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2014

ADVANCED ANALYTICAL

2014 North American Sample Analysis
New Product Innovation Award

FROST & SULLIVAN

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50 Years of Growth, Innovation & Leadership

New Product Innovation Award
Sample Analysis
North America, 2014

Frost & Sullivan's Global Research Platform

Frost & Sullivan is in its 50th year in business with a global research organization of 1,800 analysts and consultants who monitor more than 300 industries and 250,000 companies. The company's research philosophy originates with the CEO's 360-Degree Perspective™, which serves as the foundation of its TEAM Research™ methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2014 North American New Product Innovation Award in Sample Analysis to Advanced Analytical.

Key Industry Challenges

The research community continually demands new technologies that automate methods, improve workflow efficiency, simplify research, and provide better and faster time to results. Frost & Sullivan analysis finds that research laboratories need to improve current workflows through better upstream sample analysis. Companies that deliver process-changing technologies that save time and money while providing quality, valuable information will be rewarded with an eager marketplace.

In mature applications, researchers become used to entrenched technologies and standard product features. In order to convince researchers to adopt a market-changing product, companies must develop technologies that improve the work of laboratories, automate and simplify prevailing techniques, yet are not cost-prohibitive in times of budget constraints. Updating technologies with modern automation trends, integrating many capabilities into a single platform, increasing throughput and efficiency, and providing added features, all at an affordable price, will truly revolutionize a stagnant workflow.

Key Benchmarking Criteria for New Product Innovation Award

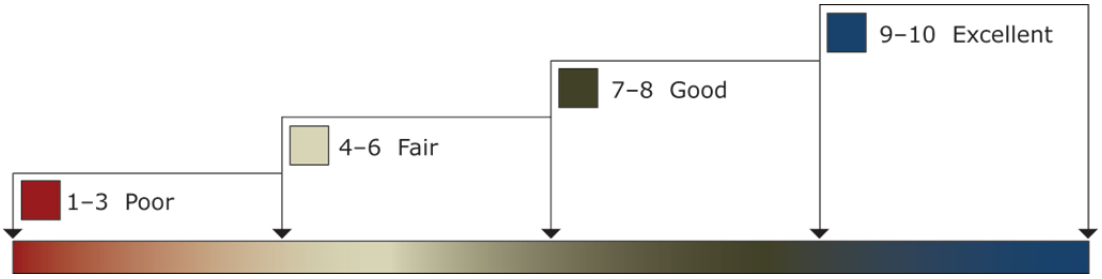
For the New Product Innovation Award, the following criteria were used to benchmark Advanced Analytical's performance against key competitors:

- Innovative Element of the Product
- Leverage of Leading-Edge Technologies in Product
- Value Added Features/Benefits
- Increased Customer ROI
- Customer Acquisition/Penetration Potential

Decision Support Matrix and Measurement Criteria

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Matrix (DSM). The DSM is an analytical tool that compares companies' performance relative to each other with an integration of quantitative and qualitative metrics. The DSM features criteria unique to each Award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. Fundamentally, each DSM is distinct for each market and Award category. The DSM allows our research and consulting teams to objectively analyze each company's performance on each criterion relative to its top competitors and assign performance ratings on that basis. The DSM follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are shown in Chart 1.

Chart 1: Performance-Based Ratings for Decision Support Matrix



This exercise encompasses all criteria, leading to a weighted average ranking of each company. Researchers can then easily identify the company with the highest ranking. As a final step, the research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

Chart 2: Frost & Sullivan's 10-Step Process for Identifying Award Recipients

Best Practice Award Analysis for Advanced Analytical

The Decision Support Matrix, shown in Chart 3, illustrates the relative importance of each criterion for the New Product Innovation Award and the ratings for each company under evaluation. To remain unbiased while also protecting the interests of the other organizations reviewed, we have chosen to refer to the other key players as Competitor 1 and Competitor 2.

