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Zacks Small-Cap Research

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Pressure BioSciences (PBIO-OTC)

PBIO: Groundwork laid; opportunities abound

Our initial valuation of $4.44 per share for PBIO is based on an NPV for the products, less corporate overhead. Our NPV uses an 11% discount rate across the business. We've modeled for $6 million of debt funding through 2024. Our valuation accounts for dilution from the existing outstanding preferred shares but does not include the exercise of options and warrants.

Current Price (09/27/19)	$2.71
Valuation	**$4.44**

OUTLOOK

Pressure BioSciences is at a tipping point. Demand grew modestly through its early years, but is expected to accelerate starting in 2020. After a decade of marketing its original PCT sample preparation platform to academic opinion leaders and early research customers, the Company recently launched two new proprietary technology platforms opening major new market opportunities. In our view, the overall story is solid, and the combination of new platform products, new commercial applications, and customers positions PBIO squarely to move its business to the next level.

SUMMARY DATA

52-Week High	**$3.90**
52-Week Low	**$1.52**
One-Year Return (%)	**-26.35**
Beta	**1.26**
Average Daily Volume (sh)	**13,316**
Shares Outstanding (mil)	**2**
Market Capitalization ($mil)	**$6**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**0**
Insider Ownership (%)	**16**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**12.5**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/A**
P/E using 2019 Estimate	**-2.4**
P/E using 2020 Estimate	**N/A**
Zacks Rank	**N/A**

Risk Level	**High,**
Type of Stock	**N/A**
Industry	**Med Instruments**
Zacks Rank in Industry	**N/A**

ZACKS ESTIMATES

Revenue
($ million)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2018	0.6 A	0.6 A	0.5 A	0.7 A	2.5 A
2019	0.5 A	0.5 A			3.2 E
2020					5.8 E
2021					9.0 E

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2018	-$1.64 A	-$9.20 A	-$2.01 A	-$2.93 A	-$15.33 A
2019	-$2.01 A	-$2.22 A			-$4.81 E
2020					-$2.92 E
2021					-$2.06 E

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INVESTMENT SUMMARY

COMPANY DESCRIPTION: Pressure BioSciences develops and sells instrumentation using their patented pressure-cycling technology (PCT) platform to support analytical chemistry testing applications. After a decade of marketing its original PCT sample preparation platform to academic opinion leaders and early research customers, in late 2018, the Company added two important new technology platforms to its portfolio. The new BaroShear platform uses high pressure and intense shearing forces to create shelf-stable, homogeneous nano-scale emulsions (i.e. oil effectively dissolved in water). PBIO has accepted orders for initial UST-based BaroShear K45 instruments and expects deliveries beginning in the second quarter of 2020. The new BaroFold platform manipulates large protein biotherapeutic molecules into their proper active (high-value) configurations in order to help make them effective protein drug candidates. BaroFold is currently a contract service, although we expect it will eventually be offered as an instrumentation sale as well.

FINANCIALS: While still a technology platform development company with a limited sales effort, PBIO has posted seven consecutive years of c.15% average annual top line growth by working with key opinion leaders to identify applications and build research supporting the value PBIO's patented sample preparation technologies. With a rapidly expanding product line addressing much broader markets demanding more skillful and higher-throughput commercial solutions, we believe it is reasonable to expect both the number and the size of orders to grow quickly, while the sales cycle shortens.
We forecast revenues of $12.1 million by 2022 with 66% coming from instrument sales and the balance from consumables and contract services. However, the magnitude and trajectory of revenue growth may differ considerably from our assumptions, especially in the next 12-24 months. PBIO should reach operating profitability by 2022 as sales growth moves overhead costs from 140% of sales (in 2018) down to c. 32%. Overhead expenses are expected to level out in the 15-20% range over the long-term.

VALUATION: We are initiating coverage on Pressure BioSciences with a valuation of $4.44 per share, based on a sum-of-the-parts NPV less corporate overhead. Our NPV uses an 11% discount rate across the business. We've modeled for $6 million of debt funding through 2024. The average prospective P/E valuations for our peer group are in the mid-twenties for 2019-2020. P/S ratios range widely from a low of 3.4x for Bruker Corporation (BRKR-$44.42) to 6.1x for Waters Corporation (WAT-$222.53). PBIO currently trades around 2x 2019 revenue estimates. It's important to note that PBIO's publicly-traded peers are multinational companies with broad product lines, significant marketing resources and good financial and trading liquidity, all of which likely contribute to PBIO's lower relative valuation.

SENSITIVITIES: Pressure BioSciences is at a tipping point, in our view. Demand grew modestly in recent years, but is expected to accelerate starting in 2020, although still below what is needed to be profitable even with its relatively modest fixed costs. While results will likely remain volatile for a few years, we expect this to stabilize as the business grows. The factors that we believe may affect forecasts, results and valuation over the next several years include: financing needs and closes with debt reduction and/or market up-listing, development and scaling challenges, competition, business investment priorities, and dilution.

COMPANY DESCRIPTION

Pressure BioSciences has been steadfastly bootstrapping its way to success. The validity of the science and the value of the technology have never been a concern, in our view. However, management faces the challenge of translating their rapid technological advances and acquisitions, with limited resources, into a consistent move towards profitability. As a result, progress in recent years has often felt like "two steps forward, one step back," as the Company continues to press for expansion capital.

Pressure BioSciences' cornerstone business has been to develop and sell instrumentation using their patented pressure-cycling technology (PCT) platform for sample preparation in analytical chemistry testing applications. Analytical chemistry answers questions about the content/characteristics of substances. Within analytical chemistry, sample preparation is increasingly a critical discipline of its own. Sample preparation is vital to obtaining comprehensive/accurate measurements. An inadequately prepped sample can produce a "garbage in – garbage out" result in analytical tests, giving misleading, inconsistent, incomplete or incorrect results.

