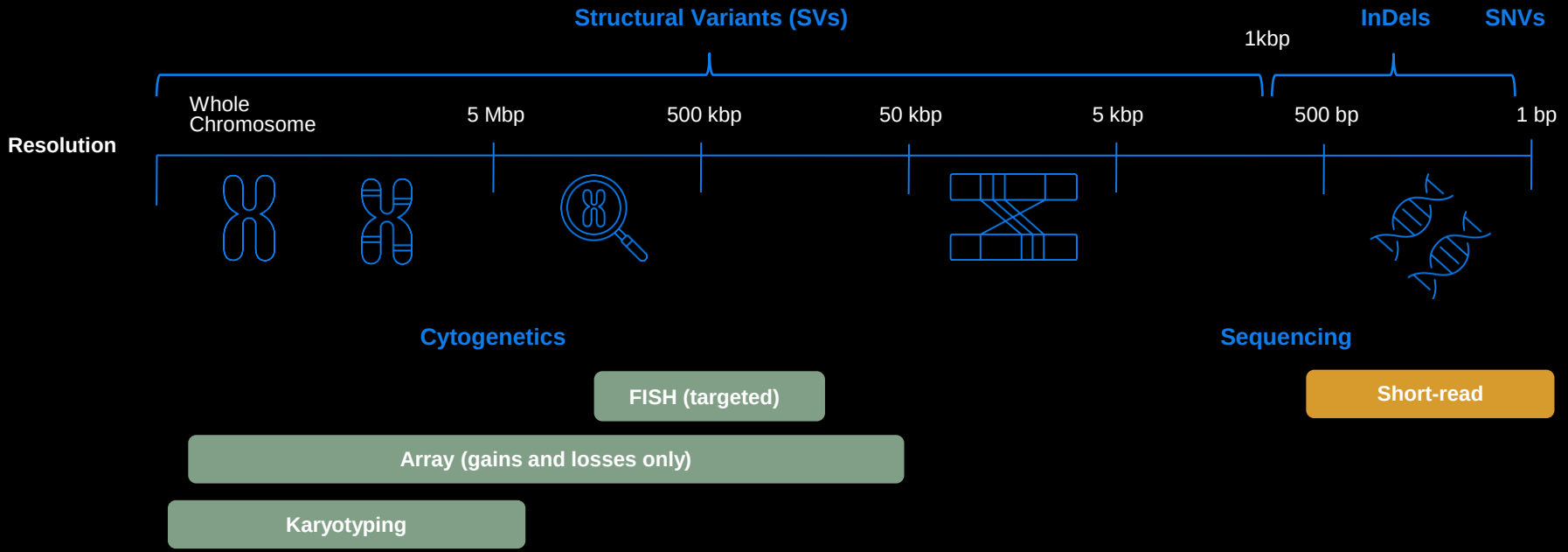
1. ***TP53* is a well-known character in oncology.** As the guardian of the genome, when its function is disrupted, we get cancer.

2. **Disruption of *TP53* function (and that of any gene)** can be caused by many different classes or types of genome variation.

3. Many of these variants can be detected with NGS, **BUT most of them cannot.**

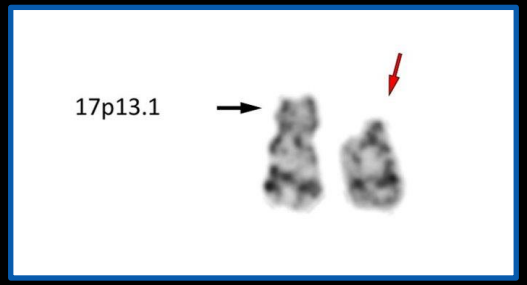
4. **Medical guidelines are now being updated to require detection of bi-allelic events,** meaning seq. should be used but other technologies should also be used.

The Standard of Care has Evolved to Address These Challenges



The Gap Between Karyotyping and NGS is Huge

Karyotyping (KT)

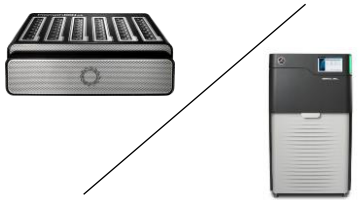


- First line test for blood cancers and solid tumors
- Hasn't changed in 50 years

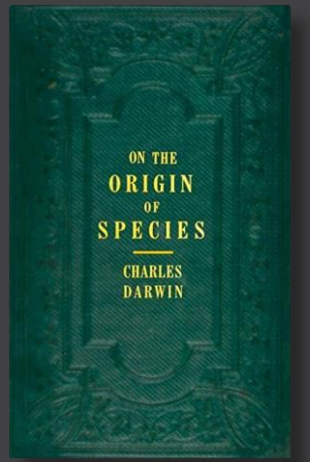
NGS

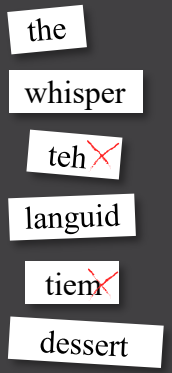
- First line test with KT for SNVs in blood cancers
- Best for SNVs and small in/dels

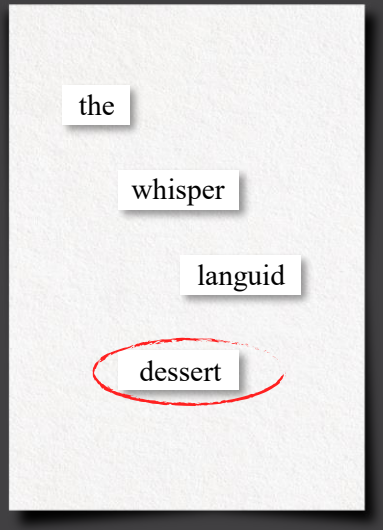
Two Decades of NGS Have Not Closed the Gap

 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

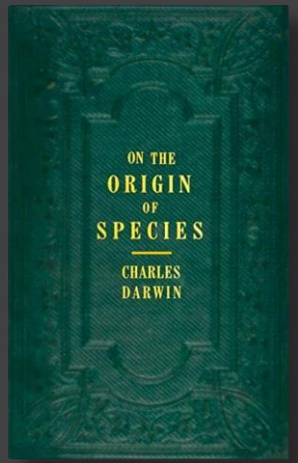


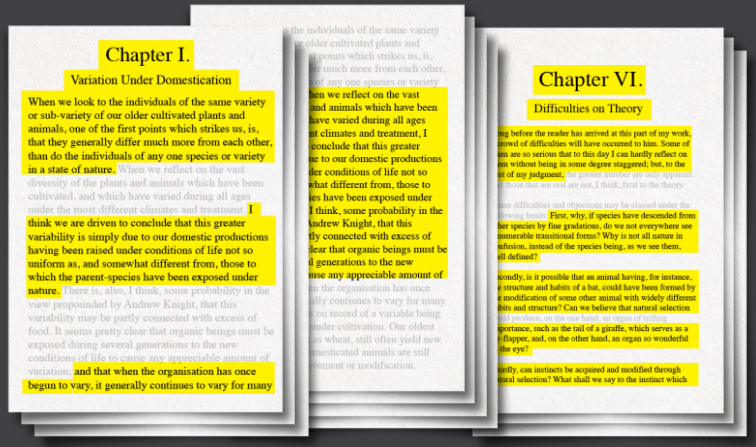


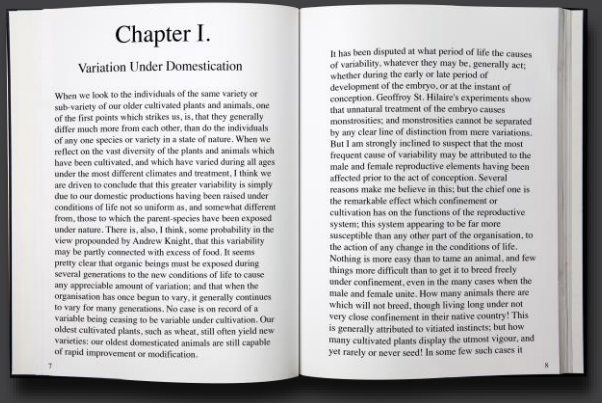


Chaisson, et al. *Nat Commun*. 2019;10(1):1784.