Chart 3: Decision Support Matrix for New Product Innovation Award

Measurement of 1–10 (1 = lowest; 10 = highest)	**Award Criteria**					
	Innovative Element of the Product	Leverage of Leading-Edge Technologies in Product	Value Added Features/Benefits	Increased Customer ROI	Customer Acquisition/Penetration Potential	**Weighted Rating**
Relative Weight (%)	**20%**	**20%**	**20%**	**20%**	**20%**	**100%**
Advanced Analytical	10	9	10	10	9	9.6
Competitor 1	6	8	5	6	9	6.8
Competitor 2	5	7	4	4	7	5.4

Introduction

Frost & Sullivan proudly recognizes Advanced Analytical Technologies as the recipient of the 2014 New Product Innovation Award for Sample Analysis. Advanced Analytical, a privately-held company based in Ames, IA, offers an innovative multi-application light-emitting diode (LED) fluorescence capillary electrophoresis (CE) system for sample analysis. Founded in 1998, Advanced Analytical originally developed flow cytometry technology that could detect low levels of microbial cells. After merging with CombiSep in 2006 and adding CE technology to its core competencies, the company licensed its flow cytometry technology to market-leader Becton, Dickinson and Company in 2010. That left the company to focus on expanding its CE-based portfolio of products. Frost & Sullivan's research reveals that Advanced Analytical's resulting Oligo PRO, and pKa PRO instruments are well-positioned in major oligonucleotide houses, pharmaceutical companies, and research institutions worldwide. When setting out to design its next instrument, for fragment analysis, Advanced Analytical evaluated the gaps and unmet needs of similar technologies in the marketplace. What resulted was the Fragment Analyzer, a multi-application platform rooted in the company's CE expertise and experience with smart features to improve the production and workflow of laboratories. The highly flexible LED

fluorescence-based CE system can be used to quantify and qualify genomic DNA, NGS fragments, RNA, and many other fragment types, as well as, perform mutation detection, switching quickly and easily between applications. With parallel, scalable throughput, Frost & Sullivan notes that the platform eliminates the frustrating and time-consuming bottleneck in upstream sample analysis that slows laboratory workflows. Various flexibility points within the system make instrument sharing simple and quick, increasing laboratory efficiency and allowing multiple users to take advantage of the Fragment Analyzer's capabilities. Overall, Advanced Analytical's Fragment Analyzer boasts the greatest throughput and flexibility of similar technologies on the market and provides simple, innovative product features to improve laboratory workflow. With over 300 instruments installed worldwide since its January 2012 launch, the Fragment Analyzer's success in the marketplace is a testament to its market appeal and workflow advantages. For developing an intuitive multi-application fragment analysis instrument that helps laboratories increase their production, Advanced Analytical is the ideal recipient of the Frost & Sullivan New Product Innovation Award for Sample Analysis.

Market-changing Smart Product Features

At the heart of the Fragment Analyzer is its fluorescence-based parallel capillary electrophoresis technology. The instrument consists of an automatic tray positioning system, exchangeable 12- or 96-capillary array assembly, high-voltage power supply, fluid pumping system, and a fixed charge-coupled device (CCD) optical detection platform. Once a 96-well plate is positioned into one of the six drawers, direct injection via vacuum or voltage injects samples into the 12- or 96-capillary array depending on instrument setup tailored to the laboratory's needs. The LED light source then excites the intercalating fluorescent dye present in the gel matrices at the windowed portion of the capillary array. The fluorescent light passes through the camera lens and is spatially imaged onto the CCD detector, providing real-time on-line detection of the separations as the capillary array is imaged continuously. Samples are read in parallel, at either 12 or 96 samples simultaneously depending on the capillary array, significantly reducing the run time. Before the platform begins to read the next set of samples, the automated capillary flush prevents sample contamination by rinsing the capillaries with fresh gel between injection cycles. Frost & Sullivan's competitive benchmarking confirms that the methodology behind the Fragment Analyzer provides multiple advantages over competing technologies, such as spectrophotomers, fluorometers, slab gel-based systems, microfluidic-based systems, and real-time PCR. The platform offers both quality and quantity information quickly, accurately, and at high resolution when needed, in an automated method that reduces sample handling. The use of intercalating dye as the fluorescent source alleviates the need to use costly and problematic labeled primers, a major benefit for PCR applications. Additionally, recognizing the trade-off between speed and resolution of all capillary electrophoresis technologies, Advanced Analytical actually uses this fact to its advantage. Two easily interchangeable capillary array lengths, 55cm and 80cm, provide simple tailoring to needed separation times and resolution. Shorter