PBIO has sold more than 350 of its flagship Barocycler instruments to date – at a rate of roughly 20-25 instruments per year since 2009. While impressive, these installations only scratch the surface of management's target market of 80,000+ laboratories – leaving significant opportunity. The long opinion leader investment phase has probably limited investor appeal to some degree, but we believe that the recent addition of two new technology platforms to its portfolio, opening new market opportunities, marks a significant change in the Company's outlook.

In our view, the overall story is solid, and the combination of new products and shifting market needs give PBIO the best opportunity to move beyond the $1.0-$2.5 million annual revenue range of the past decade for several reasons:

- ***Increased focus on commercial applications and users:*** In the past, sales have been primarily to academic and government customers. The sales cycle in these markets tends to be drawn out as research projects, and capital investments are dependent on funding such as grants, which can be unpredictable in both timing and size. Academic/government orders tend to be smaller (perhaps one installation per order), which reduces the ROI on sales. We expect purchases in their new commercial markets (e.g., pharma and biotech) to be faster, more predictable, and generally larger. For example, on its 2Q19 call, management noted that it has multiple purchase orders for its just-announced new BaroShear K45 instrument design – driven by results from its pilot-scale demos, although the Company has yet to build a single production model.

- ***Expanded product and service offerings****:* In 2018, the Company began developing two new platform technology areas, in addition to its existing PCT technology base. In December 2017, PBIO acquired the rights to BaroFold technology to manipulate large protein biotherapeutic molecules into their proper active (high-value) configurations, in an effort to make them effective protein-based drug candidates. BaroFold is gaining early market traction as a contract service, although we expect it will later translate into instrumentation sales as well. The second platform is the Ultra Shear Technology (UST). UST uses high pressure and intense shear forces to create shelf-stable, homogeneous, nano-scale emulsions (i.e. oil effectively dissolved in water) addressing a diverse set of market opportunities. PBIO has accepted orders for its initial BaroShear K45 instruments and expects deliveries to begin in the second quarter of 2020.

- ***Increased research and development on complex life science issues****:* A 2017 study of the life science research tools market by DeciBio found a "moderate-to-high incentive to innovate" in both the biopharma and academic/government markets driven by rising interest/availability of new sequencing technologies and applications in oncology drug development and therapeutics. Notably, the applied markets were forecast to have the highest growth through 2021, supporting PBIO's belief that demand is catching up with scientific advances.

Exhibit 1: Life sciences analytical market overview

	Customer Segment		
	Academia/Government	***Biopharmaceuticals***	***Applied Markets***
Sector definition	Basic and translational research centers (non-profit)	Drug development, preclinical/clinical research and manufacturing companies	Testing and some research - clinical/diagnostic labs, hospitals and other providers; agriculture and food, forensics
Incentive to Innovate	High	Moderate-to-high	Low-to-moderate
Market size and growth (2017)	$21.5 billion, 2% growth	$20 billion, 4% growth	$12 billion, 12% growth
Growth drivers	Increased funding (particularly in China)	Increased large molecule studies; development is more costly and complex	Higher automation, lower cost-per-test, increased regulation, new technologies moving to clinical settings
Growth moderators	Increased reliance on "used" equipment; flat-to-lower funding in many developed countries; political and economic uncertainty	R&D funding pressures from patent expirations and generic competition, thin development pipelines from recent under-investment, reimbursement uncertainty	

Source: Adapted from DeciBio: Life Science Tools Market Assessment (July 2017)

ANALYTICAL CHEMISTRY AND SAMPLE PREPARATION

Analytical chemistry is a scientific process to get information about a substance – its composition, relative abundances of components, their structures, and other properties. Analytical studies have myriad applications from R&D efforts to larger scale quality control in manufacturing, to marketplace analysis of everything from food to multiple industrial products, drug development, environmental monitoring, and forensic science.

Analytic measurements can be qualitative (does the sample contain a particular substance?), quantitative (how much of the particular substance does the sample contain?) or semi-quantitative (does the sample contain more/less of a substance than being sought). Other types of analyses look at physical structure, such as surface analysis and how something is distributed in a structure.

Exhibit 2: Practical applications of analytical chemistry

Application	Examples
Agriculture	What is the soil condition? Does it need to be supplemented with nutrients? Does the soil meet organic standards?
Environmental	Is drinking water safe? What contaminants are present and at what levels?
Food science	What additives will improve the taste or consistency of a food in the manufacturing process? What can be done to improve product shelf life?
Forensics	Toxicology. What can be learned from trace evidence - gunshot residue, hair, fibers, etc.
Medicine	Diagnosis (blood, urine, tissue samples), Is a patient medication compliant? Has a patient metabolized a particular drug?
Petrochemicals	Will components in a crude oil batch disrupt the refining process? How to raise production yields at a well?
Pharmaceuticals	Identify biomarkers, determine metabolization rates for a compound, How effective is a particular compound on a condition? How can a compound be made more tolerable?
Quality control - industrial	Is the production line working properly? Are the batches correct and consistent? Do the inputs meet spec?
Technology	Can computer chips be made smaller and more powerful?

Source: Adapted American Chemical Society; Zacks Investment Research

In most cases, there is no one right way to perform an analysis. Study design and parameters depend on what question is being asked and for what purpose. Accuracy and precision are key considerations in most studies; however, many factors come into play.

