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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2017;

or

o **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

Commission File Number 001-33133

YIELD10 BIOSCIENCE, INC.
(Exact name of registrant as specified in its charter)

Delaware	**04-3158289**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
19 Presidential Way, Woburn, MA	**01801**
(Address of principal executive offices)	(Zip Code)

(Registrant's telephone number, including area code): **(617) 583-1700**

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of exchange on which registered
Common Stock, par value $.01 per share	The Nasdaq Stock Market LLC (Nasdaq Capital Market)

Securities registered pursuant to Section 12(g) of the Act: **None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No o

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (Section 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer o	Accelerated filer o
Non-accelerated filer o (Do not check if a smaller reporting company)	Smaller reporting company x
Emerging growth company o	

If an emerging growth company, indicate by check mark if the registrant elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. o

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of Act). Yes o No ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold on the Nasdaq Capital Market on June 30, 2017 was $6,559,519.

The number of shares outstanding of the registrant's common stock as of March 8, 2018 was 9,865,355

DOCUMENTS INCORPORATED BY REFERENCE

Pursuant to General Instruction G to Form 10-K, the information required by Part III, Items 10, 11, 12, 13 and 14 is incorporated herein by reference from the Company's proxy statement for the Annual Meeting of Stockholders to be held on May 23, 2018, which is expected to be filed not later than 120 days after the fiscal year end covered by this Form 10-K

YIELD10 BIOSCIENCE, INC.
ANNUAL REPORT ON FORM 10-K
For the Year Ended December 31, 2017
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Forward Looking Statements

This annual report on Form 10-K contains "forward-looking statements" within the meaning of 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements relate to our future plans, objectives, expectations and intentions and may be identified by words such as "may," "will," "should," "expects," "plans," "anticipate," "intends," "target," "projects," "contemplates," "believe," "estimates," "predicts," "potential," and "continue," or similar words.

Although we believe that our expectations are based on reasonable assumptions within the limits of our knowledge of our business and operations, the forward-looking statements contained in this document are neither promises nor guarantees. Our business is subject to significant risks and uncertainties and there can be no assurance that our actual results will not differ materially from our expectations. These forward looking statements include, but are not limited to, statements concerning our business plans and strategies; the expected results of our strategic restructuring to focus on Yield10 Bioscience as our core business; expected future financial results and cash requirements; plans for obtaining additional funding; plans and expectations that depend on our ability to continue as a going concern; and plans for development and commercialization of our crop yield traits, technologies and intellectual property. Such forward-looking statements are subject to a number of risks and uncertainties that could cause actual results to differ materially from those anticipated including, without limitation, risks related to our limited cash resources, uncertainty about our ability to secure additional funding, risks and uncertainties associated with our restructuring plans, risks related to the execution of our business plans and strategies, risks associated with the protection and enforcement of our intellectual property rights, as well as other risks and uncertainties set forth below under the caption "Risk Factors" in Part I, Item 1A, of this report.

The forward-looking statements and risk factors presented in this document are made only as of the date hereof and we do not intend to update any of these risk factors or to publicly announce the results of any revisions to any of our forward-looking statements other than as required under the federal securities laws.

Unless the context otherwise requires, all references in this Annual Report on Form 10-K to "Yield10 Bioscience," "we," "our," "us," "our company" or "the company" refer to Yield10 Bioscience, Inc., a Delaware corporation and its subsidiaries.

PART I

ITEM 1. BUSINESS

Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company focusing on the development of new technologies to enable step-change increases in crop yield to enhance global food security. We consider 10-20 percent increases in crop yield to be step-change increases. According to a United Nations report, food production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. During that time period, there will be a reduction in available arable land as a result of infrastructure growth and increased pressure on scarce water resources. Harvestable food production per acre and per growing season must be increased to meet this demand. At the same time, in light of the increasing focus on health and wellness, food safety and sustainability in developed countries, we anticipate a rise in demand for new varieties of food and food ingredients with improved nutritional properties. Further, concerns about food safety have led to the concept of “seed to plate” or “farm to fork,” with a focus on stringent quality control along the entire value chain. If this concept takes hold with consumers, it is likely to require identity preservation from seed to harvest and involve contract farming. This concept has been implemented in Agricultural Biotechnology ("Ag biotech"), in products such as high oleic canola and soybean. Consumer demand for identity preserved specialty ingredients is also expected to rise, and we believe that Yield10's crop yield technologies and crop gene editing platform could be useful in this emerging field.

The foundation technology of Yield10 was based on using two proprietary advanced biotechnology trait gene discovery platforms to improve fundamental crop yield through enhanced photosynthetic carbon capture and increased carbon utilization efficiency to increase seed yield. These platforms are based on the principle that plants which capture and utilize carbon more efficiently will enable more robust crops capable of increased seed yield. Yield10 is working to develop, translate and demonstrate the commercial value of a number of novel yield trait genes from these discovery platforms in major crops. We have also identified or in-licensed a number of genome editing targets for improved crop performance in several key food and feed crops, including canola, soybean, rice and corn. Included in the genome editing targets are several

genes with the potential to increase seed oil content, a key economic value driver in major oilseed crops such as canola and soybean. Yield10 is currently combining the two trait gene discovery platforms to create an integrated system for identifying key plant gene combinations for modification using genome editing to improve crop performance. New tools for genome editing continue to develop at a fast pace and be deployed against known targets which for the most part are focused on changing seed or seed oil composition. However, identifying gene combinations remain an unmet need.

Yield10 Bioscience is headquartered in Woburn, Massachusetts and has an additional agricultural science facility with greenhouses in Saskatoon, Saskatchewan, Canada.

Yield10 Bioscience was founded as Metabolix, Inc. in 1992 and originally focused on redirecting carbon flow in living systems to produce bioplastics and biobased chemicals. In 1997, Metabolix started a crop science research program with the intent to produce the microbial bioplastic polyhydroxybutyrate (“PHB”) in high concentration in the seeds of oilseed crops or in the leaves of biomass crops where it acts as an additional carbon sink or carbon store. As we made progress on our crop program, we learned that the rate of carbon supply from photosynthesis was insufficient to support both plant growth and polymer production, so we initiated a series of exploratory programs to develop new technologies to fundamentally increase the plants’ ability to fix and capture more carbon. These early research programs resulted in the establishment of our crop yield trait gene discovery platforms and the identification of a series of promising proprietary yield trait genes.

Based on encouraging early results from these gene discovery programs, we refocused our crop science efforts to yield improvement in major food and feed crops in 2015 and rebranded the effort as Yield10 Bioscience. In 2016, we sold our biopolymers assets and restructured the Company around our crop science mission. In January 2017, we completed this transition and changed the name of the company to Yield10 Bioscience, Inc. We are developing proprietary, breakthrough plant biotechnologies to improve crop productivity and seed yield based on two proprietary discovery platforms:

- the “Smart Carbon Grid for Crops Platform,” - in which we are working to eliminate bottlenecks in plant photosynthesis and carbon metabolism by harnessing new metabolic capabilities from non-plant systems including microbes and algae, and;

- the “T3 Platform,” - in which we have identified three powerful global regulator genes in plants which control complex regulatory networks and gene cascades resulting in step-change increases in photosynthetic carbon fixation and biomass yields.

In our work to date, our team has demonstrated step-change yield increases in Camelina and canola seed production and in switchgrass biomass production. We are currently progressing the development of our lead yield trait genes in canola, soybean, rice and corn to provide step-change crop yield solutions for enhancing global food security.

