

## The DRAGEN and the Genome

*How Edico's genomic analysis platform is advancing clinical genomics in the U.K.*

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By analyzing a whole genome in under 30 minutes, Edico Genome's DRAGEN Bio-IT platform is helping to push Genomics England towards achieving its goal of sequencing 100,000 whole genomes and making genomic sequencing a staple of patient care in the U.K.

Since its launch in 2013, Genomics England Ltd., which is an independent company that is funded by the U.K. government and owned by the Department of Health and Social Care, has been building the infrastructure necessary to enable sample collection, sequencing, secondary analysis and clinical care.

Genomics England Chief Commercial Officer Joanne Hackett told BioCentury that the speed of Edico Genome Inc.'s secondary analysis technology -- DRAGEN -- was one factor that attracted Genomics England to the company. DRAGEN can analyze a whole genome in about 25 minutes, compared with about 30 hours when using industry standard BWA-GATK-HC software. The companies announced their partnership last month, under which Edico is responsible for analyzing 5,000 of the 100,000 genomes.

DRAGEN's hardware component, a Field Programmable Gate Array (FPGA), addresses the computational processing bottleneck encountered when analyzing large data sets like whole genomes. It's a chip bought off the shelf that Edico has further developed to optimally process genomic data (see "Edico: Processing Genomes." BioCentury (July 21, 2014)).

Hackett said the "FPGAs that Edico has in their DRAGEN system are exactly what we need to streamline the process" of analyzing such a large number genomes.

DRAGEN's ability to process genomic data so quickly has allowed Edico to maximize the accuracy of its analysis pipelines -- the software that enables particular types of secondary analyses of raw sequence data -- developed for DRAGEN.

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One example of Edico optimizing pipeline accuracy is the use of sample-specific error models, which differ from static error models applied across patient samples in many sequence analysis programs.

Edico’s nine pipelines offer a range of functions for users depending on what type of analysis is needed. The company’s Somatic V2 pipeline, for example, is designed to detect somatic variants in tumor samples and can call SNPs and indels and report allele frequency.

Edico showcased the accuracy of its DRAGEN V2 Germline pipeline, designed for clinical-grade analysis of whole-genome sequences, at the PrecisionFDA Hidden Treasures - Warm Up Challenge last year. The challenge was part of a series of competitions hosted by FDA to bring awareness to the need for accuracy in genome sequencing. The pipeline received the highest score in five of the six accuracy metrics (see “[Next Generation Resolutions](#).” BioCentury Innovations (Jan. 4, 2018)).

Hackett said Genomics England, which has sequenced about 50,000 genomes so far, is on track to make up the balance by year end. Completion of the landmark pilot program will coincide with another big milestone: NHS will start to commission whole-genome sequencing as routine clinical care in the fall, according to Hackett.

On a larger scale, Edico President and CEO Pieter van Rooyen said, “Whatever Genomics England is doing will form the blueprint of whatever will be rolled out in other parts of the world.”

As the partners look ahead, each says an eventual goal is to incorporate DRAGEN into sequencing machines themselves. This achievement would allow real-time analysis of genomic data as it’s being sequenced. Combining the sequencing and secondary analysis steps would further cut down the time needed to process a whole genome from start to finish.

Edico said it is exploring such an integration with undisclosed companies.

Edico does not license its IP -- which includes 12 patents with four additional patents expected to be awarded in the next month or so, according to van Rooyen -- but instead offers software as a service. Its pipelines are available in an on-site version or in the cloud, and can be bought separately or as a complete suite.

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