Exhibit 3: Considerations in study design

Parameter	Definition
Accuracy	Deviation from true value
Precision	Reproducibility of same measurements
Sensitivity	Discriminate between small differences in concentration
Detection limit	Lowest measurable concentration
Linear dynamic range	Linear range of the calibration curve
Selectivity	Ability to distinguish the analyte (target of analysis) from interferences
Speed	Time needed for sample preparation and analysis
Throughput	Number of samples that can be run in a certain time
Ease of automation	How well can system be automated (remove errors caused by manual intervention)
Ruggedness	Durability of measurements, effect of adverse conditions
Portability	Ability to move instrument around
Greenness	Eco-efficiency related to waste generation and energy consumption
Cost	Equipment, supply and labor costs

Source: Mitra, Et al. " Sample Preparation Techniques in Analytical Chemistry.

While there are perhaps as many measurement techniques as there are substances, science doesn't have a *Star Trek* tricorder-like device that provides a detailed understanding of a substance by non-invasive scanning. Studies rely on sampling, and as the number and types of analytical tests have grown, sample preparation has evolved into its own critical specialty. The analytic process consists of three distinct steps. Each needs to be done properly to obtain the best possible measurement:

- ***Sample collection:*** The goal of sampling is to ensure that the sample is representative of the entirety. For example, in measuring the caffeine content of a typical cappuccino, a sample of milk foam would not be a good study specimen. A better sample would include the coffee, milk and milk foam. In addition, samples from multiple cups of cappuccino would provide more accurate measurements; however, if some cups included sugar or flavorings, the measurements might be affected depending on how the analysis is structured. If there is a lag between when the sample is collected and when it will be analyzed, the sample should be preserved in a way that it retains its characteristics.
- ***Sample preparation:*** Generally, samples can't simply be put into an instrument and measured; it usually requires a number of manipulations before a sample is ready to be analyzed. The specific

steps depend on the sample, what is being studied, other substances that might be in the sample that could affect the analysis, if the analysis can directly detect the substance – or if it needs to be chemically changed in order to be measured, etc. A solid sample might need to be disaggregated, pulverized or turned into a liquid for analysis. Tissue and cellular structures in a biological sample typically need to be broken down. Desired analytes often need to be disassociated and/or separated from other substances that could interfere with their measurement. Sample preparation also depends on the sensitivity and precision required for a particular analysis.

- ***Analysis:*** While manual analysis still exists, measurement by an instrument has been the prevailing standard for decades. The instrument used depends on the type of analysis and the information sought. In addition, choice will consider time and financial constraints, staff expertise and preferences. Primary analytical methods include spectroscopy, mass spectrometry, electrochemical analysis, thermal analysis, separation analysis, microscopy, immunological analysis, and combination/hybrid technologies (e.g. GC-MS and HPLC-MS).

The need for better sample preparation options in life sciences

Developments in analytical instrumentation have shifted the focus in analytical chemistry to biological applications particularly in the fifteen years since the completion of the human genome project. Scientists are working to understand components at an even more basic level -- proteins, peptides and metabolites– how they present, predict and interact in healthy and disease states.

As science advances, the quantity and complexity of analytical studies have increased exponentially. Technology has moved studies into smaller sample sizes, with components that vary widely by type and concentration, demanding increased accuracy, sensitivity and precision. An inadequately prepped sample can produce a “garbage in – garbage out” outcome, giving misleading, inconsistent, incomplete or incorrect results. Sample preparation has always been an important, time-consuming part of analytical studies – curiously, it has also been a discipline that has been notoriously slow to change.

Biological molecules are incredibly complex and have characteristics making them difficult to breakdown for component analysis. Moreover, biological molecules often don’t behave in the same way when separated as they do when intact or in their native states – particularly if the structure has been manipulated – as in misfolded or denatured proteins.

Biological samples present many challenges in sample preparation. These challenges are physical or chemical properties in the sample that can lead to incorrect, inconsistent or other problems when analyzed. Biological samples, such as connective or vascular tissue, have strong cell walls that have to be broken down (lysed) to get to the molecular information inside. Biological molecules can be quite large, with long protein, DNA, and RNA chains that need to be unfolded for analysis. Physical methods of sample preparation, such as grinding or sonication, can result in different-sized or damaged chain fragments, which may affect analytic measurement outcomes. Other traditional chemical or thermal methods of sample preparation have been similarly beleaguered with unsatisfactory outcomes. Biological samples often contain components or impurities that can affect readouts from mass spectrometers and other types of instrumentation, either by obfuscating the target analyte or potentially by reacting with other components of the sample. Samples with high lipid content and those with digestive enzymes are usually challenging.

Pressure cycling technology – a well-established, novel approach to high quality sample preparation for analysis

Pressure cycling technology (PCT) uses alternating levels of hydrostatic pressures to control the breakup of physical structures and disassociation of molecular interactions, in order to extract and present desired components for analysis. PCT is based on work by physicist Percy Bridgman on the behavior of substances under high hydrostatic pressure (for which he was awarded the Nobel Prize). Pressure BioSciences’ PCT platform uses rapid, repeated changes in pressure (from ambient to as high as 45,000 psi) to break apart cellular structures in a gentle, controlled and reproducible fashion. Over 150 published scientific studies have identified applications for PBIO’s PCT platform and its

advantages over other sample preparation techniques. The advantages of using PCT are most evident in complex biomolecule studies, particularly in genomics and proteomics. In these areas, PCT has been shown to be more rapid, consistent, accurate, and sensitive than other technologies (physical, chemical, thermal, etc.), particularly in small samples.

Expanding technology portfolio

After more than a decade of developing and selling its original PCT technology platform, Pressure BioSciences now offers three technology platforms addressing a diversity of much larger market opportunities.