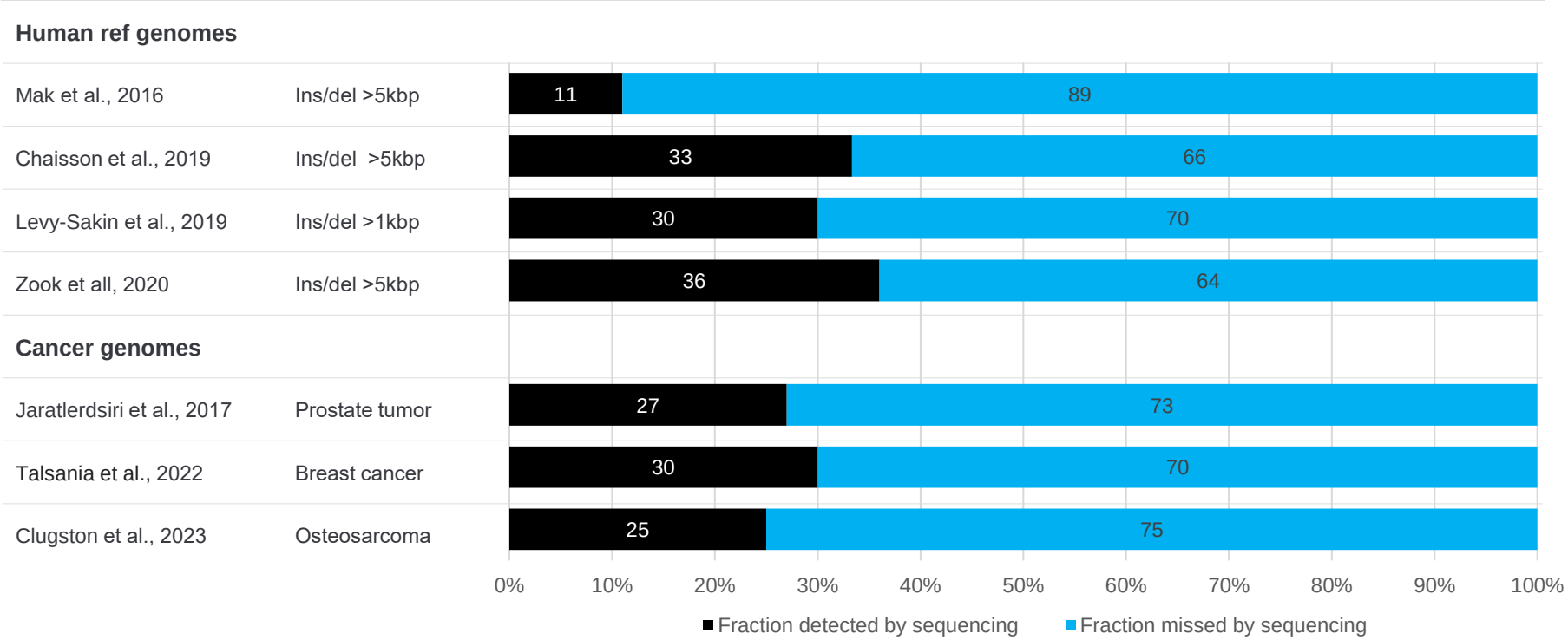
The OGM Difference is Context from Ultra Long Reads





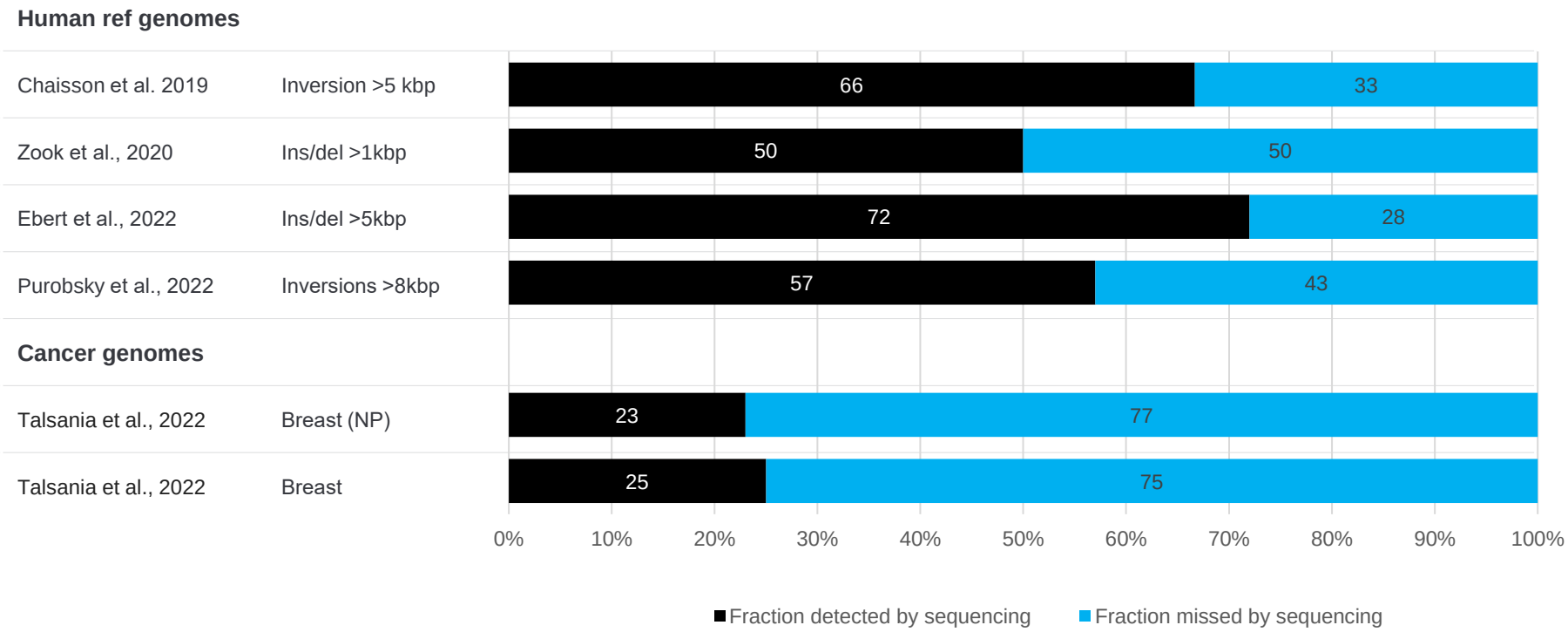


Benchmark Studies Show How Much SVs Short-Read Misses



Mak, et al. *Genetics*. 2016;202(1):351-362., Chaisson, et al. *Nat Commun*. 2019;10(1):1784., Levy-Sakin, et al. *Nat Commun*. 2019;10(1):1025., Zook, et al. *Nat Biotechnol*. 2020;38(11):1347-1355. Jaratlerdsiri, et al. Oncotarget. 2017;8(14):23588-23602. Talsania, et al. Genome Biol. 2022;23(1):255. Clugston, et al., unpublished poster presentation

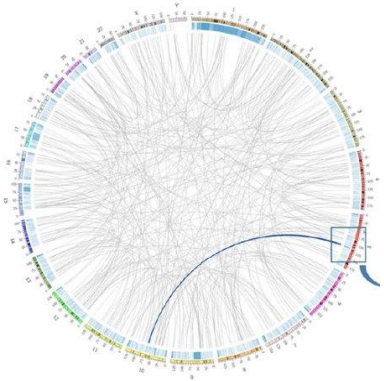
Long-Read Sequencing Performs Better but Still Misses Many SVs

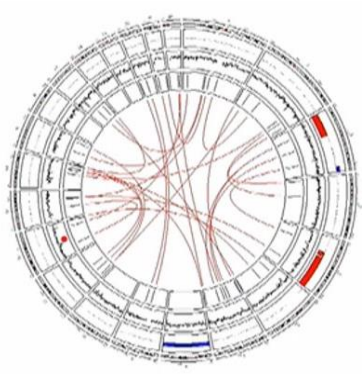


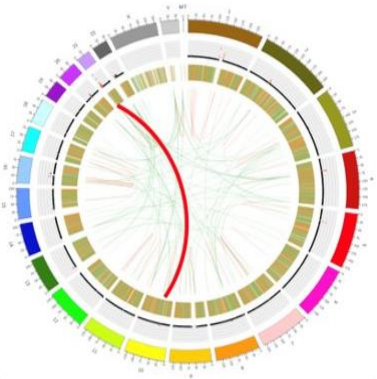
Chaisson, et al. *Nat Commun*. 2019;10(1):1784. Zook, et al. *Nat Biotechnol*. 2020;38(11):1347-1355. Ebert, et al. Science. 2021;372(6537). Porubsky, et al. Cell. 2022;185(11):1986-2005.e26. Talsania, et al. Genome Biol. 2022;23(1):255.

