FROST & SULLIVAN

# 2024 TECHNOLOGY INNOVATION LEADER

*IN THE NORTH AMERICAN NEXT-GENERATION PROTEIN SEQUENCING INDUSTRY*

FROST & SULLIVAN

2024 BEST PRACTICES AWARD

QUANTUM SI™

## Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. QSI excels in many of the criteria in the next-generation protein sequencing space.


### *Next-generation Protein Sequencing*

The field of proteomics has been limited to affinity-based protein identification and screening methods. These methods do not address different protein variants and their unique outcomes. Moreover, identification and screening do not provide single amino acid resolution in a real-time assay. Additionally, traditional methods are costly, introduce complex workflows, require bioinformatics expertise, and are not always possible in smaller laboratories (labs). A solution that addresses and overcomes these limitations will prove revolutionary in proteomics.

Frost & Sullivan estimates the next-generation sequencing informatics market will reach $1,675.2 million in 2027, with a compound annual growth rate of about 12.5% from 2022 to 2027.[1] Protein sequencing is a promising new market that may constitute a significant segment during the forecast period. Early developers leveraging next-generation technologies and pushing the innovation envelope while educating the market on new protein sequencing capabilities can capitalize on this predicted growth.

[1] *Next-generation Sequencing Informatics, Forecast to 2027. Development of Genomics and Precision Medicine Supported by Artificial Intelligence and Cloud Computing to Transform the Field.* (Frost & Sullivan, July 2023).

Founded in 2013 and headquartered in Branford, Connecticut, the United States (US), Quantum-Si (QSI) is a developer of an end-to-end next-generation protein sequencing solution. The company identified a unique opportunity in the market, developing an amino acid protein sequencer never before seen in the industry. QSI's innovative approach opens the door for proteomic research and development (R&D), addressing complex biological questions, and providing deep insights quickly. QSI uniquely leverages its technology to meet its customers' needs. It is well-positioned to capitalize on new growth opportunities, cementing its leadership in the next-generation protein sequencing market.

## *Creativity and Innovation Fuel Technology Leadership*

> *"QSI developed the first of-its kind next-generation protein sequencing technology over the last five years. From preparation to sequencing to analysis, the company develops all its technologies in-house, providing a comprehensive end-to-end proteomic solution with the Platinum™ platform."*
>
> ***- Chandni Hussain***
> ***Senior Research Analyst-***
> ***Healthcare***

With an initial focus on long-read deoxyribonucleic acid sequencing technology, QSI identified a fundamental need in the market; thus, it refined its approach and refocused its efforts on developing a revolutionary protein sequencing solution. Backed by world-class subject matter experts (SME) in bioinformatics, biochemistry, data science, semiconductor, fabrication, pixel design, mechanical and electrical engineering, and more, QSI developed the first of-its kind next-generation protein sequencing technology over the last five years. From preparation to sequencing to analysis, the company develops all its technologies in-house, providing a comprehensive end-to-end proteomic solution with the Platinum™ platform.

The company's unique development approach encourages the creativity and innovation that is fundamental to its core. This approach, coupled with its various teams of SMEs, enables QSI to deliver new proprietary capabilities. Its prolific R&D team continuously develops new innovations that drive its protein sequencing platform forward. For example, the team has developed the world's first recognizers for various amino acids using protein engineering and directed evolution approaches. Likewise, they have developed novel dye molecules with distinguishable fluorescence lifetimes, enabling a highly scalable approach to single-molecule detection. The Platinum™ platform comes complete with library preparation and sequencing kits, including reagents to digest and functionalize proteins and immobilize peptides, aminopeptidases, and recognizers for sequencing.

With pixel, sensor, and semiconductor experts, QSI's Platinum® instrument is a feat of engineering that delivers outstanding accuracy. The instrument's image sensor is designed to filter incident laser excitation light electronically, a groundbreaking achievement that enables single molecule resolution in a benchtop instrument for the first time. To sequence individual peptides, Platinum™ captures the fluorescence signal from each N-terminal amino acid (NAA) binding event; aminopeptidases then cleave an NAA, exposing it for recognition, and the entire process repeats to sequence the whole peptide. QSI's robust solution provides researchers with access to detailed protein sequencing information down to the amino acid level.