Exhibit 4: Platform technologies

Platform	Offerings	Key uses and opportunities	Comments
Pressure cycling technology (PCT)	Instruments, consumables, accessories and services	Biomarker identification and characterization	Detailed sample prep particularly for complex molecules
		Complex cell lysis	High consistency, accuracy, precision and sensitivity across wide range of molecules
		Diagnostics/research	Faster and well suited to high-throughput analyses relative to other technologies
		Quality control in biopharma development and production	
BariFold	Contract sservices/technology licensing	Therapeutic development and production	Controlled disaggregation (lysis) and refolding of proteins
			Avoids inconsistencies resulting from mis-folded proteins such as aggregates that can affect how molecule behaves
BaroShear (UST)	Instruments and services	Production and quality control of nanoemulsions particularly in food, CBD, pharmaceutical, nutraceutical and cosmetics	Improved stability, bioavailability, absorbtion with fewer additives and without the need for heat, which can affect product quality

Source: Company filings, Zacks Investment Research

Pressure Cycling Technology (PCT) Platform

The current PCT product portfolio includes Barocycler instrumentation, supplemental instruments and consumables. The main product is the Barocycler 2320EXT, a benchtop model designed for research that can generate up to 45,000 psi and handle 16 samples in a batch. Retail price for the Barocycler is c.$75,000; however, the Company often discounts the price for larger orders and, when necessary, to adapt to budget limitations – particularly if the instrument is being used in research supporting PCT. Supplemental instrumentation includes machines to heat or chill pressure fluids and compressors to extend the pressure capabilities of the Barocycler.

BaroFold Platform

The BaroFold technology platform is currently offered as a contract service; however, the Company expects to later sell instrumentation for customer use, and to license out the technology to its customers for large scale applications. Management announced a signed “proof of concept” deals with two large, multi-billion dollar bio-pharmaceutical developers looking to solve problems with protein-based drug candidates that have a tendency to misfold or aggregate. The Company has additional interest from no fewer than another seven companies. It is important to note that the deals are project-specific at this point and relatively small in economic terms ($100,000-$150,000 for each development step). As these compounds advance through the development process, job/order size is expected to increase. If the compounds eventually go into production and commercialization, PBIO would expect to license the technology to its customer, potentially as a royalty on therapeutic sales. BaroFold clients benefit not only from the ability to solve problems with misfolding or aggregating proteins, but also can expect better yields (less waste) and ultimately faster development and manufacturing progress.

Ultra Shear Technology (UST) Platform

UST uses extreme pressures and intense shear forces with proprietary valve and equipment designs to produce better performing (higher bio-availability), safer (inactivates microbial content), and room-temperature stable, nano-scale emulsions of immiscible components (effectively making "oil dissolved in water" mixtures) while reducing the need for chemical stabilizers and heat – both of which can degrade the final product and/or result in safety concerns to the consumer. The BaroShear instrument is priced at $200,000 and management indicates it has several deals inked for delivery in 2Q20.

Management is initially focused on selling UST-based instruments into the CBD product market. The CBD industry is in an explosive growth and land-grab mode with many companies spending to improve bioavailability, increase the quality of products, and scale production. PBIO believes it can quickly sell the 12 BaroShear machines it has commissioned to build in 2020; however, the sale of simply those first 12 machines will effectively double the Company's sales from 2019 levels. We believe the market for these machines is quite large and have consequently built in the sale of many more than 12 BaroShear K45 instruments over the coming years. At the same time, management recognizes that the opportunity window in CBD may only last a few years before the industry begins to consolidate. The Company sees much greater opportunity outside CBD, particularly in food, pharmaceuticals/nutraceuticals and cosmetics.

SENSITIVITIES

Pressure BioSciences is at a tipping point, in our view. Demand grew modestly through its early years, but is expected to accelerate starting in 2020, although still below what is needed to be profitable over the next several years even with its relatively modest fixed costs. While results will likely remain volatile for a few years, we expect this to stabilize as the business grows. Several factors may affect forecasts and results over the next several years.

Financing: The sales cycle into academic and government settings is lengthy and unpredictable as purchase decisions often rely on grant or endowment funding. In the past two years, PBIO has had to rely on high interest (15-30% APR), and often convertible debt financings to meet working capital needs. Maintaining sufficient liquidity to build out sales and pay interest expense has been a material hurdle for PBIO – particularly in the past few years. However, with purchase orders in hand, we don't anticipate that financing to hinder the Company's ability to fulfill orders.

For the purposes of this report, we have modeled funding needs as $6 million in debt through 2024, mostly to cover overhead and interest costs. If the sales trajectory is higher than we've modeled, or if fundraising efforts enable it to pay down or refinance its existing debt, our assumptions may be too conservative.

Competition/development risk: Pressure cycling technology has well-documented advantages over many other types of sample preparation – particularly for large biological molecules. At the same time, there are many well-established options from many vendors in sample prep and competitive inertia is stiff. On the upside, once a customer adopts PCT (or another method) into its standard operating procedures, the customer tends to stay with that technology. As a smaller company, we believe PBIO can focus its efforts on those customers where it will have the greatest impact – regardless of the customer size. Larger vendors may overlook or bypass these smaller/earlier opportunities. On a technology front, it can be difficult for newer potential applications to get into the funding cycle at larger firms. For example, PBIO immediately recognized the synergistic value of UST demonstrations in any application for driving rapid adoption into diversifying market areas, and the Company has quickly turned the nascent technology into early traction and revenues.