With these two platforms, we have established a series of proprietary trait genes to enhance carbon dioxide capture and fixation in both C3 and C4 photosynthetic plants for yield improvement. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, and includes canola, soybean, rice, wheat and potato. C4 photosynthesis is a more complex system. Plants using the C4 system have evolved an additional distinctive cellular structure, in which carbon dioxide is concentrated for the main photosynthesis enzyme RUBISCO through a series of metabolic and metabolite transports known as the C4 pathway. Corn, sorghum and sugarcane are part of the C4 photosynthetic plant family. In general, C4 photosynthetic plants have inherently higher yield than plants in the C3 photosynthetic family. This difference in plant yield is a result of evolution, which has led plant scientists to consider the possibility that new genetic enhancements can be created to fundamentally improve the photosynthetic system in C3 plants.

We are currently integrating our two technology platforms into a next generation platform (“GRAIN”) with the objective of creating a predictive tool to identify combinations of plant gene modifications (“Smart Targets") for improvement of any aspect of crop performance. We envision that GRAIN will be a powerful tool for further optimizing the seed yield and seed oil content traits we currently have in development and for identifying new gene targets. Successes in Ag biotech, based mostly on innovations from the 1990’s, were achieved by introducing single microbial genes into crops to add new functionality such as herbicide tolerance or pest resistance. Over the last 20 years, the Ag industry majors have made significant investments in testing thousands of single plant genes and have generated billions of data points from these studies as well as traditional breeding programs. However, there have been very few new Ag biotech traits launched during that period indicating the need for multi-gene solutions. This conclusion is supported by the fact that domestication of modern corn from the ancient teosinte plant was due to changes in the activity of 5-6 regulatory or transcription factors genes over a period of 9,000 years. Plant scientists now have powerful genome editing tools, such as the CRISPR/Cas9 system which enable multi-gene changes to be made in major crops; the challenge is knowing what combinations of genes to edit. The 2016 corn harvest in the United States was valued at around $50 billion. The recent breakthroughs in genome editing now make

significantly increasing, and perhaps doubling corn yield an achievable goal, if we knew what 5-6 genes to change. In the absence of this knowledge, however, we are left with the technically unrealistic prospect of experimentally testing every combination of genes. For example, testing just the 2,400 predicted gene regulators or transcription factors of corn with a single type of change in all possible pairs would require almost 3 million experiments.

There is clearly an unmet need to create advanced computational tools like GRAIN for predicting the right combinations of plant genes to modify for improvement of crop performance. There are two key components in plants, metabolic pathways and gene regulators called transcription factors. We find it useful to compare the flow of carbon through a plant to the flow of traffic in a major city. Using this analogy, metabolic pathways constitute the carbon conversion "infrastructure" and transcription factors constitute the genetic “traffic” lights that direct changes in plant metabolism in response to environmental or developmental conditions. Our “Smart Carbon Grid for Crops” metabolic engineering platform has already proven useful in identifying a number of our C3000 series of traits, and the “T3 Platform,” based on mining transcription factor network data sets identified our C4001, C4002 and C4003 global transcription factor gene traits. These gene traits enabled us to engineer switchgrass plants with high rates of photosynthesis and increased biomass yield. We are currently repeating our work with C4001 and C4003 in rice and wheat and plan to do so in corn.

GRAIN is an integrated platform based on key elements of our “Smart Carbon Grid for Crops” metabolic engineering platform and our “T3” platforms. Advanced metabolic flux analysis forms the foundation of the GRAIN platform we are developing based on Yield10 scientists unique 20-plus years of experience successfully deploying advanced metabolic flux analysis to address critical bottlenecks in carbon metabolism. Plant growth at its core is a series of chemical reactions and these can be modeled to determine the best ways to optimize the yield of the targeted end product. Advanced metabolic modeling based on flux-balance analysis and enzyme reaction thermodynamics and kinetics enables us to make predictions about which reaction modifications are most likely to achieve targeted performance improvements. However, as with all modeling approaches, the tool is only useful alongside the means and the data to test it in real plants. Here Yield10 makes use of metabolic and transcriptome data generated from its high-photosynthesis, high-yield engineered plants as well as from academic publications and other public data to project optimal gene targets for modifications. By integrating the transcriptome network capabilities of the T3 Platform, we expect to be able to identify transcription factor genes whose activity profiles can be altered to optimize multiple steps in metabolic pathways or the flow of carbon in plant tissues of interest. In a crop like modern hybrid corn, which already produces vastly more seed than it needs to reproduce, our initial objective is to reduce or even eliminate the activity of the transcription factors that restrict further seed production. Accordingly, our approach is to turn down the sequence of transcription factors (or “red lights”) which block the plant from sending more carbon to the seed.

Based on elements of the GRAIN platform that we are already working on, we have identified the C4004 - C4027 series of transcription factor genes that are down-regulated in our high-photosynthesis engineered switchgrass plants as well as a number of new gene targets related to our lead C3003 yield trait. In many cases these gene targets can be modified by genome editing, opening the potential for the traits to not be regulated by USDA-APHIS, or in some cases, genes from the microbial world can be introduced to develop regulated traits. We believe our integrated GRAIN platform can be leveraged in the near term to secure research and development funding from industry partners.

We have consolidated our crop science intellectual property position with 15 patent filings in prosecution, identified additional novel gene targets for improving crop performance and yield through genetic engineering or genome editing, formed a scientific advisory board with leaders in plant science, conducted several greenhouse studies and conducted two years of Fast Field Testing of traits from our “Smart Carbon Grid for Crops” discovery platform. We have reported encouraging data for our lead yield trait gene, C3003 in field tests of Camelina and canola and are conducting additional studies in Camelina, canola, soybean and rice.

In 2017, we intensified our efforts to evaluate genome editing targets for improving seed yield, seed composition and/or biomass yield in commercial crops. We believe that strategies based on C3004, a trait that complements C3003, and on C3007, an oil content boosting trait that we have an option to in-license from the University of Missouri, have the potential to provide a path to commercialization based on achieving “nonregulated” status from United States Department of Agriculture - Animal and Plant Health Inspection Service ("USDA-APHIS"). If this status is achieved, this could significantly reduce the time and cost of launching new yield traits. We achieved this status for a genome edited Camelina line in 2017 through a submission to USDA-APHIS. We developed this genome edited Camelina line together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content. We are currently evaluating combinations of the genome editing targets to optimize oil content in Camelina and

canola, and plan to do so in soybean with the objective of achieving non-regulated status from USDA-APHIS for additional plant lines. In addition, we are advancing research with a number of genome editing targets which could provide new strategies to increase biomass yield in forage and other crops.

In our 2017 fast field test program conducted at two sites in Canada, we tested both first and second generation versions of C3003 in Camelina as well as first generation C3003 in canola, an important North American oilseed crop. In the field tests, we monitored key agronomic and growth parameters of the plants throughout the field test and collected yield data including yield of seed per area planted, individual seed weight, and seed oil content in our transformed plants as compared to control plants. In January 2018, we reported encouraging results from our field tests of the C3003 gene in Camelina and canola. The main objectives of the studies were to evaluate the performance of C3003 in Camelina and canola using different genetic constructs, which are used to optimize when and where in the plant the gene is activated to provide the best performance. Yield10 researchers transformed plants with genetic constructs intended to optimize expression of C3003 during different stages of plant and seed development and tested these events in the field tests. The best events for second generation C3003 in Camelina produced improvements in seed yield (up to 7.7 percent), harvest index and overall agronomic performance as compared to control plants. Harvest index, the ratio of seed to biomass (leaf, stems) is a critical parameter for improving seed yield and increasing harvest index is one of the major objectives of our technologies. The best events for first generation C3003 in canola produced improvements in seed yield (up to 13.1 percent) as compared to control plants. The studies also met the objective for bulking up seed to enable further evaluation of C3003 in Camelina and canola in field tests planned for spring 2018. A new second generation construct using a different seed specific promoter was tested in the minicage plots, used for seed bulk up, and produced plants showing indications of strong agronomic performance and seed yield which we plan to explore further in our 2018 field tests.

