

GATC BIOTECH EXPANDS APPLICATIONS WITH UNIQUE ATTRIBUTES OF SMRT SEQUENCING

GATC Biotech, the first PacBio® Certified Service Provider in Europe, became a leader in the sequencing field by continuously adopting new technologies, developing innovative products, and delivering quality results to its 10,000-strong customer base. Today, GATC Biotech is constantly looking for new ways to maximize the value of highly accurate, long-read sequencing.

GATC Biotech has been serving the life science community since the beginning of the 1990s. During that time, the sequencing service provider has closely monitored the state of sequencing techniques, making them readily available to its customers as soon as possible. Now, at the time of its 25th anniversary, GATC Biotech has a team of 150 employees with headquarters in Konstanz, Germany, and laboratories and offices across Europe. This scale represents the company's success with its 10,000 customers, for whom GATC Biotech has analyzed more than 10 million samples to date.

With a customer base of this size, it is no surprise that the company has a dedicated in-house development team working on new research services and protocols. The staff



Laboratory technician prepares for the next PacBio run in GATC Biotech's Genome and Diagnostic Centre, Konstanz, Germany.

also continually surveys the sequencing market, eager to adopt the latest platforms. In 2011, GATC Biotech was one of the first companies to order the Pacific Biosciences® sequencer. Today, it is the first Certified Service Provider in Europe for the PacBio sequencing system, which GATC Biotech runs for a variety of scientific projects that benefit from highly accurate, long-read sequencing. For example, the company recently launched a new microbiome product designed specifically for high-throughput analysis of full-length 16S amplicons.

For Dr. Kerstin Stangier, Director Next-Generation Sequencing at GATC Biotech, the company's long history as a leading provider of Sanger sequencing — a business that continues today — serves as a good foundation for the Single Molecule, Real-Time (SMRT®) Sequencing technology. Customers who already appreciated the long reads and high accuracy of Sanger sequencing are quite interested in the industry-leading read lengths and consensus accuracy generated by the PacBio system, Stangier says. With the new barcoding method for SMRT Sequencing, Stangier anticipates that much of the business from customers looking to sequence amplicons and BACs might shift from Sanger to PacBio. "This is a big opportunity for us," she says.

The Value of Long Reads

Stangier was already with GATC Biotech when the company acquired its first next-generation sequencing instruments, an original Solexa sequencer and a Roche 454 GS 20 sequencer. "This was in the very early days," she recalls. Today, GATC Biotech is one of the few multi-platform service



Facility name:	GATC Biotech
Staff size:	150 employees at headquarters in Konstanz, Germany, as well as labs and offices across Europe
Year founded:	1990
Investigators served:	The company has worked with 10,000 customers, for whom it has analyzed more than 10 million samples so far
Differentiator:	With its emphasis on internal R&D, GATC Biotech routinely develops new methods to meet customer demand and enhance the services it provides
PacBio System installed:	August 2011
Website:	www.gatc-biotech.com
Email:	customerservice@gatc-biotech.com

A PacBio Certified Service Provider

providers offering technologies ranging from Sanger and popular short-read platforms to the PacBio system.

But GATC Biotech is more than just a sequencing fleet, Stangier says. “We have the great opportunity to offer complete solutions to our customers. We try to understand the scientific question behind the project and then look for the best solution instead of just offering sequencing technology,” she adds.

For applications ranging from *de novo* sequencing to cDNA analysis, the solution recommended by Stangier and her team is often the PacBio platform. “The value for the customer in *de novo* projects is great,” she says. “For lots of bacterial genomes, with a small amount of work, we reach closure with 100-fold coverage.” She notes that larger genomes and genomes with highly repetitive regions benefit from SMRT Sequencing as well, because the assembly improvements can be substantial. “Bioinformatics analysis gets much easier, and we can overcome issues like repeats, which cannot be resolved by other sequencing technologies,” Stangier says, noting that this is especially true for plant genomes.

Many customers who have existing draft genomes based on other sequencing technologies come to GATC Biotech looking to fill the many gaps in those assemblies. The service team deploys SMRT Sequencing to provide scaffolding, using the HGAP assembly process to reduce gaps and correct misassemblies. By adding PacBio data, “customers are getting a better quality on their existing assemblies,” Stangier says.

“You can sequence through the whole cDNA fragment and directly see all the splicing variants. This gives a completely new view into transcriptomes. It’s a great advantage.”

Transcriptome analysis is another application for which Stangier and her associates routinely recommend the PacBio platform, particularly to customers who previously used Roche 454 sequencers, which were recently retired. “It’s very helpful because you can sequence through the whole cDNA fragment and directly see all the splicing variants,” she says. “This gives a completely new view into transcriptomes. It’s a great advantage.”



“Ultra-long reads are a real advantage” says Dr. Kerstin Stangier, Director Next-Generation Sequencing at GATC Biotech.

New Protocols

Stangier and her colleagues began using PacBio’s new barcoding protocol as soon as it was announced. The technique dramatically broadens the field of applications for SMRT Sequencing, including amplicon and BAC sequencing, which were traditionally Sanger-based applications. “We can already shift BAC sequencing to the PacBio platform, and with just one SMRT Cell, you can even get closure of these BACs,” Stangier says. “It’s really an astonishing application.”

A new GATC Biotech-developed approach for microbiome profiling makes for another application that will be a good fit for SMRT Sequencing. Microbiome analysis, usually done with short-read sequencing, has been problematic due to the highly variable regions of the 16S rRNA gene that short reads cannot fully span. “With PacBio sequencing, we are now able to cover all variable regions in the full-length 16S amplicon, which results in high specificity for determining the different bacterial species in a microbiome,” Stangier says. The service, called INVIEW™ Microbiome High Specificity, was designed for use with PacBio’s long reads to enable phylogenetic characterization and quantification of microbes down to the species level.

Looking ahead, the GATC Team will continue to develop new ways to benefit from the unique attributes of SMRT Sequencing and to deliver reliable results to their customers. “The ultra-long read sequencing of Pacific Biosciences’ platform is really fantastic,” Stangier says. “It’s a real advantage.”