Business strategy and investment priorities: PBIO would benefit from more sales and marketing bandwidth, in our view. The challenge has been expanding financing to recruit/retain the right people and/or co-marketing partnerships to build out this effort. The slow opinion-leader-driven development of their original PCT market focus, the highly technical nature of the sale, and the long and unpredictable sales cycle around grant funding have paced their growth towards the current inflection point. With two new major technology platforms now opening diverse new large market opportunities, PBIO's ability to quickly adapt and pivot to market needs is a potential positive relative to larger and slower moving companies and can reset the sales growth focus on dynamic new areas. For example, PBIO sees a significant opportunity to drive adoption of UST building upon the visibility in the CBD market. From the standpoint of near and longer-term revenue generation, this strategy makes sense. The sales cycle is significantly shorter than for PCT and there is a higher return on investment as revenue per sale is $200k vs. $75k. However, in the very short term, focusing resources on UST reduces those available for PCT and BaroFold.

Dilution risk: Pressure BioSciences has relied on a combination of product revenue, convertible debt, and convertible preferred stock to fund its growth. Outstanding convertible warrants, debt and preferred stock would add some 15.4 million shares to PBIO's existing c 1.8 million common shares. Exercise prices generally range from $3.50-$12.00, limiting the likelihood of conversion in the near-term, while also creating a significant potential source of funding. Our $4.44 valuation includes dilution from the outstanding preferred shares.

VALUATION

We are initiating coverage on Pressure BioSciences with a valuation of $4.44 per share, based on a sum-of-the- parts NPV less corporate overhead expense. Our NPV uses an 11% discount rate across the business. We've modeled for $6 million of debt funding through 2024, but with no exercise of warrants and options.

Exhibit 5: Valuation

Valuation by NPV sum-of-the-parts			
Product	**NPV ($000)**	**Probability**	**rNPV ($000)**
Products	105,848	***100%***	105,848
Corporate overhead	(31,656)	***100%***	(31,656)
Net Cash	(4,000)	***100%***	(4,000)
Firm Value	**70,192**		**70,192**
Basic shares outstanding (000s)			1,798
Value per basic share ($)			39.04
Preferred shares in common share equivalents (000s)			6,999
Diluted shares outstanding (000s)			8,797
Value per diluted share ($)			**4.44**

Source: Company filings. Zacks Investment Research estimates.

We reviewed market valuations for scientific instrument companies based in the U.S. It is important to note that the peers are multinational companies with broad product lines and significant resources. Most of the peers have grown through acquisition over the past two decades. The average prospective P/E valuations for our peer group are in the mid-twenties for 2019-2020. P/S ratios range widely from a low of 3.4x for Bruker Corporation (BRKR-$43.44) to 6.1x for Waters Corporation (WAT-$231.70). PBIO currently trades around 2x 2019 revenue estimates.

Exhibit 6: Peer Valuation

Company	Ticker	Price ($)	Shrs (m)	Mkt Cap ($B)	Revenues ($m)			EPS ($)			P/S			P/E		
					2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
Agilent	A	76.82	312.0	24.0	4,914.0	5,135.0	5,666.0	2.79	3.42	3.87	4.9	4.7	4.2	27.5	22.5	19.9
Bio-Rad	BIO	333.86	30.2	10.1	2,289.0	2,340.0	2,430.0	12.10	7.15	8.75	4.4	4.3	4.1	27.6	46.7	38.2
Bruker	BRKR	44.42	157.6	7.0	1,895.6	2,040.0	2,160.0	1.14	1.61	1.83	3.7	3.4	3.2	39.0	27.6	24.3
Thermofisher	TMO	291.49	403.0	117.5	24,358.0	25,440.0	26,970.0	7.24	12.26	13.59	4.8	4.6	4.4	40.3	23.8	21.4
Waters Corp.	WAT	223.56	69.5	15.5	2,419.9	2,549.0	2,669.9	8.29	9.02	10.16	6.4	6.1	5.8	27.0	24.8	22.0

Source: Company filings, Yahoo finance.

Given PBIO's small size and relatively thin trading liquidity, we believe that consistent good progress from the Company could quickly drive its P/S valuation more in-line with its peers. However, the Company's valuation may be limited by several factors:

- The company is of smaller size and lower liquidity than the peer group.
- Company is not GAAP or cash-flow positive and is highly leveraged.
- It is currently an emerging growth venture, albeit one with a robust product portfolio and pipeline.

FINANCIALS

While still a technology platform development company with a limited sales effort, PBIO has posted seven consecutive years of c.15% average annual top line growth by working with key opinion leaders to identify applications and build research supporting the value PBIO's sample preparation technologies.

With an expanded product line and increased need for more sensitive and higher-throughput instrumentation in the commercial market, we believe it is reasonable to expect both the number of orders and the size of orders to grow, while the sales cycle shortens.

Profit and loss

We base our model on instrument and service revenues for PBIO's three technology platforms – Pressure Cycling Technology (PCT), BaroFold and Ultra Shear Technology (UST). We expect the bulk of near-term sales growth to come from the UST-based BaroShear K45 machines, with customers graduating from contract services and pilot-scale equipment purchases before investing in capital-intensive large capacity production-scale instruments. We have modeled for PCT growth to stay in a range of 10-15%, although sales will likely accelerate from successful opinion leader and applications development, along with overall increasing levels of protein molecule research and development.

We forecast revenues of $12.1 million by 2022 with 66% coming from instrument sales and the balance from consumables and contract services. However, as PBIO is moving from the slower-moving academic and government markets into broader and diversified commercial (pharma and biotech) markets, the magnitude and trajectory of revenue growth may differ considerably from our assumptions, especially in the next 12-24 months.

PBIO should reach operating profitability by 2022 as sales growth moves overhead costs from 140% of sales (in 2018) down to c. 32%. Overhead expenses are expected to level out in the 15-20% range over the long-term.

Interest expense currently exceeds overhead for PBIO, but we expect that the Company will have sufficient resources to refinance/paydown this high cost debt beginning in 2022, if not sooner.

Cash flow

We expect PBIO to be a new user of cash through 2021. The Company's overhead burn rate is $300,000 per month and we estimate operating breakeven in the $9-10 million range, depending on sales mix and R&D spending.