arrays provide fast, 15-minute results when high resolution is not required. The longer array provides very precise high resolution down to 3 base pairs (bp). Ultimately, the instrument provides size and quantification information for genomic DNA, RNA, next-generation sequence fragments, microsatellites (SSR), or small and large amplicons, enabling a variety of downstream laboratory applications.

When setting out to design the Fragment Analyzer, Advanced Analytical located various unmet needs, inefficiencies, and areas of improvement over competing technologies and instruments. Frost & Sullivan research shows that realizing laboratory needs often vary and change, Advanced Analytical brilliantly designed several flexibility features that allows for simple customization to the end users needs. First, the 12- or 96-capillary array options provide scalable throughput. This is the only instrument on the market that can switch between these throughput levels. In addition, the electrophoresis voltage can be adjusted to the end users needs, ultimately affecting run time and resolution. This can also be achieved through opting for the 55cm or 80cm length capillaries. The settings depend on what end-users need to achieve, a "yes/no" answer or more accurate sizing and quality information. Furthermore, Advanced Analytical recognized that instrument sharing often occurs within laboratories, with multiple end-users conducting different downstream applications, be it next-generation sequencing library preparation, or RNA analysis. The Fragment Analyzer accounts for this sharing, providing two slots for different bottles of gels to be loaded on the system for varying samples types. Thus, if one end user is analyzing DNA and the other RNA, the instrument will pull the different gels required for each application. This is completely unique to the Fragment Analyzer, as competing instruments require preparing an application-specific chip or swapping out cartridges. Advanced Analytical's technology allows users to switch between applications and sample types seamlessly.

Furthermore, the company recognized that when instrument sharing occurs, usage of the instrument is often at a premium with multiple end-users trying to juggle a single platform. In general if a shared instrument is in use, others have to wait until it runs through to load their own samples, regularly checking the instrument's availability. Advanced Analytical developed a solution for this tedious, inefficient backlog. The Fragment Analyzer contains six drawers on the face of instrument, with three dedicated 96-well sample plates. As one plate of samples runs, the other drawers can be loaded while in operation and programmed to run once the first plate has completed. Thus, end-users can load samples whenever ready to be run as soon as possible, rather than regularly checking the instrument's availability. In addition, the instrument can continue to run samples from each drawer overnight, allowing for maximum laboratory efficiency. This amounts to a market-leading capacity of up to 1,500 samples per day. For increased throughput flexibility and scalability, the Fragment Analyzer can be set to run 12 samples or 96 samples at once depending on the capillary array used. The ability to interchange the capillary allows laboratories to scale up as needs change. Furthermore, an open-tray system can be configured for integrated use with robotic liquid handling platforms.

Overall, the Fragment Analyzer's simple yet ingenious setup is the first of its kind which Frost & Sullivan firmly believes is market-changing. Many competing instruments lack 96-well throughput capability altogether and none of them provide the ability to load and sequentially pull three sample plates.

Ultimately, when designing the Fragment Analyzer, Advanced Analytical addressed a wide range of the laboratory flexibility and workflow needs that are often overlooked by instrument providers. Instead of building a technology and fitting it into the current workflow as many companies do, Advanced Analytical designed the technology to enable a highly improved workflow solution. The end user is not just purchasing an instrument for simultaneous qualification and quantification of samples, but also a better way to manage sample analysis within a fast-paced laboratory of various needs and applications. Installing 300 instruments worldwide in under two years is a testament to the demand for Advanced Analytical's Fragment Analyzer and its ability to improve laboratory workflow and efficiency.