According to the National Oilseed Processors Association, soybean is the leading North American oilseed crop. Accordingly, we accelerated deployment of both first and second generation C3003 into soybean in 2016 and through a collaborator generated early greenhouse data in late 2017. Preliminary observations with a small number of lines suggest that results for C3003 previously obtained in Camelina and canola are translating into soybean. Consistent with previous results, first generation C3003 produced seeds with lower individual weight while typical individual seed weight was observed with second generation C3003 in soybean. Further, our greenhouse results show that there is an increase in branching in the plants for some of the events tested. We believe this is significant because more branching provides more sites on the soybean plant for seed pods to develop. We expect additional development work will continue in soybean during 2018.

In 2017, we granted a non-exclusive research license to Monsanto Company to evaluate our novel C3003 and C3004 yield traits in soybean. Under the license, Monsanto has the non-exclusive right to begin work with C3003 in its soybean program as a strategy to improve seed yield. Monsanto also may conduct research with our C3004 yield trait, a trait accessible through genome editing, in combination with C3003 to evaluate the effect of the combination to improve seed yield in soybean.

Results from our studies with C3003 to date suggest that it may provide an entirely new strategy to improve seed yield in oilseeds and other C3 photosynthetic crops by bringing in unique metabolic functionality from non-plant systems. We plan to continue to generate data on C3003 in field tests and greenhouse studies in 2018.

Metabolix Oilseeds, Inc., signed a two-year collaboration with the National Research Council of Canada in 2017 to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors (“GTFs”). We have shown that these GTFs have the potential to significantly increase photosynthesis and yield in certain crops. Research with the C4000 series of traits will allow the discovery of additional gene targets in wheat that could enhance the yield and/or drought tolerance of the crop. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world.

In 2017, we were selected as a subawardee on a new U.S. Department of Energy (DOE) Grant to conduct research aimed at boosting oilseed yield in Camelina. The 5-year, $10 million grant, which was recently awarded to Michigan State University (MSU) will be led by MSU and will involve a multidisciplinary team of researchers from MSU, North Carolina State University and Yield10 Bioscience as the industry partner. Under the grant, the team of scientists will integrate metabolic and gene expression models to predict in detail the gene combinations and pathways used by the Camelina plant to convert sucrose, the primary product of photosynthesis, into oil. Our work under the award will involve the use of our T3 gene discovery platform to identify novel global regulatory genes that are designed to increase oil and seed yield. The identification of new genetic targets to boost seed yield in Camelina may allow for the broader cultivation of Camelina for commercial use, and may have further application to other oilseed crops, such as canola and soybean.

Crop yield is the primary driver of the agriculture value chain. Yield can make the difference between a profitable season and losses for growers. As such, technologies to protect crop yield or increase it are the primary determinant of the seed buying decision by growers at the start of the season. This in turn determines both revenue and market share for the major seed players. Yield10's goal is to discover, optimize and translate our yield trait gene innovations into major food and feed crops and demonstrate the economic value to growers and seed companies. In all cases our trait genes will be introduced using genetic engineering technologies either to introduce new genes, to introduce additional copies of genes from the same crop species with modified regulatory sequences from that crop species or by using genome editing technologies to reduce or eliminate the function of specific plant gene targets in individual crops. The method by which we deploy our yield trait genes has significant regulatory implications, which, in turn can affect the timelines and cost of their commercialization. We intend to create high-value assets in the form of proprietary yield gene technologies and to de-risk these assets by progressing them along the path to commercial development with increasingly larger scale field tests and multi-site field trials in major crops. We are deploying our yield trait genes into canola, soybean and corn. We are engineering these traits into the major crops with the goal that they will be suitable for the regulatory approval process and in crop varieties (germplasm) such that our traits can be readily introduced into the industry's elite crop lines by plant breeding.

The Unmet Need: Global Population Growth Outpacing Anticipated Global Food Supply

Yield10 is targeting a critical unmet need in agriculture based on the future disconnect between agricultural supply and the growing global population. According to a United Nations study, the global population is expected to exceed 9.6 billion people by 2050 and therefore there is a need to increase global food production to meet this demand. This will need to be achieved in the face of increased pressure on land and water resources in addition to increasingly variable weather patterns. Solving this problem is a major global challenge requiring new crop innovation and technologies to fundamentally enhance crop productivity.

The Yield Gap

According to several studies described in an article published in the Public Library of Science in 2013, crop yields may no longer be increasing in different regions of the globe, and current rates of crop yield increase are expected to fall significantly behind the levels needed to meet the demand for global food production. The researchers found that the top four global crops - maize (corn), rice, wheat and soybean - are currently witnessing average yield improvements of only between 0.9 to 1.6 percent per year, far slower than the required rates to double their production by 2050 solely from incremental yield gains. At these rates, global production of maize, rice, wheat and soybean crops may be required to increase by about 67 percent, 42 percent, 38 percent and 55 percent, respectively, by 2050, in order to meet the anticipated increase in demand for food production caused by population growth. For corn and soybean, the benefits of currently available Genetic Modification ("GM") traits were already factored into the data cited in the studies referenced above. The yield increases needed to meet the demands of the growing global population show that a significant "yield gap" exists for each of the crops evaluated in the study.

Yield10 is focused on addressing the yield gap for major crops by utilizing modern biotechnology strategies, including metabolic engineering (synthetic biology approaches) to "build better plants," in which technology is deployed to make the process of photosynthesis within plants more efficient at capturing atmospheric carbon and depositing that carbon in seed or biomass, with the effect of improving the overall yield of important food crops. Enhancement of the photosynthetic capacity of major crops is fundamentally important to crop science and an essential first step to increase the seed and/or biomass yield of plants and, therefore, food production. We have been working in the area of increasing photosynthetic carbon capture and crop yield technologies since 2012. As a result, we have identified a number of exciting genes for increasing yield or improving crop performance.

Health and Wellness, Food Safety and Sustainability

At the same time, in light of the increasing focus on health and wellness, food safety and sustainability in developed countries, we anticipate a rise in demand for new varieties of food and food ingredients with improved nutritional properties. Further, concerns about food safety have led to the concept of "seed to plate," with a focus on stringent quality control along the entire value chain. If this concept takes hold with consumers, it is likely to require identity preservation from seed to harvest and involve contract farming. This concept is currently being implemented in Ag biotech, in both canola and soybean which have been modified to alter the composition of the oil produced. High oleic canola and soybean oils are being marketed as a "healthier" approach which will typify this space where the value driver is the ability to make marketing claims directly to the consumer. Consumer demand to be able to identify preserved specialty ingredients is expected to rise, and we believe that Yield10's crop yield technologies and crop gene editing targets could be useful in this emerging field. Yield10

believes that these types of small acreage specialty crops have the potential for a broader range of partner prospects along the entire value chain.

Business Strategy

Our goal is to build a successful agricultural biotechnology company centered on demonstrating the value of our yield traits in major food and feed crops. We have identified and are evaluating novel yield trait genes that we have discovered using our two technology platforms. We believe we have extensive and unique metabolic engineering capabilities that can be deployed to help address the growing global yield gap in food and feed crops. As the primary driver of financial returns each season, crop yield is the key decision variable for farmers in making seed buying decisions, and as a result is critical to the seed industry. Improvements in yield to the levels targeted by Yield10, for example 10-20 percent increases, can be expected to generate significant value to the seed and crop industry. For example, Yield10 is targeting an approximately 20 percent increase in canola and soybean yields, which, if successfully deployed across North American acreage, would result in annual incremental crop value of $10 billion. By ultimately increasing the output of major food and feed crops and potentially reducing strains on scarce natural resources, we believe that Yield10's technologies will also contribute to addressing global food security.