Balance sheet

PBIO recently sold c. $1.1 million in convertible notes and preferred stock, giving the Company approximately $1.2 million in cash and $7 million of debt on its balance sheet (based on June 30, 2019 results). Our forecast includes $6 million in fundraising during the next three years.

EXHIBIT 7: FINANCIAL SUMMARY

INCOME STATEMENT

Fiscal year	2016A	2017A	2018A	2019E	2020E	2021E	2022E	2023E
Revenue	1,976	2,240	2,458	3,195	5,788	9,059	12,098	15,168
Cost of sales	(834)	(1,273)	(1,280)	(1,661)	(2,567)	(3,968)	(5,245)	(6,552)
Gross Profit	1,142	967	1,178	1,534	3,221	5,091	6,853	8,616
Research & development	(1,183)	(989)	(1,208)	(1,148)	(1,205)	(1,217)	(1,229)	(1,242)
Selling, general & administrative	(3,695)	(4,626)	(4,447)	(4,891)	(5,082)	(5,336)	(5,603)	(5,883)
Operating profit (EBIT)	(3,736)	(4,647)	(4,477)	(4,505)	(3,066)	(1,462)	20	1,491
Interest income	0	0	0	0	0	0	0	0
Interest expense	(4,501)	(6,055)	(4,168)	(2,231)	(2,097)	(2,183)	(2,306)	(2,246)
Other expense/exceptionals	5,530	(13)	(1,054)	(146)	0	0	0	0
Pretax profit	(2,707)	(10,716)	(9,699)	(6,882)	(5,163)	(3,645)	(2,286)	(755)
Taxes	0	0	0	0	0	0	0	0
Net income (common shareholders)	(2,707)	(10,716)	(23,473)	(8,298)	(5,163)	(3,645)	(2,286)	(755)
Basic shares outstanding	911	1,114	1,531	1,724	1,768	1,768	1,768	1,768
Diluted shares outstanding	911	1,114	1,531	1,724	1,768	1,768	1,768	1,768
Basic EPS	**($2.97)**	**($9.62)**	**($15.33)**	**($4.81)**	**($2.92)**	**($2.06)**	**($1.29)**	**($0.43)**
Diluted EPS	**($2.97)**	**($9.62)**	**($15.33)**	**($4.81)**	**($2.92)**	**($2.06)**	**($1.29)**	**($0.43)**
Growth rates & margins								
Revenue growth	NA	13%	10%	30%	81%	57%	34%	25%
Gross profit as % of sales	58%	43%	48%	48%	56%	56%	57%	57%
R&D margin	60%	44%	49%	36%	21%	13%	10%	8%
SG&A margin	187%	206%	181%	153%	88%	59%	46%	39%
Tax rate	NA	NA	NA	0%	0%	0%	0%	0%
EBITDA reconciliation								
Depreciation & amortization	18	9	94	92	95	101	109	119
Stock based compensation	380	406	593	593	606	734	746	853
EBITDA	(3,338)	(4,232)	(3,789)	(3,820)	(2,366)	(627)	876	2,464

BALANCE SHEET

Fiscal year	2017A	2018A	2019E	2020E	2021E	2022E	2023E
Cash & equivalents	81	103	1,095	1,711	981	936	2,232
Total current assets	**1,368**	**1,514**	**2,474**	**4,232**	**4,706**	**5,661**	**7,900**
Property plant and equipment	23	69	74	121	195	291	407
Total Assets	**2,160**	**2,400**	**3,211**	**4,866**	**5,329**	**6,296**	**8,568**
Accounts payable	589	659	474	498	523	549	2,293
Accrued liabilities	1,169	1,570	1,567	1,645	1,728	1,814	1,905
Total current liabilities	**9,266**	**16,726**	**8,410**	**11,233**	**13,031**	**14,888**	**15,787**
Long-term debt (all types)	0	77	3,197	7,611	9,127	10,735	11,379
Total liabilities	**16,783**	**8,525**	**14,464**	**20,675**	**24,049**	**26,556**	**28,729**
Common stock / additional paid in capital	30,844	39,794	41,004	41,611	42,345	43,092	43,945
Warrants	9,879	19,807	20,707	20,707	20,707	20,707	20,707
Retained earnings / accumulated deficit	(55,349)	(65,730)	(72,965)	(78,128)	(81,773)	(84,059)	(84,814)
Other comprehensive income / (loss)	0	0	0	0	0	0	0
Total equity	**(14,623)**	**(6,125)**	**(11,252)**	**(15,809)**	**(18,720)**	**(20,260)**	**(20,161)**
Total liabilities and equity	**2,160**	**2,400**	**3,211**	**4,866**	**5,329**	**6,296**	**8,568**

CASH FLOW STATEMENT

Fiscal year	2017A	2018A	2019E	2020E	2021E	2022E	2023E
Cash from operating activities	**(3,905)**	**(5,695)**	**(3,793)**	**(3,326)**	**(1,639)**	**75**	**3,448**
Capital expenditures	(22)	0	(13)	(58)	(91)	(121)	(152)
Purchases of intangibles	(150)	0	0	0	0	0	0
Cash from investing activities	**(172)**	**0**	**(13)**	**(58)**	**(91)**	**(121)**	**(152)**
Cash from financing activities	**4,019**	**5,718**	**4,797**	**4,000**	**1,000**	**0**	**(2,000)**
Net change in cash during period	**(57)**	**22**	**992**	**617**	**(730)**	**(46)**	**1,296**

Source: Company filings. Zacks Investment Research estimates.