Conclusion

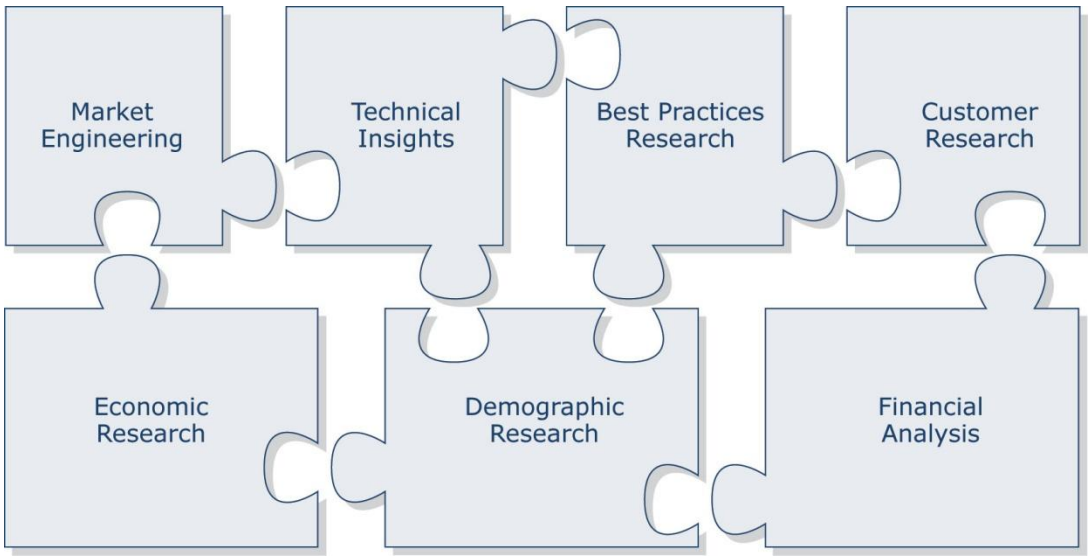
In conclusion, Frost & Sullivan analysis hails Advanced Analytical's Fragment Analyzer as a smartly-designed, highly innovative automated CE system for fragment analysis. Frost & Sullivan's independent analysis of the Sample Analysis market clearly shows that the instrument provides an incredible amount of advantages and value-adds over competing technologies, including high resolution, ability to quantify and qualify samples simultaneously, reduced time to results, multiple flexibility features for various applications and end user needs, decreased hands-on time, lower run costs, scalable throughput, and improved laboratory workflow efficiency, among others. Advanced Analytical didn't just settle for solving a few unmet needs, they tackled them all and continuously locate new areas to improve upon for future product development. With a highly innovative and market-changing platform with intuitive features that outpace the competition, Frost & Sullivan expects Advanced Analytical to gain further traction in the global marketplace. For developing a revolutionary instrument that provides high quality results while improving laboratory workflow efficiency, Frost & Sullivan is pleased to present the 2014 New Product Innovation Award for Sample Analysis to Advanced Analytical Technologies.

Critical Importance of TEAM Research

Frost & Sullivan's TEAM Research methodology represents the analytical rigor of our research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all seven of Frost & Sullivan's research methodologies. Our experience has shown over the years that companies too often make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Frost & Sullivan contends that successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best

practices, and demographic analyses. In that vein, the letters T, E, A and M reflect our core technical, economic, applied (financial and best practices) and market analyses. The integration of these research disciplines into the TEAM Research methodology provides an evaluation platform for benchmarking industry players and for creating high-potential growth strategies for our clients.

Chart 4: Benchmarking Performance with TEAM Research



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best-practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from more than 40 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.