Studies Show Nanopore Detects SVs but with High False Positives

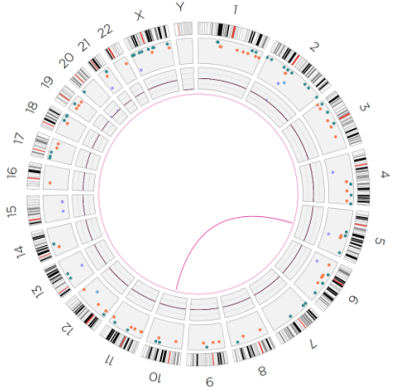
Nanopore

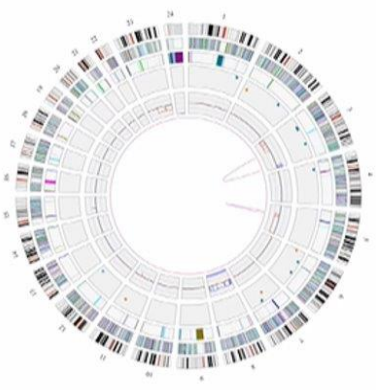


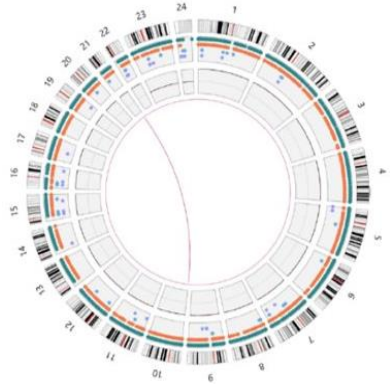




OGM







Scharf et al. J Med Genet. 2022;59(10):976-983. doi:10.1136/jmedgenet-2021-108147

Rodney Scott - Human Genetics Society of Australasia ASM2022 Perth Australia

Reproductive disorder case - Personal communication - Unpublished

KOL Opinions of LR and SR Sequencing

Recent comments in publications from leading US sequencing consortiums

Utility of long-read sequencing for All of Us

M. Mahmoud[1,2], Y. Huang[3], K. Garimella[3], P. A. Audano[4], W. Wan [3], N. Prasad[5], R. E. Handsaker[6], S. Hall[5], A. Pionzio[5], M. C. Schatz[7], M. E. Talkowski[8,9], E. E. Eichler[10,11], S. E. Levy[12], F. J. Sedlazeck[1,2,13]

- "The percentage of SVs agreed upon by all three technologies is approximately 22.00%; ONT and HiFi agreed on 53.86% of all SVs"
- "For long reads to advance, several major considerations must be addressed including costs, throughput, robustness of software cycles, and predictable/variable yields from sequence components or DNA quality fluctuations."

Beyond the exome: what's next in diagnostic testing for Mendelian conditions

Monica H. Wojcik[1,2,3], Chloe M. Reuter[4], Shruti Marwaha[4], Medhat Mahmoud[5], Michael H. Duyzend[1,2,6], Hayk Barseghyan[7,8], Bo Yuan[9], Philip M. Boone[1,2,6], Emily E. Groopman[1,2,6], Emmanuèle C. Délot[8,10,11], Deepti Jain[12], Alba Sanchis-Juan[1,6], Genomics Research to Elucidate the Genetics of Rare Diseases (GREGoR) Consortium, Lea M. Starita[13,14], Michael Talkowski[1,6,15,16], Stephen B. Montgomery[17,18,19], Michael J. Bamshad[13,14,20], Jessica X. Chong[13,20], Matthew T. Wheeler[4], Seth I. Berger[21], Anne O'Donnell-Luria[1,2,22], Fritz J. Sedlazeck[5,23], Danny E. Miller[13,20,24,*]

- "A direct comparison of lrGS, srGS, and OGM on the same sample showed that 1 in 3 deletions and 3 in 4 insertions larger than 10 kb were detectable only by OGM."

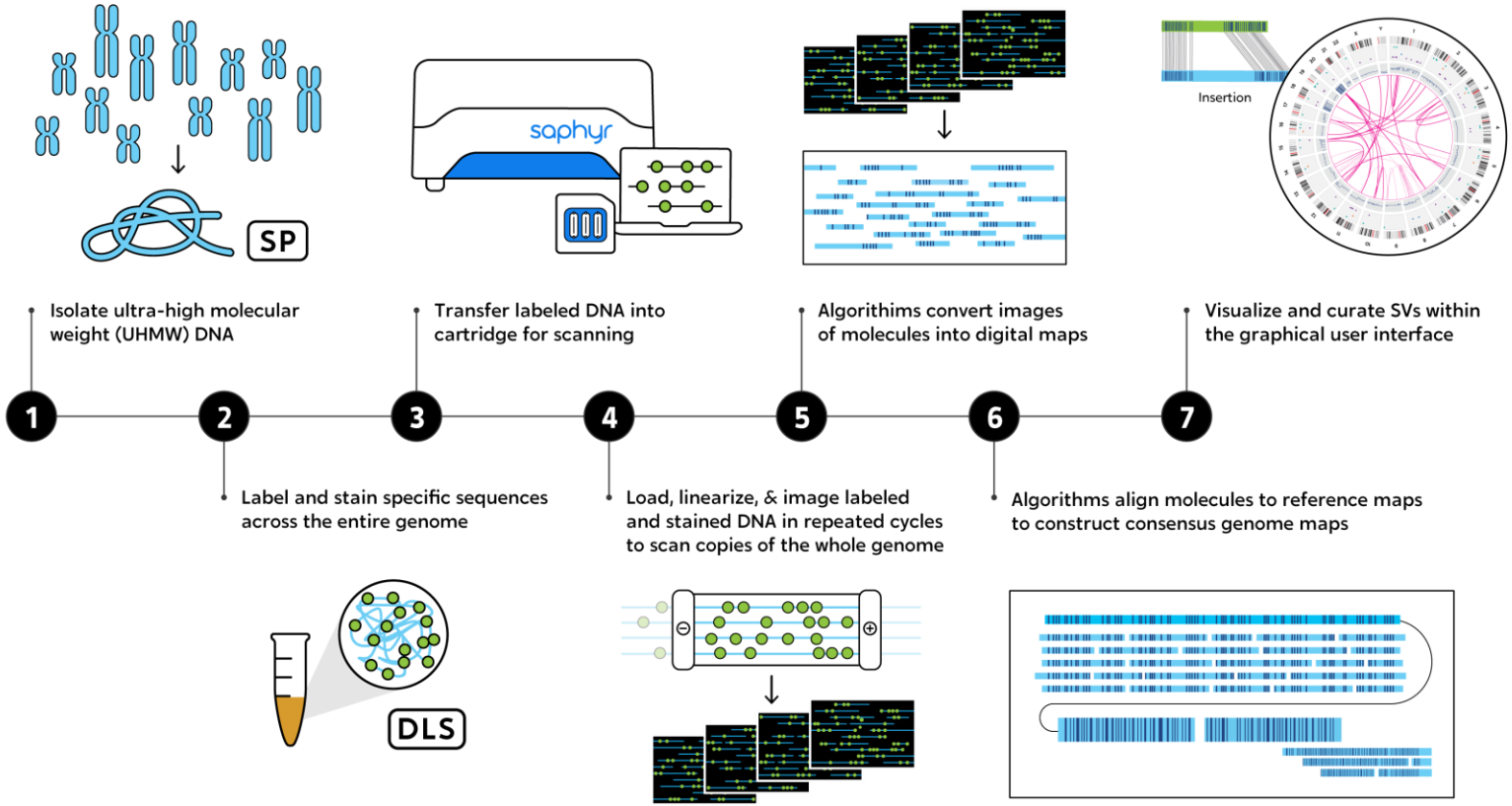
Bionano is Focused on Providing a Robust Solution for Clinical Translational Research

Key Success Criteria in Clinical Research Environment[1]