As a final step in its end-to-end solution, Platinum™'s automated analysis software conducts single-molecule level protein analysis for quick and easy identification and data interpretation. Furthermore, each protein analysis automatically uploads to the cloud, ensuring data is backed up and secure.

In addition to its innovative capabilities, QSI's technology provides an outstanding value proposition. With a cost of $85,000, the compact benchtop instrument seamlessly fits into labs of any size. Compared to mass spectrometer machines that cost $1 million, QSI's instrument is an affordable option, saving labs time and money by removing the reliance on outside labs and bioinformatics personnel for analysis. Equipped with automated data analysis, the device enables all proteomic research to be completed within the lab, providing core labs with deeper insights and supporting non-core labs with in-house analysis and quick turnaround, revolutionizing the market.

Frost & Sullivan identifies QSI's next-generation protein sequencing technology as a groundbreaking, innovative technology. Its strong intellectual property portfolio, including 1,000 issued and pending patents, upholds its pioneering technology, adding value relative to its growth potential, thus securing a competitive advantage.

## *Strategic Practices Promoting Successful Operations*

*"Reciprocally, QSI's R&D scientists support customers by leveraging their comprehensive Platinum™ platform knowledge, helping to design studies, troubleshoot problems, and ensuring full utilization of the technology. With in-house labs, R&D teams can duplicate testing, helping them overcome any issues with processing samples."*

***- Elizabeth Whynott***
***Best Practices Research Analyst***

QSI understands the challenge of introducing a revolutionary protein sequencing technology to the market. As a new solution, launched in the beginning of 2023, the company aims to educate the market about the Platinum™ through symposiums, conferences, technical seminars, and webinars. Its untraditional product marketing team comprises expert scientists knowledgeable in proteomics and the Platinum™ platform. These teams work closely with customers to ensure they thoroughly understand Platinum™'s capabilities and can carry out their vital research.

To retain customers, QSI maintains close partner relationships, ensuring its continuous innovation and customer success. The company collaborates with some customers, world-renowned experts, and academic researchers who support its Center of Excellence research. These members serve as advisors and meet with the R&D teams, helping to inform the company with data reviews, library preparation innovation sessions, and challenging the company to push the innovation envelope. Reciprocally, QSI's R&D scientists support customers by leveraging their comprehensive Platinum™ platform knowledge, helping to design studies, troubleshoot problems, and ensuring full utilization of the technology. With in-house labs, R&D teams can duplicate testing, helping them overcome any issues with processing samples. The company also provides testing protocols at no additional cost.

Since QSI's protein sequencing technology's launch in early 2023, the company has experienced steady and promising adoption, especially in academic institutions. The Platinum™ platform has broadened researcher's application and enabled new research that has historically not been done or has been difficult to conduct within a single lab. For example, a protein engineering researcher for therapeutic and industrial

applications at Northwestern University (Northwestern) implemented the Platinum™ solution, enabling them to examine protein variants of single amino acid changes within the lab. The researcher is also exploring applying Platinum™'s technology for antibodies and other protein engineering experiences. Another researcher has already published a peer-reviewed study examining PTM for a targeted therapeutic in oncology by looking at the response/non-response of a protein from a new pharmaceutical.

These early adopter wins showcase QSI's capabilities, boosting its reputation and setting on an encouraging growth trajectory. The company intends to capitalize on its initial acceleration and expand its footprint in the US and internationally. Frost & Sullivan's research finds the company is well-positioned in the market, with an industry-leading product that provides tremendous value in high-demand sectors.

QSI aims to maintain an open roadmap, not limiting its engineers by specific release capabilities. To support this continuous innovation, the company fosters an environment where its engineers feel free to pursue their interests and follow their research leads. Furthermore, by pushing new capabilities and generations of its technology as they are developed, the company maintains a leadership position, bolstering its reputation and attracting more customers.