Recognizing the highly concentrated nature of the seed business, the prevalence of cross-licensing of traits, and the need to stack multiple crop traits in elite seed germplasm to provide the best options for farmers for large acreage commodity crops, Yield10 does not expect to become an integrated seed company. The current major seed players dominate the GM crop space based largely on the early technology innovations that resulted in herbicide and pest resistance traits and have a very successful operating track record in the sector. Therefore, rather than replicating the downstream elements of these operations and developing our own regulatory, crop breeding or seed production capabilities, we intend to seek industry collaborations and partnerships to leverage these existing core competencies of the current seed industry. Yield10 will focus on its core competency, which is breakthrough science and technology innovation.

The type of collaborations and partnerships we seek will depend on the specific anticipated path to market for the crop. For large acreage GM crops including canola, soybean and corn, we plan to develop proof points for our yield traits as a basis for licensing to the Ag majors with a focus on capturing downstream value. According to industry estimates, the timeline from discovery to full commercialization of a GM trait in a commodity crop can be up to 13 years at a cost of up to $130 million. Our C3003 yield trait is an algal gene and will be regulated as a GM trait. As we are in the construct optimization/event selection stage, we are about half way along the anticipated development timeline for C3003. Our strategy is to make it attractive for the Ag majors to invest financial and technical resources to introduce our traits into their elite germplasm for event selection and evaluation. In 2017, we signed a non-exclusive research license with Monsanto Company to test C3003 and C3004 in soybean. We may sign additional non-exclusive research licenses on a crop by crop basis at minimal cost, allowing the licensees to invest their resources on progressing the trait. Our focus is on securing a share of the upside value of our traits when we finalize the economic terms of license agreements at the point where the value of the trait is well understood.

For small acreage specialty oil crops, we believe we can leverage our unique skill set to add value to the development of specialty oils focused on nutrition and aquaculture feed. In general, these crops cost more to produce because of the unique supply chain needed to ensure identity preservation for the crop from seed planting through final product. In this area, there may be opportunities for establishing partnerships and license agreements with consumer facing companies in the food and feed sector. Our high oil content traits developed through genome editing may have shorter timelines to commercialization (3-6 years) if deployed in specialty oil crops. We are at an early stage of developing our strategy in this area but believe it may have considerable potential for Yield10.

Yield10 plans to build on its core strengths bringing new technology approaches to exploit an innovation gap in the agricultural biotechnology space that exists due to reduced investment in basic research and development resulting from the ongoing consolidation and restructuring in the agricultural sector. Yield10's mission is to translate and optimize our step-change yield trait innovations in the major food and feed crops, and demonstrate their economic value to farmers and seed companies. We intend to create high-value assets in the form of proprietary yield trait gene technologies and to de-risk these assets by progressing them along the path to commercial development with increasingly larger scale field tests and multi-site field trials in major crops. We are currently deploying our yield trait genes into canola, soybean, rice, wheat and corn, by designing and progressing genetically engineered events suitable for the regulatory approval process which can be readily bred into the industry's elite crop lines by plant breeding. We expect the customers for Yield10's innovations to be the large and mid-size agricultural companies that would either license or acquire rights to Yield10's yield trait genes and incorporate them into their proprietary commercial crop lines for subsequent commercialization.

We are focused on identifying and developing technologies that will enable us to produce step-change improvements to crop yield.

Yield10 is targeting a critical unmet need in agriculture based on the anticipated disconnect between agricultural supply and the growing global population. Food production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. Global climate change is also resulting in regional shifts to historical growing conditions. Given the projection for population growth, recent studies show a "yield gap" for major food and feed crops that studies show cannot be addressed by incremental improvements to yield brought about by traditional plant breeding and existing GM traits. Current GM traits in the industry are based primarily on using microbial-sourced genes to impart yield protection through herbicide, pest, disease and even drought resistance, whereas Yield10 is focused on increasing fundamental crop yield through enhanced carbon capture and utilization.

Yield10 is fundamentally focused on "building better plants" based on using genetic engineering technologies to deploy new yield trait genes that improve the efficiency of photosynthesis and the efficiency of converting fixed carbon to seed and/or introducing targeted genetic changes in the plant genome that allow the plant to make more seed or biomass.

Our History

We have a significant track record and expertise in the metabolic engineering of microbes and have made significant progress translating this capability to plants.

As part of the legacy biopolymers and biobased chemicals business of our predecessor company Metabolix, our research team developed an advanced metabolic engineering capability to alter key biochemical pathways and redirect the flow of carbon metabolic intermediates in microbes resulting in the production of the biomaterial polyhydroxyalkanoate or PHA, at a level of more than 80 to 90 percent by weight of microbial cells that normally did not produce any PHA. Through our experience producing PHA in plants we have demonstrated that our experience with re-engineering the metabolism of microbes can be translated to "building better plants." In 1997, Metabolix initiated a crop science research program to produce renewable bioplastics and chemicals from agricultural crops. Historically, these efforts were focused on producing PHB, a microbial carbon storage biopolymer, in high concentration in the seeds of oilseed crops or in the leaves of biomass crops such as switchgrass.

As we made progress on producing PHB in plants, we learned that basic carbon supply from photosynthesis was a bottleneck. To address this carbon shortfall, we began developing new metabolic engineering and bioinformatics approaches to enhancing basic crop photosynthetic carbon capture. Discoveries from these two approaches became the foundation of our "Smart Carbon Grid for Crops" and "T3 Platform" crop trait discovery platforms, respectively. We also began building intellectual property on novel yield trait gene technologies discovered in these programs. Photosynthesis is the most important biological process responsible for global food production. For example, according to the USDA, the output of U.S. farms contributed $177 billion, or one percent, to GDP in 2014. Improving the photosynthetic capacity of plants is an essential first step to increase the performance of crops to increase seed and/or biomass yield and, therefore, food production. We must develop plants which on a per acre basis during the growing season fix more carbon and ultimately target that additional fixed carbon to seed. Key to achieving this is increasing the rate of net photosynthetic carbon capture. Once a plant has fixed carbon, that fixed carbon can be directed to three different places in the plant: it can be used to make roots, leaf and stem tissue of biomass, used for seed or it can be released again as CO2 through normal metabolic processes.

Since 2015, we have made significant progress applying our "Smart Carbon Grid for Crops" platform to plants. Using this technology platform, which we established as a result of a series of government funded internal programs and external academic collaborations, we have developed metabolic engineering strategies using microbial genes to introduce new functionality into plants to increase photosynthesis by making key metabolic pathways in plants more efficient, and to eliminate bottlenecks to efficient carbon usage. This approach is similar to what has been the bedrock of the agricultural biotech seed industry, the introduction of genes from non-plant systems to enable new functionality in the form of herbicide, pest resistance and drought tolerance. Our approaches led not only to the identification of novel yield trait genes but also encouraging early yield data from field studies with our lead yield trait gene in the industrial oilseed Camelina.

Our Approach

We have two unique, proprietary technology platforms for identifying novel yield trait genes.

Our unique approach consists of two core technology platforms. The first is based on our 30 years of experience optimizing the flow of carbon intermediates in living systems and is called the "Smart Carbon Grid for Crops." Using this approach and working with our partners in academia, Yield10 has demonstrated major step-changes in seed yield in the industrial oilseed Camelina. We currently have four novel trait genes impacting seed yield, which we refer to as the C3003 series of traits, and we are progressing our lead yield trait gene C3003 in our key crop targets canola, soybean and corn. Recently, we reported seed yield increases of up to 23% in early field tests conducted in 2016 with Camelina and up to 13% in early field tests conducted in 2017 with canola.