KEY EXECUTIVES

Richard T. Schumacher, the founder of the Company, has served as Chief Executive Officer, President, Director, Secretary, and Treasurer of the Company since 2004. Prior to that, from 1986 to 2004, Mr. Schumacher was the founder, CEO, President, and Director of Boston Biomedica, Inc. (NASDAQ: BBII), where he built from scratch the world's preeminent infectious diseases quality control company, whose novel products have saved lives and reduced debilitating disease in thousands of people worldwide. Mr. Schumacher served as the Director of Infectious Disease Services for Clinical Sciences Laboratory, a New England-based medical reference laboratory, from 1986 to 1988. From 1972 to 1985, Mr. Schumacher was a research scientist and clinical laboratory director at the Center for Blood Research, a nonprofit medical research institute associated with Harvard Medical School. Mr. Schumacher received a B.S. in Zoology from the University of New Hampshire. Mr. Schumacher has lectured on viral hepatitis and HIV at international, national, regional, and local scientific symposia and meetings. He has also published widely in the area of infectious diseases, and in pressure-enhanced laboratory techniques and applications. In 1987, Mr. Schumacher was the recipient of the AIDS International Research Award from the World Federation of Contraception and Health. Mr. Schumacher was a co-founder of Panacos Pharmaceuticals (NASDAQ: PANC), an HIV drug discovery and development company, and a member of the founding group of Trinity Biotech (NASDAQ: TRIB), a provider of diagnostic test kits to the clinical marketplace. Mr. Schumacher is a member of a number of professional organizations and has served several in the capacity of local and national President or Treasurer. Mr. Schumacher received a B.S. in Zoology from the University of New Hampshire in 1972.

Dr. Edmund Ting joined as Senior Vice President of Engineering on April 24, 2006. Dr. Ting served as the Chief Research Officer of Avure Technologies, a leading worldwide manufacturer of high-pressure hydrostatic processing equipment for the food and materials processing industry. Earlier, Dr. Ting worked at Flow International Corporation, the parent company of Avure Technologies, as Vice President of Engineering Research and Development. From 1984 to 1990, Dr. Ting was a research scientist and then a group leader at Grumman Aerospace Corporation. Dr. Ting earned a Bachelor of Science degree in mechanical engineering from Northeastern University and a Science Doctorate in materials science and engineering from the Massachusetts Institute of Technology (MIT).

Dr. Nathan P. Lawrence has been a Senior Consultant with the Company since his retirement in December 2018. Dr. Lawrence joined Pressure BioSciences Inc. in 2005, serving as Director of Research and Development until his promotion to Vice President of Marketing and Sales in 2006, a position he held until his retirement in 2018. From 2004 through 2005, Dr. Lawrence worked for 454 Life Sciences Inc. in product development. Prior to 454 Life Sciences, Dr. Lawrence was Director of Research and Development for Boston Biomedica, Inc. (the precursor of PBI) from 1998 to 2004. He was primarily responsible for the development of PCT, as well as the development of nucleic acid-based diagnostic assays. Prior to joining Boston Biomedica, Inc., Dr. Lawrence held several positions with increasing responsibility in Research and Development and manufacturing at Becton Dickinson and Gene Trak Systems. Dr. Lawrence holds a BA from the University of Miami, an M.S. from Southern Connecticut State University, and a Ph.D. from Yale University.

Dr. Alexander Lazarev joined the Company as our Director of Research and Development in April 2006, served as our Vice President of Research and Development from2007 to 2018, and as Chief Science Officer since 2018. Prior to joining us, Dr. Lazarev worked as a Visiting Scientist at the Barnett Institute of Chemical and Biological Analysis at Northeastern University in 2005, and served as a Director of New Technology Development at Proteome Systems, Inc., where he was involved in research and development of innovative proteomic analysis applications from 2001 until early 2006. From 1998 to 2001, Dr. Lazarev was employed as Senior Scientist at the Proteomics Division of Genomic Solutions, Inc. Prior to his employment at Genomic Solutions, Dr. Lazarev was employed in an analytical contract service startup company, PhytoChem Technologies, Inc., which was founded as a spin-off from ESA, Inc. in 1997. Previously, Dr. Lazarev held various scientific positions at the Ohio State University School of

Medicine and the Uniformed Services University of Health Sciences. Most of his scientific career has been dedicated to development of methods and applications for biochemical analysis. Since 2005, Dr. Lazarev has been elected as an Executive Board member of the MASSEP.org, a non-profit scientific discussion forum dedicated to the promotion and improvement of chromatography and other analytical technologies. Dr. Lazarev earned his undergraduate and graduate degrees at the University of Kazan, Russian Federation.

Daniel J. Shea joined the Company as CFO in September 2019. Mr. Shea has over 30 years experience leading and advising financial organizations. Since January 2017, he has operated Woodcliff Advisors LLC, a CPA advisory firm providing counsel to boards, CFOs and senior management. Through Woodcliff, Mr. Shea personally filled CFO roles at public and private companies in the financial services and technology industries. From 1998 to 2016, he was a Senior Vice President at Affiliated Managers Group, Inc., a publicly traded asset management holding company with a long record of growth through acquisition. His core experience is in acquisitions, SEC reporting, internal controls, and the capital markets. Previously, he advised financial services firms at PricewaterhouseCoopers where his clients included asset managers, banks, private equity firms, mutual funds and leasing companies. Mr. Shea is a certified public accountant and earned his B.S. in Finance and Accounting from Boston College.