1. High Specificity >95%
   Low false positivity
2. High Sensitivity >95%
   High true positivity
3. High complexity
   cancer genomes
4. Detect low VAF <5%
5. Cost Effective
6. Simple workflow
   Fast TAT and easy analysis

1 Duncavage, et al., N Engl J Med 2021;384:924–35a

The OGM Workflow is Sample to Answer for SV Detection

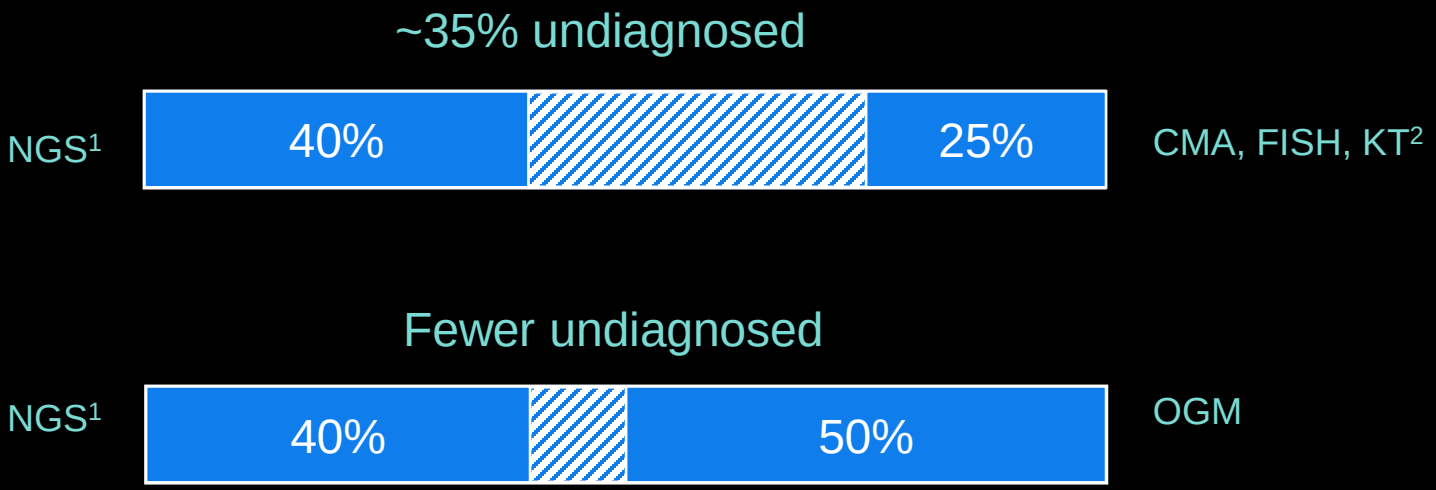


Multiple Studies Show that OGM Matches SOC and Adds Yield

Study	Application	Concordance	Yield Increase
Broeckel et al, 2022	Dev disorders	98.7%	15%*
Yang et al, 2022	Heme	99%	28%
Levy et al, 2022	Heme	100%	18%
Hsieh et al, 2021	Dev disorders	NA	12%
Pang et al, 2022	Heme	100%	37%
Sahajpal et al, 2022	Heme	98.7%	22%
Sahajpal et al, 2022	Prenatal	100%	51%*

Broeckel et al. (2022) medRxiv. 2022.12.26.22283900., Yang et al. (2022). Leukemia. 2022;36(9):2306-2316., Levy et al. (2022). Blood Adv. 2022; Blood advances.2022007583., Shieh et al. (2021). NPJ Genom Med. Sep 23;6(1):77., Pang et al. (2022) medRxiv. 2022.12.27.22283973., Sahajpal et al. (2023). J Mol Diagn. 25(3) in press., Sahajpal et al. (2022). J Mol Diagn. 24(12):1279-1291.

Cytogenetics and Molecular Genetics are Standard of Care



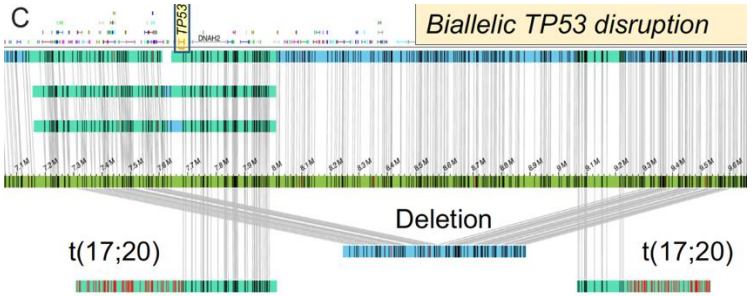
[1]100,000 Genomes Project Pilot Investigators, Smedley D, Smith KR, et al. 100,000 Genomes Pilot on Rare-Disease Diagnosis in Health Care - Preliminary Report. *N Engl J Med*. 2021;385(20):1868-1880.
[2]Taylor A, Alloub Z, Tayoun AA. A Simple Practical Guide to Genomic Diagnostics in a Pediatric Setting. Genes (Basel). 2021;12(6):818. Published 2021 May 27. doi:10.3390/genes12060818

We Need to Detect All Variant Classes!