### *Innovative Technology for Broad Applicability*

From small research labs at renowned universities (e.g., Northwestern) to pharmaceutical and biotechnology enterprises, the company's clients use its technology for various applications, including antibody analysis, biomarker identification, protein identification, protein variant, and PTM analysis. Notably, customers leverage QSI's solution for antibody quality control, finding it outperforms traditional lab methods and sequencing gel.

QSI's R&D methodologies position the company with the ability to launch new capabilities quickly. It recognizes that breakthroughs and innovation can occur at any time and thus maintains an open roadmap, funneling development initiatives and new capabilities as it progresses toward its long-term goals. Its development group processes new solutions by identifying and characterizing industry-driven requirements. After development, the company packages the new innovations for release, delivering immediate value to customers.

### *Strong Company Culture Promoting Employee Satisfaction*

QSI fosters an inviting and stimulating company culture, promoting innovation and collaboration and encouraging the free exploration and development of new ideas. Sticking firmly to its supportive culture, QSI aims to employ people-first type personnel, valuing positive attitudes, collaboration, and modesty.

Backing its fundamental values, the company creates a culture where employees feel that QSI's leaders care about their well-being. For example, all personnel receive meaningful benefits, including stock equity and complete payment of healthcare premiums. Additionally, the company commits to celebrating and recognizing the success of its employees. QSI believes giving personnel creative freedom in their R&D efforts is vital to its innovation. Frost & Sullivan's research analysts find that QSI's company culture supports employee happiness, and happy employees translate to satisfied customers, which facilitates customer loyalty and revenue growth.

## Conclusion

Technology is a critical success factor for the proteomic research industry. Yet, with many options available, market stakeholders need to leverage the most appropriate and best technology-based solutions to optimize their market impact. With its Platinum™ technology, Quantum-Si (QSI) delivers a comprehensive protein sequencing platform. The company generates all its technologies in-house, from preparation to sequencing to analysis. Its prolific engineering teams continuously develop new molecules through directed evolution and protein engineering, addressing complex biological, chemical, and mechanical problems for deeper insights. The Platinum™ platform delivers remarkable single-molecule amino acid resolution, interrogation of proteoforms, post-translational modification, and direct protein detection. QSI stands out from competitors based on its commitment to innovation and creativity while achieving commercial success. Platinum™ is an outstanding value proposition that broadens researchers' applications and enables new research as a compact benchtop instrument for core and non-core proteomic labs.

QSI earns Frost & Sullivan's 2024 North American Technology Innovation Leadership Award for its strong overall performance in the next-generation protein sequencing industry.

# What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

## Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

### *Technology Leverage*

**Commitment to Innovation**: Continuous emerging technology adoption and creation enables new product development and enhances product performance

**Commitment to Creativity**: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

**Stage Gate Efficiency**: Technology adoption enhances the stage gate process for launching new products and solutions

**Commercialization Success**: Company displays a proven track record of taking new technologies to market with a high success rate

**Application Diversity**: Company develops and/or integrates technology that serves multiple applications and multiple environments

### *Business Impact*

**Financial Performance**: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

**Customer Acquisition**: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

**Operational Efficiency**: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

**Growth Potential**: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

**Human Capital**: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

## About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at http://www.frost.com.

### The Growth Pipeline Engine™

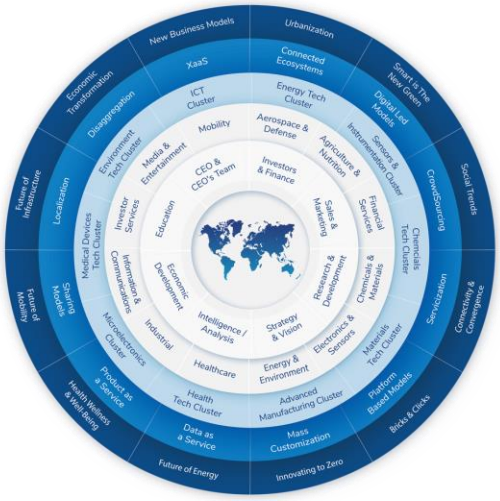
Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.
Learn more.


***Key Impacts***:

- **Growth Pipeline:** *Continuous Flow of Growth Opportunities*
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

### The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.




***Analytical Perspectives:***

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)