In our second platform, the "T3 Platform," we developed a proprietary computational process to identify global transcription factor (GTF) genes, or master switches, which algorithms predicted could both up-regulate or down-regulate multiple gene cascades with the potential for increasing photosynthesis, reducing bottlenecks in central metabolism and positively impacting plant and biomass yield. We have tested the three lead gene targets experimentally and have shown that they produced average increases of over 40 percent in photosynthetic carbon fixation, flow of carbon through central metabolism and biomass levels in our experiments with switchgrass. In some cases the biomass yield has been increased up to 75-100 percent in preliminary greenhouse tests, a notable finding given that switchgrass is a high yielding C4 photosynthetic crop. Although it is a very useful model for C4 photosynthesis plants, switchgrass is not a food crop, so we identified the corresponding genes in major food crops including our key targets, rice and corn, and work continues in this area.

Our work with the Smart Carbon Grid for Crops and the T3 Platform has identified promising potential targets for genome editing. We believe that these approaches may be subject to less regulatory complexity in the U.S. during development and along the path to commercialization, and may provide opportunities for licensing.

Genome editing techniques, including CRISPR, which involve making small targeted changes to the DNA of a target organism, have been of interest to the agricultural biotechnology industry because this approach is believed to have the potential to significantly reduce development costs and regulatory timelines for crop trait development and market introduction. Announcements from DuPont and USDA-APHIS regarding a clarification on the regulatory path for a genetically edited corn line indicated that this line will not be subject to regulations typically used for genetically modified crops on the basis that while the plant DNA was edited, the final plant did not contain any remaining foreign DNA (i.e. DNA sequences not from the plant being engineered) from the procedure used to edit the plant. This industry example suggests that crops that are genome edited may not be subject to certain GMO regulations in the U.S., an outcome supported by recent developments in the USDA APHIS review of the current regulatory process for crops made using genetic engineering. This has opened the potential for Yield10 to exploit a second tier of novel traits addressable with genome editing. The challenge now for the agricultural biotechnology sector will be to identify gene targets for genome editing which can generate economic value.

Yield10 has identified from its internal discovery platforms and in-licensed through academic collaborations a number of gene targets for genome editing in crops. In the course of our work, we have introduced genes coding for new metabolic pathway enzymes or global transcription factors producing high yield lines with higher rates of photosynthetic carbon fixation. We are studying our high yield plants at the molecular level using advances in high throughput analytical systems at the whole genome level to look at what happens to every other gene in the plant as a result of the changes we have engineered in, focused specifically on which native plant genes are turned on or off. Genes whose activity is turned on in the high yield lines are worth further study on their own and genes whose activity is turned off are interesting candidates for genome editing. This type of molecular analysis of the high yielding lines where the flow of carbon is higher has given us insights into key steps to target for further improvement. We recently made progress deploying genome editing technology based on our C3008 trait in Camelina, which in 2017 was deemed non-regulated by USDA-APHIS. Plants that are not regulated by USDA-APHIS may be subject to regulation by FDA or EPA. We expect to increase our level of effort in this area in other crops, particularly canola, over the course of 2018, eventually expanding into soybean, rice and corn. We believe our genome editing targets as well as the improved crops we develop using this approach may enable us to form collaborations or license arrangements with a broader set of commercial partners and bring these forward into development in the near-term.

We plan to use any revenues we generate from license agreements around our genome editing targets to support our ongoing research and development efforts to enable step-changes in crop yield.

We are developing the Camelina Fast Field Test model system to evaluate and de-risk novel yield trait genes.

One of the challenges the agricultural industry has faced over the years is translating early crop science discovery into value generating traits. In part this is because results from greenhouse studies in model plants have not translated well into field results in major crops. This is also in part because the plants used for discovery research have not been suitable for studies in the field and are not representative of the advanced seed or crop varieties (germplasm) used in commercial production, which have been subject to decades of intensive breeding to improve yield. Translating success when introducing non-plant genes into major crops has been very successful and the current biotech seed sector, which accounted for 457 million acres of crops worldwide in 2016, is based on using microbial genes in plants. The long timelines to progress early discoveries successfully into major crops and generate field data adds to the challenge.

For these reasons, Yield10 has put in place a process we call “Fast Field Testing” based on our Camelina oilseed platform. We believe that over time this will become a valuable tool in the trait discovery to translation effort. Camelina is an industrial oilseed well-suited to field trials, and we believe it is a good model for identifying promising new yield traits for canola and soybean. It is also very fast to modify and develop genetically stable seed sufficient for field planting. Ideally, we hope to be able to progress from trait identification to field planting in about 12 months. Our process is to identify trait genes of interest in Camelina and immediately begin putting them into canola and soybean, where the timelines to transform plants and generate field data are much longer. We can then progress the Fast Field Testing in Camelina and generate field data and a complete molecular analysis of plant material from the field. These results and data can then be used to inform how we progress the previously transformed canola and soybean.

We believe that this will provide the opportunity for go-no-go decisions in some cases and in other cases allow us to update our approach based on the results of our Fast Field Testing in Camelina. For example with the longer development timelines needed to get canola and soybean ready for field testing, we expect to initiate additional modifications earlier in these crops, having identified the potential to further improve the outcome based on the results of our Fast Field Testing in Camelina.

In our 2017 field test program, we tested both first and second generation versions of C3003 in Camelina, and we also tested first generation C3003 in canola, an important North American oilseed crop. Overall, our findings in canola for first generation C3003 mirror closely our observations of the trait in Camelina, underscoring the value of Camelina as a predictive system for understanding the performance of our novel yield traits in development.

We are using our Camelina Field Test model system to de-risk and accelerate the demonstration of the trait gene value in major crops. As a particular trait is de-risked there is the potential for inflection points in value. If we can establish a strong correlation between the results from the Camelina system with future field data first from canola and then with soybean, then we may be able to leverage this to enter partnership and licensing discussions earlier while preserving the opportunity to capture a meaningful share of the upside value.

If results of testing new yield traits in our Camelina Fast Field Testing model are shown to be predictive of results that can be obtained in other C3 crops, we may be able to accelerate translation of new traits into important food and feed crops.

We developed our Camelina Fast Field Testing model as a system to develop and optimize yield traits based on novel metabolic pathways. We have significant expertise in the genetic transformation and analysis of Camelina. We believe that if we can show that the results we obtain for potential yield traits in Camelina are directionally predictive for the results we obtain in other oilseed and C3 crops, then we will be able to use the system to effectively screen for novel traits and accelerate their deployment into additional crops having the C3 photosynthetic system, including canola, soybean, rice and wheat. For this reason, our Camelina Fast Field testing system may prove to be a valuable tool for novel yield trait discovery facilitating translation into commercially important crops.

Our Oilseed Operation based in Canada provides us with unique capabilities in the development of oilseed crops.

We established our oilseeds subsidiary in Canada in 2010 to produce robust oilseed germplasm with engineered value-added traits for commercial crop production in western North America. Our oilseeds team is based in Saskatoon, Saskatchewan, with laboratories in the National Research Council (NRC) - Saskatoon facility and commercial greenhouse and laboratory facilities at nearby Innovation Place. Our team has developed and implemented technology to improve and accelerate engineering and trait evaluation of Camelina and canola. The team also plays a key role in designing and conducting greenhouse and field tests required to effectively evaluate novel yield traits.

We have established a lean organizational footprint which is capable of evaluating our initial novel yield traits in greenhouse and field tests while maintaining efficient use of cash resources.