NGS

AGGTCCTTTAGCATCTA
TCCTGTAGCATCTACGA
GGTCCTTTAGCAGCTACGATT
CCTTTAGCATCTCCG
TCCTTTACCATCTACGATT

OGM



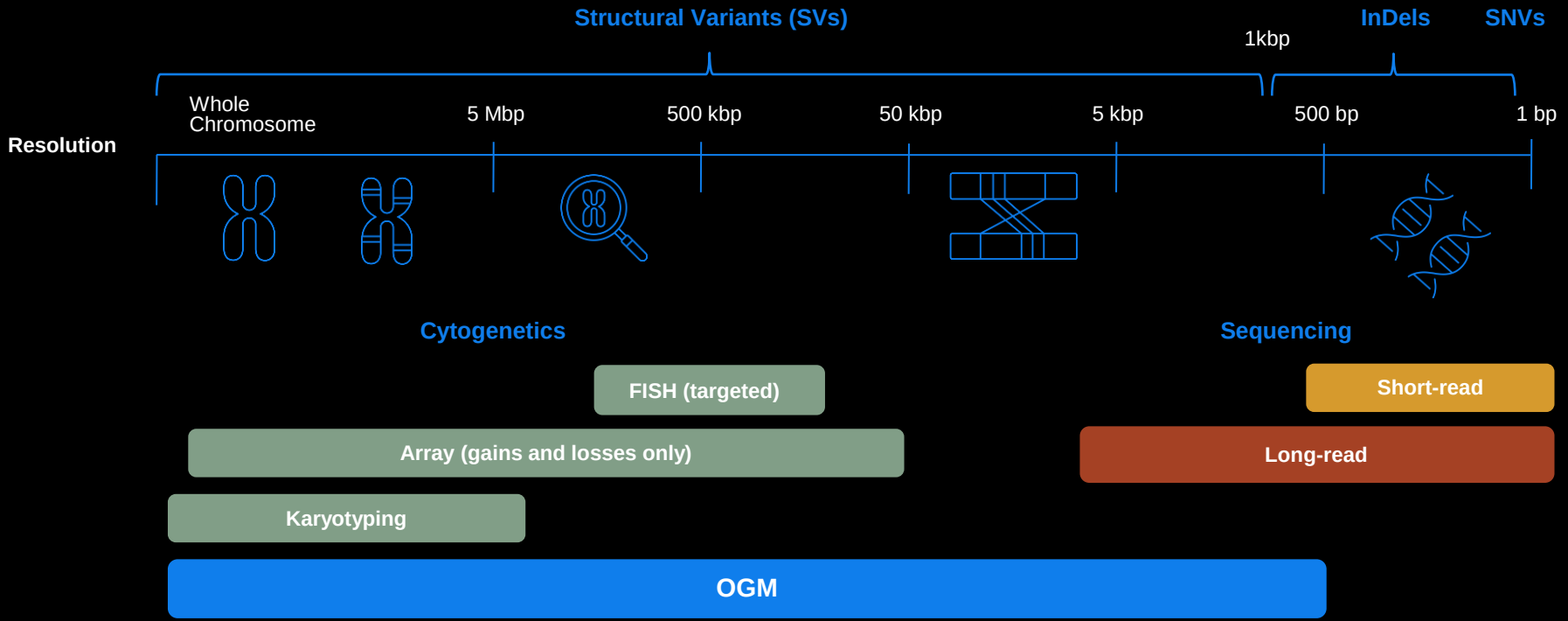
Courtesy of Rashmi Kanagal Shamanna

Product Portfolio & Development Roadmap

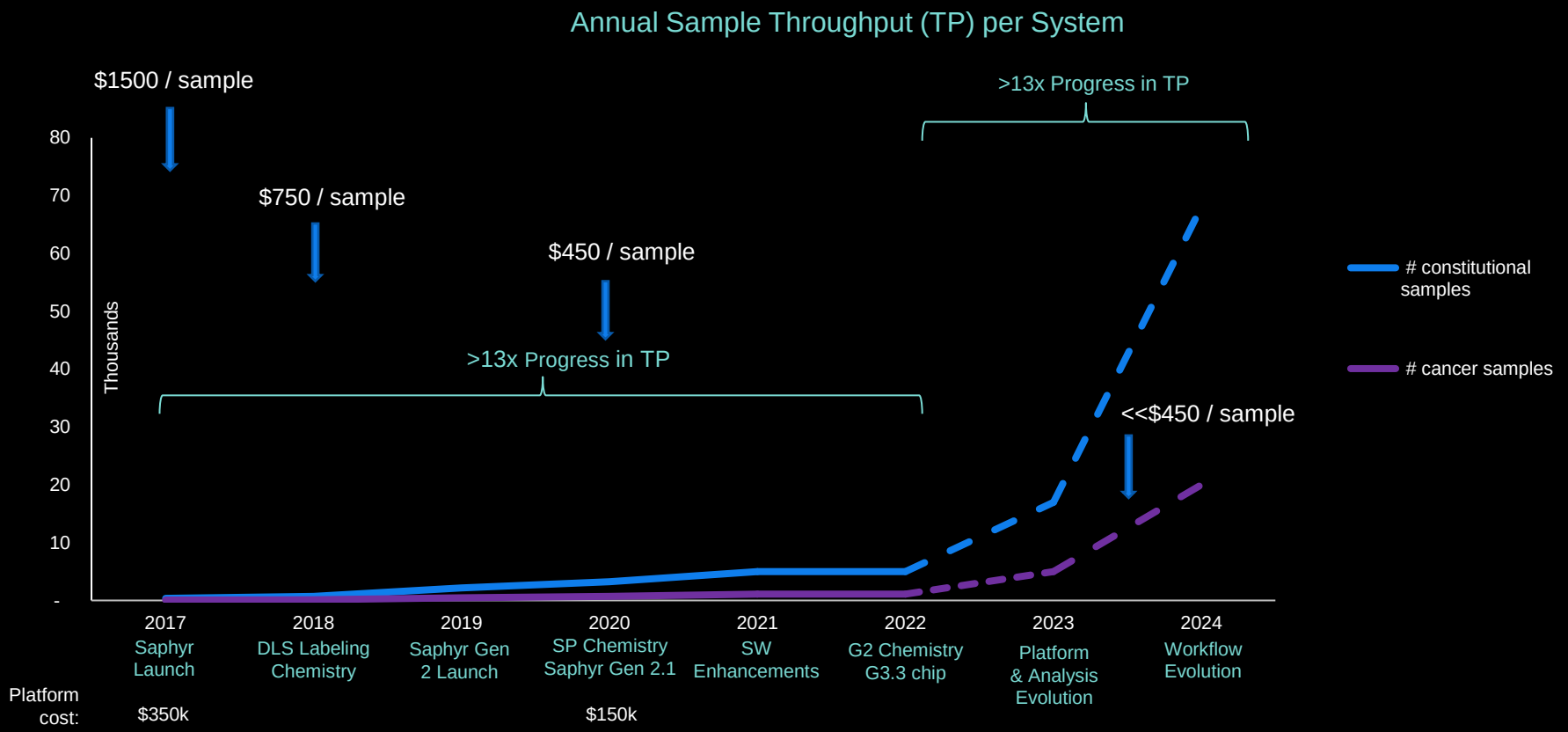
Mark Oldakowski
Chief Operating Officer

bionano™

We Believe Optical Genome Mapping will Transform Cytogenetics



Evolution of OGM Workflow



End To End Solutions for OGM

Saphyr ® System

Optical Genome Mapping in a User-Friendly Workflow

- Instrument, Consumables, Reagents
- Software, Compute
- Up to 4,500Gbp of data per day
- Up to max. 15,000Gbp per Saphyr Chip
- As low as $0.09 per Gbp
- Up to 1,100 deep coverage cancer whole genomes per year
- Low bioinformatics burden

Enhancing and Integrating Workflows Across Genomics Applications

Bionano Ionic Purification System

Automated ITP extraction, purification and concentration of genomic DNA/RNA for breath of genomic applications

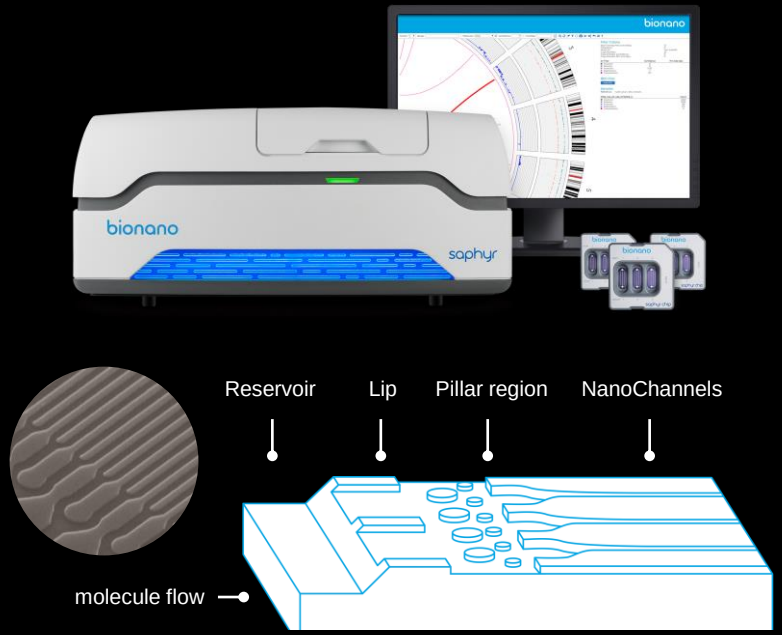
- Ionic Purification System
- Ionic Purification Kits
- Tackles complex samples like FFPE

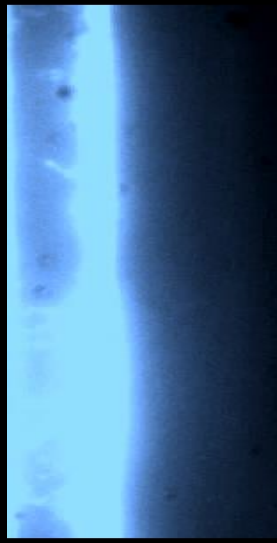
N_xClinical

Comprehensive analysis in one system for analysis and interpretation of data from microarray and NGS

- *Integrated analysis of CNVs, SNVs, and LOH in One View*
- *Automated interpretation*
- *HRD analysis*

OGM with Saphyr Uses Nanochannel Arrays to Linearize Ultra-High Molecular Weight DNA





Summary – Bionano IP Protection

Broad protection on (i) **nanochannel** arrays and methods of manufacture and use; and (ii) **ITP** methods and systems

200+
Patents and applications[1]

Bionano-owned IP (software)

- **NGS and Array:** proprietary algorithms for analysis and presentation of NGS and microarray data in a consolidated view (soon to include OGM data as well)
- **OGM:** proprietary algorithms for processing and analysis of OGM data

Exclusively licensed from leading universities

- **Nanochannel:** multiple patents and applications directed to nanochannel arrays, systems and labelling covering OGM technology
- **ITP:** multiple patents directed to extracting nucleic acid from a mixture, hybridizations, separations, and chemical reactions

Bionano-owned IP (patents)

PROTECTING BIONANO PRODUCTS

- **Nanochannel:** methods and improved devices covering OGM technology and alternate embodiments
- **ITP:** methods and devices for ITP implementation

PROTECTING FUTURE OPPORTUNITIES

- **Nanonozzle:** methods and devices for single molecule detection

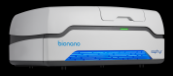
1 includes acquired Purigen patents and applications

