



Vertebrate Genomes Project Co-Leader Erich Jarvis will use BioNano to Generate Thousands of Reference Genomes

Next-Generation Mapping (NGM) with Irys® System to play integral role in Vertebrate Genomes Project

SAN DIEGO, CA – October 13, 2016 – BioNano Genomics, the leader in physical genome mapping, together with Howard Hughes Medical Institute (HHMI) Investigator and new Rockefeller University Professor, Erich Jarvis, Ph.D., today announced that his team will use BioNano Genomics' Next Generation Mapping (NGM) combined with Pacific Biosciences sequencing technology to construct thousands of vertebrate reference genomes in the Vertebrate Genomes Project.

Dr. Jarvis's lab and his collaborator Dr. Olivier Fredriko, co-director of the Duke University Genome Sequencing Center, performed a systematic evaluation of available DNA sequencing and scaffolding technologies. They concluded that a combination of BioNano's NGM and PacBio sequencing yields well-structured and informative genome assemblies, making the technologies a very good combination for establishing reference quality genomes.

Dr. Jarvis has purchased an Irys® System for next-generation mapping to play an integral role in generating quality reference genomes for the Genome 10K (G10K) and Bird 10,000 Genomes (B10K) projects. The mission of G10K and B10K projects is to generate high-quality references, diploid to multiploid, genomes of vertebrate species. For future sequencing of species, Dr. Jarvis and other members of these projects plan to generate sequence assemblies with the Pacific Biosciences Sequel System and an optical map with BioNano's Irys® System.

Genomics research over the past 20 years has produced an unprecedented amount of information and has increased our understanding of the molecular basis for evolution and disease. The addition of next-generation Irys® System mapping to the G10K and B10K projects is expected to produce high-quality reference genomes that will allow discovery of structural variations and complete structure of genes that control complex traits and their disorders. Revealing the accurate and complete structure of the thousands of vertebrate genomes will also help researchers understand vertebrate evolution. As such, the project members hope to secure additional Irys® Systems to support an increased rate of sequencing and mapping of vertebrate genomes.

"Dr. Jarvis's work and scientific vision for genomics projects is fundamental to advancing how we understand the diversity of life and how genome variation relates to human health and disease," said Erik Holmlin, Ph.D., CEO of BioNano Genomics. "The scope of the Vertebrates Genomes Project has impressed us and we look forward to our Irys® System contributing to its success in generating complete genome maps of the highest quality for all vertebrate species. The project reflects validation from published research and recognition by the genomics community that optical mapping using BioNano's Irys® System makes an influential difference in identifying structural variations in human and animal genomes."

About G10K and B10K Vertebrate Genomes Project Sequencing Labs

The ongoing G10K project aims to sequence the genomes of 10,000 vertebrate species, representing at least one species per vertebrate genus, and the ongoing B10K project aims to sequence the genomes of all 10,500 bird species on Earth. Dr. Jarvis is one of the co-leaders of G10K, along with Steve O'Brien of the Dobzhansky Center for Genome Bioinformatics, David Haussler and Beth Shapiro of the UCSC Genome Institute, and Oliver Ryder of UC San Diego. He is also one of the co-founders of the B10K project, along with Guojie Zhang affiliated at BGI in China and Denmark, and Thomas Gilbert of the University of Copenhagen in Denmark. Dr. Jarvis will set up an operational hub for these projects, to be located at the Rockefeller University and possibly the New York Genome Center (NYGC), where BioNano and PacBio platforms will reside.

This hub will involve working with the world's leading experts and institutions in genomics, including the National Center for Biotechnology (NCBI) in the U.S., ENSEMBL and the Sanger Institute in the UK, and BGI in China. They will receive vertebrate DNA samples from participating investigators across the world. Over the next three years, they hope to generate high quality chromosomal-level genome assemblies of at least 1,000 species representing each of the 1,000 vertebrate taxonomic families. With these 1,000 species, the consortia plan to conduct a series of focused studies, including studies on complex behavioral and brain traits, a genome-scale vertebrate family-level tree, and unmatched analytical power for detecting selection on every base in the human genome, all of which will impact studies on health and disease. All genomes produced through the G10K and B10K projects will be publicly available.

For more information or if you are an investigator or sponsor interested in becoming involved in or providing funding support for their projects, please visit the G10K (<https://genome10k.soe.ucsc.edu>) and the B10K (<http://b10k.genomics.cn/index.html>) websites.

About BioNano Genomics

BioNano Genomics, Inc., the leader in next-generation mapping, provides customers with genome analysis tools that advance human, plant and animal genomics and accelerate the development of clinical diagnostics. The Company's Irys® System uses NanoChannel arrays integrated within the IrysChip® to image DNA at the single-molecule level with average single-molecule lengths of about 350,000 base pairs, which leads the genomics industry. The long-range genomic information obtained with the Irys System helps decipher complex DNA involving repeats, which are the primary cause of inaccurate and incomplete genome assembly.

On its own, next-generation mapping with the Irys System enables detection of structural variants, many of which have been shown to be associated with human disease as well as complex traits in plants and animals. As a companion to next-generation sequencing, next-generation mapping with the Irys System integrates with sequence assemblies to create contiguous hybrid scaffolds that reveal the highly informative native structure of the chromosome.

BioNano Genomics provides long-range genomic information with cost-efficiency and throughput to keep up with advances in next-generation sequencing.

The Irys System has been adopted by a growing number of leading institutions around the world, including: National Cancer Institute (NCI), National Institutes of Health (NIH), Wellcome Trust Sanger Institute, BGI, Garvan Institute, Salk Institute, Mount Sinai and Washington University. Investors in the

Company include Domain Associates, Legend Capital, Novartis Venture Fund and Monashee Investment Management.

For more information, please visit www.BioNanoGenomics.com.

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