As of December 31, 2017, we had 20 full-time employees, with the majority directly involved with our research and development activities. We believe that our organizational capabilities are aligned with our research priorities and are complemented by our use of third party infrastructure and certain service providers. With this approach we can leverage third party infrastructure and capability without having to spend the time and capital needed to recreate them in-house. This will allow us to focus our limited resources on deploying our core strengths against our key development goals. We expect to grow our research and development operations over time commensurate with building value in our business and advancing our traits through development while at the same time tightly managing overhead costs.

We have established a Scientific Advisory Board which provide us with opportunities to access government grant revenue to support our research as well as key intellectual property.

Yield10 has pursued academic collaborations that have led to the discovery of novel yield trait genes. Researcher Danny Schnell, Ph.D. discovered the C3003 trait in an ARPA-e funded collaborative project at the University of Massachusetts in which Yield10 was a partner. In 2015, Prof. Schnell moved to Michigan State University where he is Chairperson, Department of Plant Biology and remains a collaborator on C3003. Heike Sederoff, Ph.D. Professor, Department of Plant and Microbial Biology at North Carolina State University developed the C3004 and C3005 traits with ARPA-e funding which Yield10 is now progressing under a license agreement. Both Dr. Schnell and Dr. Sederoff are members of our Scientific Advisory Board. In early 2017, Yield10 announced taking an option to a global license agreement from the University of Missouri for advanced technology to boost oil content in oilseed crops. This license covers two gene targets, including C3007, which are based on the recent discovery of a key regulatory mechanism controlling oil production in oilseed crops which can be used to increase oil content. Oil content is the key economic driver in crops such as canola, sunflower and safflower. We plan to exercise this option and in-license the technology in 2018. Dr. Jay J. Thelen, Ph.D., Professor of Biochemistry at University of Missouri, who discovered this new mechanism, became a member of our Scientic Advisory Board in early 2018.

We plan to seek U.S. and Canadian government grants to support our research and development goals.

Yield10 has been awarded grants over the last several years supporting research on strategies to improve the efficiency of photosynthesis,increase seed oil content, identify novel yield traits and test these novel traits in Camelina. This work is valuable because traits developed in Camelina have the potential to be developed and deployed in other oilseed crops. For example, in 2017, we were selected as a subawardee on a new U.S. Department of Energy (DOE) grant let by MSU that is expected to commence during the Company's first quarter of 2018 to conduct research aimed at boosting oilseed yield in Camelina. We plan to continue to pursue government grants to defray research costs associated with our research and development activities.

We plan to deploy our novel yield trait genes to generate proof points across a range of crops.

Current biotech-generated crop protection traits such as “Roundup Ready” and insect resistance are deployed broadly in the Americas in the canola, soybean and corn crops. For novel yield trait genes, such as C3003, we envision deployment of the trait in C3 photosynthetic oilseed crops such as Camelina, canola and soybean and potentially in other C3 crops such as rice, alfalfa, cotton, potato and wheat. We are currently testing C3003 and C4003 in rice where genetically modified plants have not yet been widely introduced commercially. We also believe there is an opportunity to deploy our novel yield traits into existing GM crops as “stacked traits” included in branded seeds marketed and sold to farmers. “Stacked traits” refers to the practice of adding multiple biotech traits to an elite plant line as a strategy to further increase value.

Metabolix Oilseeds, Inc. signed a two-year collaboration with the National Research Council of Canada in 2017 to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors (“GTFs”). We have shown that these GTFs have the potential to significantly increase photosynthesis and yield in certain crops. Research with the C4000 series of traits will allow the discovery of additional gene targets in wheat that could enhance the yield and/or drought tolerance of the crop. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world.

In addition, we view our genome editing targets as a complement to plant breeding techniques and plan to test our genome editing targets in oilseed crops, as well as in rice, corn and forage crops as a way to improve seed yield and/or biomass and generate opportunities for licensing or collaboration with established industry partners.

We believe our business model will allow us to capture value for our discoveries and provide a path to commercialization for important new yield traits for major crops.

We are positioning Yield10 as a discovery company whereby we will work to advance our own developments as well as form business alliances to progress our traits through development and early commercialization. Our goal is to capture an attractive share of the added economic value resulting from the deployment of our trait genes and technologies in key crops. We are currently working on the development and deployment of our trait genes into canola, soybean, rice and corn, an approach facilitated by the expiration of much of the early foundation patents in the agricultural biotechnology sector, and one of our key objectives in that regard is to demonstrate commercial proof points through multi-site field tests. Yield10 has a number of opportunities and models for value capture including partnering or licensing with established agricultural industry players. Key to our strategy is to retain, where practical, control of timelines and maximize, where possible, the opportunity for value creation and optionality around future exit strategies.

In 2017 we granted a non-exclusive global research license to Monsanto Company to evaluate our novel yield traits C3003 and C3004 in soybean. Under the license, Monsanto plans to research both traits in its soybean platform. Monsanto is a leader in the development and commercialization of GM soybean seed. This license provides a market leader in biotech seed with the opportunity to test our traits and develop data at its own expense; at any time during the term, they have the option to negotiate a broader agreement with us. At the same time, we have the right to sign licenses with other companies for C3003 in soybean or other traits. This structure allows us the flexibility to expand the testing of the trait with investment by another party and to potentially enter negotiations for a development and commercial license when the value of the trait is better understood. In 2018, we plan to explore additional opportunities to expand the testing of our traits through arrangements with other companies.

Technology Platforms

In the last decade there has been a dramatic expansion of new genetic engineering and systems biology tools: genomics data; metabolic engineering; high-throughput analytical tools, including whole organism gene expression analysis and metabolomics, and powerful genome editing technologies. At Yield10 we plan to build value by leveraging genome editing targets for revenue generation in the near-term while we independently work to demonstrate the economic value of our transformative genetic engineering based yield breakthroughs in the longer term. The recent expiration of early blocking patents on plant genetic engineering means we can now be more effective in research and development, leverage third party service providers and independently drive key proof points in major commercial crops such as canola, soybean and corn while focusing our resources on our core strengths. Yield10 is focused on increasing the inherent yield of major food and feed crops. With regard to forming collaborations, we recognize there are considerable headwinds to overcome in this sector, including industry skepticism based on disappointing outcomes from major investments made screening large numbers of single crop genes. This has resulted in a challenging environment for early crop innovations prior to demonstration of key proof points in commercial crops. Our goal is to “build better plants” which requires new approaches and innovation and in our view will most likely involve gene combinations and/or multi-gene systems.

Increasing crop yield is a complex two-step carbon optimization problem. Harvested seed is mostly carbon fixed from carbon dioxide in the air by photosynthesis with oxygen coming from water in the soil and smaller amounts of nitrogen and phosphate both of which are applied as fertilizer. To achieve increased yield, the rate at which crops can fix carbon has to be increased. Based on our experience optimizing carbon flow in living systems, we know that increasing seed yield will likely require multiple trait genes to increase carbon fixation by photosynthesis at the front-end and direct the increased fixed carbon to the seed. One analogy would be the fact that simply filling the gas tank in a car does not make it go faster. If successful in increasing photosynthesis, we expect to reach metabolic bottlenecks downstream, some of which will likely prevent some of the additional fixed carbon from reaching the seed. However, with new analytical tools available we expect to be able to identify bottlenecks and develop solutions to achieve our targeted outcomes, step-change increases in seed yield. This leads to our theme of enhanced carbon capture from photosynthesis and targeted carbon deposition to seed.