How is Bionano Scaling with Customers' Volume Needs

bionano™

Second Generation (G2) Reagents for Better Results in Less Time

Introducing New Product Offerings and Updates Across Your Entire OGM Workflow



Product	SP-G2	DLS-G2	G3.3 Chip	Saphyr (ICS v5.3)	Compute / Access v.1.7.2
Sample Input	Day 1: Isolation	Day 2 : Labeling and Loading		Day 2-3: Imaging	Day 3-4: Analysis

Increased **Robustness** in Sample Preparation

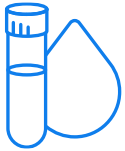
Decreased **turnaround times** for DNA labeling and imaging

Improved **Throughput** and **N50** quality metrics

Hamilton's Long String Automation + Bionano SP Generation 2 for UHMW DNA Isolation

Walk-away automation to run higher sample numbers and reduce hands-on time

Sample Types (Fresh or Frozen)



Blood (650 µl)

Bone marrow aspirate

Cultured cells

Utilize optimized SP-G2.LS kits

- Pre-packaged and configured kits for automation

Isolate 24 DNA samples in a day

- Increase sample throughput routinely

Optimize with Generation 2 Chemistry

- Improved DNA quality & throughput, length metrics

Where Do We Go From Here

bionano™

Future Evolution in How the World Sees the Genome

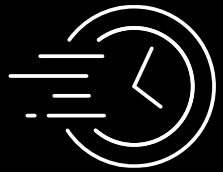
Enhancing usability, access, and results across genomics

Enhancing Throughput & Usability

Building toward an end to end high throughout future

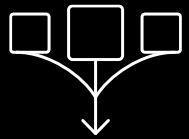
Simplified Sample Prep

Enhancing sample prep across genomics application



Time to Result

The power of NVIDIA in OGM



Analysis Integration

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

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
- Ultimate menu flexibility
  - Random access / no batching
  - Application freedom: constitutional, cancer, cell bioprocessing
  - 15 samples on board / up to 3 STAT samples
- Designed to scale with multiple systems orchestrated for higher throughputs – “workcell”
- Compatible with current Bionano reagents and software
- Manufactured in FDA-registered facility
- To be submitted to FDA as part of a 510k filing

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**

Bionano Ionic + OGM

Next-gen sample prep: 2 hours for 8 samples with minimal hands-on time

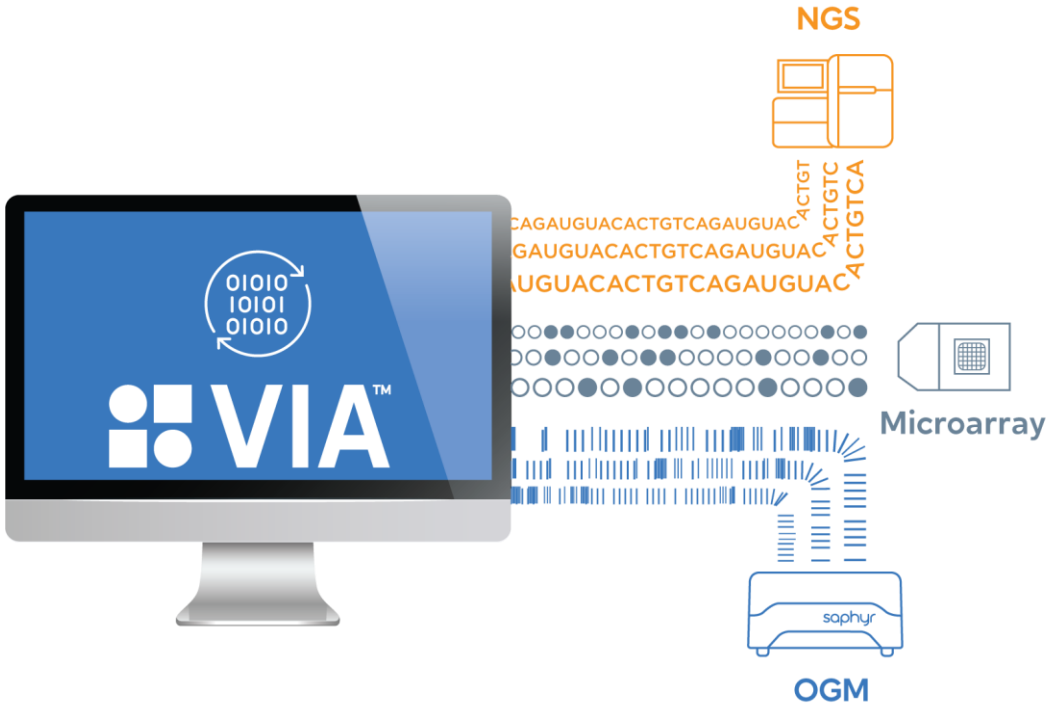
The Ionic® Purification System in unlike any other on the market; next generation platform for DNA and RNA isolation and purification

- Overcomes limitations with all other binding approaches
- Highly effective with challenging sample types (i.e. FFPE)
- Capable of evolving to support very long DNA for OGM use, including
  - Minute samples (i.e. fine needle biopsies)
  - Dilute samples (i.e. buccal swabs)

Future Evolution in Bionano Analysis SW!

Automation-assisted Interpretation of OGM Data Stand-alone or with Microarray and NGS Data Sets

In-Preview



Anticipated Product Milestones

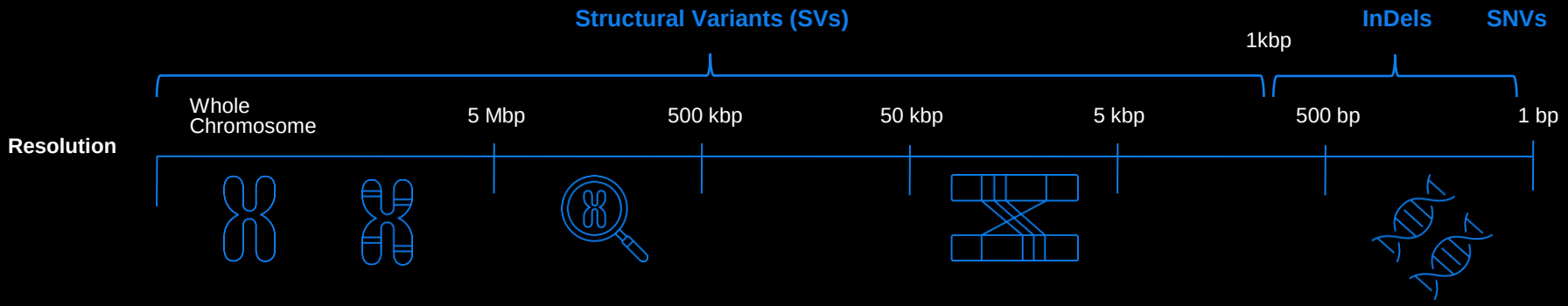
- High throughput Saphyr in first half 2023
- High throughput Saphyr Workcell in first half 2024
- High throughput Saphyr Compute in first half 2023
- Sample menu expansion via manual, Ionic and third-party workflows throughout 2023 and 2024
- VIA Automated variant Interpretation and reporting for OGM data fully commercial in second half 2023
  - Constitutional disorders and cancers
- High throughput Saphyr FDA 510k submission in 2024
  - Reagents received NMPA class I approval in China in 2022 for cancer indications

Clinical Development for Transforming Medical Practice

Alka Chaubey, PhD, FACMG
Chief Medical Officer

bionano™

Standard of Care in Cancer and Genetic Disease



Cytogenetics

- FISH (targeted)
- Array (gains and losses only)
- Karyotyping

Sequencing

- Short-read

Standard of Care is Defined by Medical Societies

Disease Areas	Patients	First Line Test (Reflex)	OGM Replaces
GENETIC DISEASE	PRENATAL	Chromosomal Microarray (KT, FISH, WES)	CMA, KT, FISH
	POSTNATAL	Chromosomal Microarray, Southern Blot (KT, FISH, WES)	CMA, KT, FISH, Southern Blot
BLOOD CANCERS	LEUKEMIA	Karyotype, FISH, Seq panels (CMA)	KT, FISH, CMA
	LYMPHOMA	Karyotype, FISH, Seq panels (CMA)	KT, FISH, CMA

Transforming Medical Practice Dependent on 2 Key Elements

Large Clinical Trials Program Underway To Address Key Drivers

We are following the paths already set by molecular methods for infiltrating the medical guidelines!