Jeffrey N. Peterson has served as a director of the Company since July 2011 and as Chairman of the Board starting in 2012. Since 1999, he has served as the Chief Executive Officer of Target Discovery, Inc. (“TDI”) a personalized medicine diagnostics (PMDx) company. Mr. Peterson also serves as Chairman and CEO of TDI’s majority-owned subsidiary, Veritomyx, Inc., which provides SaaS tools for advanced signal processing of mass spectrometry data. Prior to TDI, Mr. Peterson served as CEO of Sharpe, Peterson, Ocheltree & Associates, an international business development consulting firm assisting Fortune 500 and many smaller firms in business expansion and strategy. Mr. Peterson held key management roles in Abbott Laboratories’ Diagnostics and International businesses (including CEO & GM of Abbott South Africa) and with General Electric’s Engineered Materials and Plastics businesses. Mr. Peterson holds BSChE and MSChE (Chemical Engineering) degrees from MIT, as well as six US patents. He is Chair Emeritus of the BayBio Institute, a non-profit organization serving the life science community, and served on the board of BayBio, a trade association for the life sciences industry in Northern California. He was a cofounder of the Coalition for 21st Century Medicine, and of BIO’s Personalized Medicine & Diagnostics Working Group. He served on the Board of Advisors for the Center for Professional Development and Entrepreneurship at the University of Texas MD Anderson Cancer Center. He currently serves on the Advisory Board of the California Technology Council.

Vito J. Mangiardi has served as a director of the Company since July 2012. Mr. Mangiardi is an accomplished senior executive with proven experience as a President, CEO and COO in the Life Sciences and Bio-Energy product and service sectors. He is a strong P&L performer and corporate strategist in General Management, Operations, Sales/Marketing, and Science. Mr. Mangiardi has held positions as a Research Chemist for Bio-Rad Laboratories, Inc.; Sales & Marketing Director for Baxter Travenol, Inc.; Executive VP and COO for Quintiles Transnational Corp.; President and CEO of Diagnostics Laboratories, Inc., Clingenix, Inc., and Bilcare, Inc.; and President of AAI Pharma, Inc. More recently he was the COO/Deputy Director of Operations and Production at the University of California Lawrence Berkeley National Laboratory Joint Genome Institute. Mr. Mangiardi has experience with three start-ups, two midsize, and several mature companies, and has international experience leading and managing organizations on four continents. He has vast experience in leading alliances, acquisitions, due diligence, and post-acquisition assimilation. Mr. Mangiardi has been on the Board of Directors of three companies and has proven success in working with both national and international investment groups to raise funds. Mr. Mangiardi earned a BS in Biology/Chemistry from Eastern Illinois University and two MBA degrees from Golden Gate University - in General Management and in Marketing. Mr. Mangiardi is listed as an inventor in four patents and various publications in protein separation techniques in the area of metabolism, thyroid, anemia/hematology and cancer, and is a member of numerous professional organizations. Mr. Mangiardi is the founding partner, President and CEO of Marin Bay Partners, LLC (MBP), a consulting firm focused on life sciences, pharmaceutical development and clinical diagnostics.

Kevin A. Pollack has served as a director of the Company since July 2012. From 2017 to 2018, Mr. Pollack served as an advisor to Opiant Pharmaceuticals, Inc. (OPNT-NASDAQ), a specialty pharmaceutical company developing pharmacological treatments for substance use, addictive, and eating disorders. He previously served as its Chief Financial Officer and as a member of its Board of Directors from 2012 until 2017. He also serves as President of Short Hills Capital LLC, where he provides a range of services. Previously, Mr. Pollack worked in asset management at Paragon Capital LP, focusing primarily on U.S.-listed companies, and as an investment banker at Banc of America Securities LLC, focusing on corporate finance and mergers and acquisitions. Mr. Pollack started his career at Sidley Austin LLP (formerly Brown & Wood LLP) as a securities attorney focusing on corporate finance, and mergers and acquisitions. He currently sits on the Board of Directors of MagneGas Corporation (MNGA- NASDAQ), the developer of a technology that converts liquid waste into a hydrogen-based metal-working fuel and natural gas alternative. Mr. Pollack graduated magna cum laude from the Wharton School of the University of Pennsylvania and received a dual J.D./M.B.A. from Vanderbilt University, where he graduated with Beta Gamma Sigma honors.

Dr. Michael S. "Mickey" Urdea has served as a director of the Company since February 8, 2013. Dr. Urdea founded and is a Founder and Partner for Halteres Associates, a biotechnology consulting firm. He also founded and served as Chief Executive Officer of Tethys Bioscience, a proteomics-based diagnostics company involved in preventative personalized medicine. Additionally, Dr. Urdea is a founder and the Chairman of Catalysis Foundation for Health, an organization addressing gaps in global healthcare caused by inefficiencies in disease diagnosis and monitoring. He serves as an expert consultant to the life sciences industry and is on the scientific advisory boards and boards of directors of a number of biotechnology, diagnostics, venture capital and philanthropic organizations. Prior to his current business activities, Dr. Urdea founded the Nucleic Acid Diagnostics group at Chiron Corporation, and with colleagues, invented branched DNA molecules for amplification of signal in nucleic acid complexes. Application of this technology resulted in the first commercial products for quantification of human hepatitis B, hepatitis C, and human immunodeficiency viruses (HBV, HCV, and HIV, respectively). He then became business head of the Molecular Diagnostics Group and Chief Scientific Officer at Bayer Diagnostics. He continues to serve as a diagnostics industry, product development and scientific advisor to the Bill and Melinda Gates Foundation, acted as co-chair of two of the Grand Challenges grant review committees, and served as a member of its Diagnostic Forum. Dr. Urdea is an author on nearly 200 peer-reviewed scientific publications, nearly 300 abstracts and international scientific presentations, and more than 100 issued and pending patents. He received his BS in Biology and Chemistry from Northern Arizona University in Flagstaff and his Ph.D. in Biochemistry from Washington State University.

HISTORICAL STOCK PRICE



Source: Zacks Investment Research.

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