Plants can be categorized generally into two different groups based on their system of photosynthesis. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, and includes canola, soybean, rice, wheat and potato. C4 photosynthesis is a more complex system. Plants using the C4 system have evolved an additional distinctive cellular structure, in which carbon dioxide is concentrated for the main photosynthesis enzyme RUBISCO through a series of metabolic and metabolite transports known as the C4 pathway. Corn and sugarcane are part of the C4 photosynthetic plant family. In general, C4 photosynthetic plants have up to five times inherently higher plant yield than plants in the C3 photosynthetic family. This difference in plant yield is a result of evolution,

which has led plant scientists to consider the possibility that new genetic enhancements can be created to fundamentally improve the photosynthetic system in C3 plants.

Smart Carbon Grid for Crops Technology Platform

Yield10 is leveraging over a decade of metabolic engineering experience to optimize photosynthetic carbon capture and utilization in plant systems, which is critical to increasing seed yield. The "Smart Carbon Grid for Crops" is an advanced metabolic engineering platform that we believe has the potential to address well known metabolic limitations in crops and in C3 crops in particular. Similar to the electric grid where much of the investment made to generate the power is lost in the distribution system, plants having the C3 photosynthetic system are similar in that they lose over half the carbon the grower has paid to fix in input costs due to metabolic inefficiencies. We plan to mirror an approach taken by many of the current herbicide and pest resistance GM traits where genes from non-plant sources were used successfully to impart new functionality to crops. In our case, we are exploiting non-plant genes such as genes from microbial or algal sources to fix or reduce the impact of well-understood carbon capture metabolic pathway limitations in C3 crops. For example, photorespiration is a wasteful side reaction or carbon capture inefficiency in crops having the C3 photosynthetic system which represent approximately 70 percent of the food consumed by humans and include wheat, rice, soybean, canola and potato. We believe impacting photorespiration should lead to improved net carbon fixation from photosynthesis and as a result, we would expect to see step-change increases in seed yield.

To illustrate the value creation potential, yield loss in C3 crops due to photorespiration was recently quantified in a paper published in the *Annual Review of Plant Biology*. The authors estimated that yield in U.S. soybean crops is reduced by 36 percent and the yield in U.S. wheat crops is reduced by 20 percent due to photorespiration. They also estimated that achieving a five percent reduction of photorespiration in soybean and wheat in the U.S. would add approximately $500 million per year of value. Some models suggest that photosynthesis could improve by 12 to 55 percent in the absence of photorespiration. Therefore, photorespiration has been a major topic in plant science and researchers have employed multiple strategies in attempts to reduce photorespiration in C3 plants as a means to improve yield.

Impacting photorespiration is one of the key targets of our Smart Carbon Grid for Crops technology platform. This platform is an innovative, systems based approach to boost yield by increasing the amount of carbon fixed by photosynthesis and targeting the increased carbon to harvestable seed. Our lead trait, C3003, has been shown to enhance carbon fixation and seed yield in the oilseed Camelina where it impacts photorespiration. C3003 is a scientific discovery made in one of our academic collaborations and Yield10 has exclusive rights to this technology. While our collaborator continues to work on characterizing the mechanism of this yield trait gene, current data suggests C3003 is a very unique gene that impacts photorespiration in an unexpected manner. New science also represents a key aspect of de-risking our technologies. If the science provides new insights or addresses a well-defined bottleneck in a key limiting pathway common to a large number of crops, then the expectations for broadly translating initial results should be higher. We are excited about the prospects of C3003 in reducing the well-known yield losses that occur through photorespiration in C3 crops. We are currently studying C3003's effect in the food crops canola, soybean and rice. We know C3003 has increased the rate of photosynthetic carbon fixation in our Camelina plants and we have been able to study these plants at the molecular level. Consistent with our initial hypothesis that downstream bottlenecks can be identified, we have found that in high yielding plants expressing C3003, the expression of other genes, including our C3004 trait gene is changed. We believe the C3004 trait gene is involved in controlling the flow of fixed carbon to seed as part of the plants natural regulatory system. It is well known that the flow of carbon in plants is tightly controlled and we believe our approach to engineering the C3004 gene using genome editing has the potential to remove one of these control points and can be combined with the C3003 trait gene to further increase yield beyond what can be achieved with C3003 alone.

T3 Platform and Plant Targets for Genome Editing

In crops having the evolutionary advanced, more efficient C4 photosynthetic system, including corn, sugarcane and sorghum, the yield is already several-fold higher than in C3 crops. In this case, the hurdle to accomplish step-change increases in seed yield is higher as these crops are already more metabolically efficient. Leveraging the industry's significant investment in crop genomics research over the last 20 years, we developed the "T3 platform," which is an algorithm-based approach to "big data" mining of publicly available genomics data sets. We focused not on individual genes but on specific gene expression patterns. Gene expression patterns tell the researcher which genes are turned on and off under different growth conditions. With the T3 platform we wanted to identify and focus our activities on a small number of very important plant genes. Using this approach we were able to identify and select novel genes, which could function as global regulators or master switches to control cascades of other genes and metabolic systems. The strategy was to use the T3 platform to significantly narrow the number of candidate genes to be tested and then test them experimentally in our high throughput

gene transformation platform in our C4 photosynthetic crop model system, switchgrass. We validated the T3 platform approach by verifying with experimental results the positive yield impact of the three gene targets we identified computationally, an exceptional hit rate. These three yield genes, C4001, C4002 and C4003, significantly increased photosynthetic carbon capture and biomass production in our switchgrass plants. In this case our early experiments have been successful in demonstrating the potential to increase the rate of carbon fixation even in a high yielding C4 crop.

We believe Yield10 is in a unique position to expand our learning and discover additional gene targets, or genes that need to be modulated, to optimize the flow of carbon to seed in these plants and have made considerable progress in this regard. Molecular analysis of high yielding plants expressing the global transcription factors has allowed the identification of 71 downstream transcription factors that are differentially expressed in the high yielding lines and are themselves targets for genetic manipulation. The expression of some of these genes is down regulated in the high yielding plants making them exciting targets for genome editing through well-known approaches such as CRISPR. We are beginning to validate these second generation gene targets in switchgrass and have thus far validated the predicted role of the first three genes. We know the industry has struggled to deploy downstream transcription factors to improve crops particularly in hybrid corn. However, we are optimistic that we will be more successful introducing our global regulator genes given the impact we saw in our experiments, and we believe genome edited traits, particularly simple gene deletions, will be significantly easier to implement and translate across all varieties of a crop.

Integrating the Smart Carbon Grid and T3 Platform to Identify Plant Targets for Genome Editing

We are currently integrating our two technology platforms into a next generation platform (“GRAIN”) with the objective of creating a predictive tool to identify combinations of plant gene modifications (“Smart Targets") for improvement of any aspect of crop performance. We envision that GRAIN will be a powerful tool for further optimizing the seed yield and seed oil content traits we currently have in development and for identifying new gene targets. Successes in Ag biotech, based mostly on innovations from the 1990’s were achieved by introducing single microbial genes into crops to add new functionality such as herbicide tolerance or pest resistance. Over the last 20 years, the Ag industry majors have made significant investments in testing thousands of single plant genes and have generated billions of data points from these studies as well as traditional breeding programs. However, there have been very few new Ag biotech traits launched during that period indicating the need for multi-gene solutions. This conclusion is supported by, the fact that domestication of modern corn from the ancient teosinte plant was due to changes in the activity of 5-6 regulatory or transcription factors genes over a period of 9000 years. Plant scientists now have powerful genome editing tools, such as the CRISPR/Cas9 system which enable multi-gene changes to be made in major crops; the challenge is knowing what combinations of genes to edit. The 2016 corn harvest in the United States was valued at around $50 billion. The recent breakthroughs in genome editing now make significantly increasing, and perhaps doubling corn yield an achievable goal, if we knew what 5-6 genes to change. In the absence of this knowledge, however, we are left with the technically unrealistic prospect of experimentally testing every combination of genes. For example, testing just the 2400 predicted gene regulators or transcription factors of corn with a single type of change in all possible pairs would require almost 3 million experiments.