Study Description

- Multi-site, multi-operator, multi-instrument study
- Establish concordance with 1 of more SOC methods
- Retrospective arm
- Prospective arm
- Assess % increase in Dx Yield
- Assess cost effectiveness
- Assess TAT
- Assess Health Economics

	Status and Results	Pubs
Prenatal Cultured amnios/CVS	• 100% site-to-site reproducibility • 100% concordance with SOC* • Replaces SOC (whether 1, 2 or 3 tests were required for diagnosis)	3
Postnatal Blood, cell lines	• 100% site-to-site reproducibility • >99% concordance with SOC • Increase in Dx Yield (~10-15%)	4
Blood Cancers Blood, Bone Marrow Aspirates, Lymph node suspensions	• 100% concordance with SOC • Increase in Dx Yield (~37%)	5
Solid Tumors Tumor Tissue	• 100% concordance with SOC • Using OGM for HRD calculations	2

*SOC = Standard of Care

Clinical Trial Sites and PIs Influence Guidelines and Reimbursement

Brynn Levy, PhD
Columbia
Board ISPD, Co-Editor Prenatal Diagnosis, CGC Founding Member

Aaron Bossler, MD, PhD
University of Iowa
AMA CPT Editorial Committee Member

Rashmi Kanagal-Shamanna
MD Anderson
AMP BOD, CGC BOD, NCCN Liaison

Ravindra Kolhe, MD, PhD
Augusta University
US and Canadian CAP, AACR/ASCO visibility, NCI match PI, TSO500 driver for Illumina

Adrian Dubuc, PhD
Harvard
Former CGC president, and Harvard

Barb Dupont, PhD,
Greenwood Genetics Center
Constitutional (Agilent validation, Affy validation , Illumina FDA sequencing validation consortium)

Jim Broach, PhD
Penn State Medical College
Track record of success with Bionano technology

Gordana Raca, PhD
CHLA
CGC President, NCCN Liaison ACMG Technical Standards

Saurabh Gupta, PhD
Quest – Med Fusion
Quest, high volume

Anwar Iqbal, PhD
University of Rochester
CGC Founder, NY state

Yassmine Akkari, PhD
Nationwide Childrens
AMCG lab QA, AMP training and ed chair, CGC President

Ron Wapner, PhD
CUMC
KOL for influencing Prenatal/postnatal guidelines

Roger Stevenson, MD
Founder of Greenwood Genetics Center
World renowned geneticist

Aleksandar Rajkovic, PhD, MD
UCSF Chief Genomics Officer
Stuart Lindsay Distinguished Professor in Experimental Pathology

Teresa Smolarek, PhD
Cincinnati Children's Hospital
Director, Genetics and Genomics Diagnostic Laboratory

Peter Bui, PhD, FACMG
Quest Diagnostics
National Chief Director, Cytogenetics

Consortia Advancing OGM Too: International Heme Working Group

UHN

Adam Smith , PhD, FCCMG

UZ LEUVEN

Barbara Dewaele, PhD

Katrina Rack, PhD

Children's Hospital Los Angeles

Gordana Raca, MD, PhD, FACMG

The University of Texas MD Anderson Cancer Center

Rashmi Kanagal, MD

Augusta University

Ravindra Kolhe, MD, PhD

Columbia University Irving Medical Center

Brynn Levy, MSc, PhD, FACMG

Hospital del Mar / Parc de Salut MAR Barcelona — Hospital del Mar

Blanca Espinet, PhD

Anna Puiggros, PhD

Josep Carreras LEUKAEMIA Research Institute

Francesc Sole, Phd

Mar Mallo, PhD

Radboudumc university medical center

Alex Hoischen, PhD

Kornelia Neveling, PhD

Marian Stevens-Kroef, PhD

Daniel Olde Weghuis

PennState Health

James Broach, PhD

David Claxton, MD

Harvard

Adrian Dubuc, PhD

University of Oulu

Tuomo Mantere, PhD

Greenwood Genetic Center

Nikhil Sahajpal, PhD

bionano

Alka Chaubey, PhD, FACMG

Alex Hastie, PhD

OGM AML Consortium- Advancing Adoption in the US

RESEARCH ARTICLE | NOVEMBER 23, 2022

Optical Genome Mapping in Acute Myeloid Leukemia: A Multicenter Evaluation

Brynn Levy, Linda B. Baughn, Yassmine M. N. Akkari, Scott Chartrand, Brandon LaBarge, David F Claxton, Patrick Alan Lennon, Claudia Cujar, Ravindra Kolhe, Kate Kroeger, Beth Pitel, Nikhil Sahajpal, Malini Sathanoori, George Vlad, Lijun Zhang, Min Fang, Rashmi Kanagal-Shamanna, James R Broach

Jim Broach, PhD
Penn State Medical College

Track record of success with Bionano technology

Linda Baughn, Ph.D.
Mayo Clinic

Co-director of the Clinical Genomics Laboratory

Rashmi Kanagal-Shamanna, MD
MD Anderson

AMP BOD, CGC BOD, NCCN Liaison. Current CGC president

Min Fang, M.D., Ph.D.
Fred Hutchinson Cancer Center

CGC president, Chair of SWOG Leukemia Committee, AMP Board of Directors.

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Brynn Levy, PhD
Columbia

Board ISPD, Co-Editor Prenatal Diagnosis, CGC Founding Member

Patrick Lennon, Ph.D.
LabCorp

Past president of Cancer Genomics Consortium

Efforts of our Clinical Trials and Consortia Advancing OGM are Providing Critical Publications and Data

		Genetic Disease			Cancer				
REFERENCE	COHORT SIZE	FSHD	Prenatal	Postnatal	AML/CML//MPN/MDS	ALL/CLL	Lymphoma	MM/PCM	Solid Tumor
University of Iowa Stence, et al., 2021	351	●							
Multisite trial Stevenson, et al., 2022	123		●						
Multisite trial Iqbal, et al.,in press	404			●					
Multisite trial Broeckel, et al., 2022	560			●					
Radboud University Neveling et al., 2020	48				●	●		●	
Multi-site Pang et al. 2022	68				●	●	●	●	
Augusta, Emory Sahajpal et al. 2022	69				●		●	●	
M.D. Anderson Yang et al., 2022	101				●				
Cancer Genomics Consortium Levy et al., 2022	100				●				
Penn State Med Goldrich et al., 2021	20								●

● Pre-print
● Peer-reviewed

Adoption of OGM is Another Key Driver

- We are seeing validation of OGM as an LDT on a global basis – 25 LDTs as of 31-Dec 2022

- We leverage Bionano Labs for OGM-LDT development to engage with payors and support the global community

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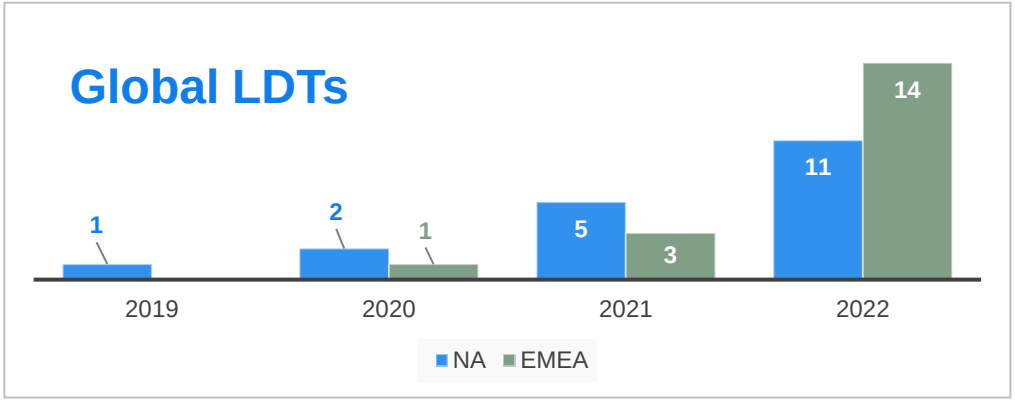
- CLIA-certified, CAP-accreditation pending
- Menu of OGM LDTs
  - OGM-Dx FSHD1
  - OGM-Dx HemeOne
  - OGM-Dx Constitutional (in progress)
- Lab supports the global community (clinical report)
- Engage with payors for pricing and reimbursement
- CLIA site for clinical trials
- Heme RUO study- 83% pathogenic abnormality detection rate!


CLINICAL TEST RESULTS
OGM-Dx HemeOne
bionano laboratories
Test Result Summary:
ISCN Nomenclature:
Results Summary:
Section A:
Section B:
Section A: Tier 1A Guideline Driven Analysis For Chronic Myelogenous Leukemia Results
Variant
Detected
Not Detected
Section B: Whole Genome Results – Tier 1 – Tier 3



Parallel Paths to OGM Adoption and Reimbursement

PLA codes: Constitutional Genetic Disorders and Hematological Malignancies

- Augusta University - 0260U priced $1263
- Praxis - 0264U priced $1263
- Augusta University - 0331U; pending pricing
- Praxis - 0299U, 0300U; pending pricing
- Other labs in the US are applying for PLA codes

Category 1 CPT code:

- Gathered AMA panel's feedback from application in 2022
- Reapplying in 2023 for 2 OGM codes

Engagement with Payors:

- Medicare Administrative Contractors (MACs) for local coverage determination (LCD) for OGM reimbursement
- Private Payors for positive medical policies

US Peer Reviewed Publications Showing Clinical Utility will Support CPT Code Application

2022

Constitutional genetic disorders

Shieh et al., (2021). NPJ Genom Med. Sep 23;6(1):77.	50 postnatal cases
Stence et al. (2021). J Mol Diagn. Nov;23(11):1506-1514.	351 FSHD1 cases

2023

Constitutional genetic disorders

Shieh et al., (2021). NPJ Genom Med. Sep 23;6(1):77.	50 postnatal cases
Stence et al. (2021). J Mol Diagn. Nov;23(11):1506-1514.	351 FSHD1 cases
Iqbal et al. (2023). J Mol Diagn. Feb;25(3) in press.	404 postnatal cases
Sahajpal et al. (2023). J Mol Diagn. 25(3) in press.	91 prenatal cases

Hematologic malignancies

Sahajpal et al. (2022). J Mol Diagn. 24(12):1279-1291.	69 heme cases
Levy et al. (2022). Blood Adv. 2022; Blood advances.2022007583.	100 AML cases
Yang et al. (2022). Leukemia. 2022;36(9):2306-2316.	101 MDS cases
Jean et al. (2022). Blood Adv. 2022;6(11):3343-3346.	42 pediatric ALL cases

Status Summary (2 yr period: 2020-2022)

OGM Data and Pubs

Human samples
600% increase

Pubs
275% increase

Clinical Utility and Validity

Prenatal
Postnatal
Heme

OGM Health Economics

Global efforts:
ongoing

OGM Adoption and Utilization

LDTs
1500%
increase

Transforming Medical Practice With OGM

Drivers	2022	2023-2024
Abundant Data on OGM	3000 genomes	6000 OGM genomes
Clinical Validity & Utility	<10 publications	>20 pubs ~20% Increase in success rate
Health Economic Data	-	Establish health economic benefits of OGM vs SOC
Payor Specific Data	-	Meeting key evidence requirements for payor coverage
Publications	30	>100 publications
Adoption & Utilization	25	>100 LDTs globally
Consensus Statement by KOLs	-	Constitutional and Heme
Coding & Reimbursement	PLA codes	Cat 1 CPT codes for heme and constitutional; Medicare LCD on OGM
Inclusion in Guidelines	First line test statements in pubs	Evidence based review - precursor to guidelines

Clinical Research Panel

Moderated by Dan Brennan, Cowen & Co

Featuring Drs. Adam Smith, Ravindra (Ravi) Kohle, and Gordana Raca

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Clinical Research Panel
Audience Q & A

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Translational Research Panel

Moderated by Dan Brennan, Cowen & Co

Featuring Drs. Ben Finlay, Rashmi Kanagal-Shamanna and Catherine Brownstein

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Translational Research Panel
Audience Q & A

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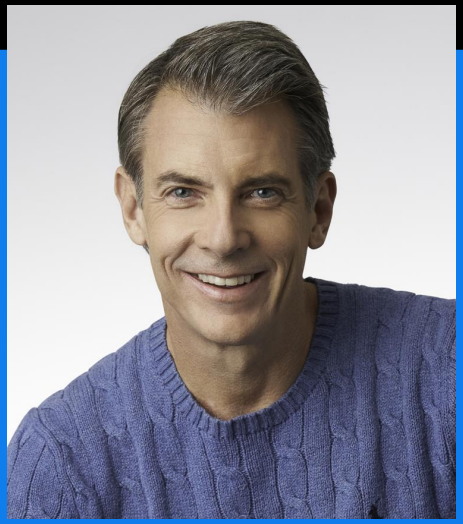

Fireside Chat

Erik Holmlin, PhD

Bionano President and Chief Executive Officer

with Moderator Dan Brennan

Cowen & Co

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We Believe Bionano has Reached a Key Inflection Point with Great Momentum

- We are squarely focused on transforming cytogenetic analysis with our OGM, DNA isolation & software solutions
- We believe we have the only solution capable of comprehensive structural variation analysis for cytogenetics
- Publications from clinical research studies are ramping, and our trials and the work of multiple consortia around the world are advancing awareness of OGM
- We consistently deliver on our product development programs
- We believe our current product roadmap will enable us to penetrate our target markets
- We have global initiatives underway to pursue reimbursement for OGM applications
- We are seeing compelling interest from pharma and biotech for applications in cell Rx

Bionano Management Q & A

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Non-GAAP Financial Measures

To supplement Bionano's financial results reported in accordance with U.S. generally accepted accounting principles (GAAP), Bionano has provided non-GAAP (also referred to as adjusted or non-GAAP) financial measures in this presentation: adjusted operating expense and adjusted operating income (each as a percentage of revenue). Adjusted operating expense excludes from GAAP operating expense the following components: [stock-based compensations expense, intangible asset amortization and transaction related expenses]. [**BNGO**: Please confirm. Adjusted operating income is calculated GAAP revenue minus adjusted operating income (as determined in the prior sentence). Further, adjusted operating expense and adjusted operating income are expressed in this presentation as a percentage of revenue, which can be obtained by dividing each of these measures by GAAP reported revenue. Because this presentation includes forward-looking or projected non-GAAP operating expense and non-GAAP operating income for future periods, we have not reconciled our projections for non-GAAP operating expense and non-GAAP operating income to their most comparable GAAP reported financial measures (GAAP reported operating expense and GAAP reported operating income, respectively) due to the unavailability of information needed to calculate reconciling items and due to the variability, complexity and limited visibility of such reconciling items. For example, the reconciliation for stock-based compensation expense would require additional inputs such as the number and value of awards granted that are not currently ascertainable, uncertain and out of our control, and thus cannot be reasonably predicted. The actual amounts of reconciling items during the future periods presented will have a significant impact on GAAP operating expense or GAAP operating income. Accordingly, a reconciliation of these non-GAAP measures to their most directly comparable GAAP measure are not available without unreasonable efforts.

We believe that these non-GAAP financial measures provide useful supplementary information to, and facilitate additional analysis by, investors and analysts, and that each of these non-GAAP measures, when considered together with our financial information prepared in accordance with GAAP, can enhance investors' and analysts' ability to compare our results from period to period and to our forward-looking guidance, to identify operating trends in our business and to understand our objectives for financial and operating performance. We use these non-GAAP measures internally to understand, manage and evaluate our business and to make operating decisions. These non-GAAP financial measures are not meant to be considered in isolation or as substitutes for comparable GAAP measures; should be read in conjunction with our consolidated financial statements prepared in accordance with GAAP; have no standardized meaning prescribed by GAAP; and are not prepared under any comprehensive set of accounting rules or principles. In addition, from time to time in the future, there may be other items that we may exclude for purposes of our non-GAAP financial measures; and we may in the future cease to exclude items that we have historically excluded for purposes of our non-GAAP financial measures. Likewise, we may determine to modify the nature of our adjustments to arrive at our non-GAAP financial measures. Because of the non-standardized definitions of non-GAAP financial measures, the non-GAAP financial measures as used by us in this presentation have limits in their usefulness to investors and may be calculated differently from, and therefore may not be directly comparable to, similarly titled measures used by other companies.

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