There is thus clearly an unmet need to create advanced computational tools like GRAIN for predicting the right combinations of plant genes to modify for improvement of crop performance. There are two key components in plants, metabolic pathways and gene regulators called transcription factors. We find it useful to compare the flow of carbon through a plant to the flow of traffic in a major city. Using this analogy, metabolic pathways constitute the carbon conversion "infrastructure" and transcription factors constitute the genetic “traffic” lights that direct changes in plant metabolism in response to environmental or developmental conditions. Our “Smart Carbon Grid for Crops” metabolic engineering platform has already proven useful in identifying a number of our C3000 series of traits, and the “T3 Platform,” based on mining transcription factor network data sets identified our C4001, C4002 and C4003 global transcription factor gene traits. These gene traits enabled us to engineer switchgrass plants with high rates of photosynthesis and increased biomass yield. We are currently repeating our work with C4001 and C4003 in rice and wheat and plan to do so in corn.

GRAIN is an integrated platform based on key elements of our “Smart Carbon Grid for Crops” metabolic engineering platform and our “T3” platforms. Advanced metabolic flux analysis forms the foundation of the GRAIN platform we are developing based on Yield10 scientists unique 20-plus years of experience successfully deploying advanced metabolic flux analysis to address critical bottlenecks in carbon metabolism. Plant growth at its core is a series of chemical reactions and these can be modeled to determine the best ways to optimize the yield of the targeted end product. Advanced metabolic modeling based on flux-balance analysis and enzyme reaction thermodynamics and kinetics enables us to make predictions about which reaction modifications are most likely to achieve targeted performance improvements. However, as with all modeling approaches, the tool is only useful alongside the means and the data to test it in real plants. Here Yield10 makes use of metabolic and transcriptome data generated from its high-photosynthesis, high-yield engineered plants as well as from

academic publications and other public data to project optimal gene targets for modifications. By integrating the transcriptome network capabilities of the T3 Platform, we expect to be able to identify transcription factor genes whose activity profiles can be altered to optimize multiple steps in metabolic pathways or the flow of carbon in plant tissues of interest. In a crop like modern hybrid corn, which already produces vastly more seed than it needs to reproduce, our initial objective is to reduce or even eliminate the activity of the transcription factors that restrict further seed production. Accordingly, our approach is to turn down the sequence of transcription factors (or "red lights") which block the plant from sending more carbon to the seed.

Based on elements of the GRAIN platform that we are already working on, we have identified the C4004 - C4027 series of transcription factor genes that are down-regulated in our high-photosynthesis engineered switchgrass plants as well as a number of new gene targets related to our lead C3003 yield trait. In many cases these gene targets can be modified by genome editing, opening the potential for the traits to not be regulated by USDA-APHIS, or in some cases, genes from the microbial world can be introduced to develop regulated traits. We believe our integrated GRAIN platform can be leveraged in the near term to secure research and development funding from industry partners.

The same logic applies to the metabolic infrastructure, where we need to identify the combinations of genes in specific metabolic pathways. Yield10 scientists have over 20 years of experience successfully deploying advanced metabolic flux analysis to address critical bottlenecks in carbon metabolism. Advanced metabolic flux analysis is based on metabolic flux balance, enzyme reaction thermodynamics and kinetics to create predictive models of targeted changes with the potential to significantly increase crop performance. These predictions can then be challenged using both the scientific literature as well as transcriptome and metabolic data generated by Yield10 from its high photosynthesis-high yield engineered plants. This system provides leads to very specific combinations of gene targets for enzyme activities or transport proteins to modify to improve crop performance. We are currently working on a number of new gene targets related to our lead C3003 yield trait based on this type of analysis to further improve its performance. In many cases these Smart Targets can be modified by genome editing or in some cases by simply introducing a new gene from the microbial world. We also believe our GET-SET program can be leveraged in the near term to secure research and development funding from industry partners.

Fast Field Testing System in Camelina

One of the challenges the agricultural industry has faced over the years is translating early crop science discoveries into value generating traits. This is in part because most of the plants used for discovery research have not been suitable for studies in the field. In addition, the plant systems used for discovery are not representative of the advanced seed or germplasm used in commercial production which have been subject to decades of intensive breeding to improve yield. The long timelines to progress early discoveries successfully into major crops and generate field data adds to the challenge.

In 2010, we established a research and development operation in Saskatoon, Canada staffed with leading oilseed researchers. Our team established a model for testing novel trait genes called the "Fast Field Testing" system based on our Camelina oilseed platform. We believe that this system has the potential to become a valuable tool for our yield trait discovery and translation effort. Camelina is an industrial oilseed, with reasonable field performance providing a robust model for canola and soybean and is well suited to multi-site field tests and larger scale trials. Camelina is a plant that can be readily genetically modified and bred through the efforts of our skilled staff to deliver genetically stable seed sufficient for planting in field tests. We have shown that we can go from the identification of a potential yield trait gene or combinations of genes to field planting in about 12 months. In our Fast Field Tests, we collect and analyze a broad set of data on our transgenic plants including parameters such as stand establishment, flowering, maturity, seed weight, seed size, oil content and oil composition. We also perform molecular analysis on plants of interest. We are using our Camelina Fast Field Test system to identify and screen trait genes of interest while deploying them in parallel into canola, soybean and rice where the timelines to obtain stable plant lines and field data are longer.

Traits in Development

With the benefit of more than five years of investment, the Company has been able to launch itself as Yield10 Bioscience with ownership or licensed rights to several crop trait genes in hand and with the lead yield trait gene C3003 well-positioned in terms of translation and demonstration in key crops. Yield10 has exclusive rights through ownership or licensing or is preparing to file patent applications covering the trait genes listed in the table below.

Under our "Smart Carbon Grid for Crops" technology platform we have identified the C3000 series of novel yield traits based on establishing new metabolic pathways in crops. We have tested our lead yield trait gene, C3003 in Camelina in both greenhouse and initial field tests and have reported results from these initial tests. We are moving this promising trait

forward in additional crops including canola, soybean and rice and expect to report data once additional greenhouse tests and/or field tests have been completed and analyzed.

Under our "T3 Platform" we have identified the C4000 series of novel yield traits and gene editing targets. We expect to progress in our C4 monocot model a select few of the C4000 series traits, global regulatory genes discovered through our T3 Platform research program which we have shown to significantly enhance photosynthesis and carbon capture in switchgrass. We are also progressing the C4003 trait gene in rice using our internal resources and we expect to report initial rice data once greenhouse tests have been completed and analyzed.

SUMMARY OF OUR CROP YIELD TRAITS IN DEVELOPMENT	
R&D Area	**Current Status**
Seed Yield Traits-Regulated[1]	
C3003	Camelina 1st and 2nd generation in field testing Canola 1st generation in field testing Soybean and rice in development
Oil Enhancing Traits-Non-Regulated[2]	
C3004	Camelina testing underway
C3007	Camelina, canola editing underway
C3008a	Camelina non-regulated status achieved[4]
Non-regulated oil trait combinations - C3008a, C3008b and C3009	Camelina, editing of all 3 gene targets completed
Additional oil trait combinations	Research in progress
Yield Improvement Discovery Platform[3]	
C4001	Wheat program underway Corn transformation next step Rice transformation underway
C4002	Corn transformation next step
C4003	Wheat program underway Rice transformation underway Corn transformation next step
C4004	Editing in rice underway
C4004 plus 23 additional crop gene targets	Research with rice and wheat next step

(1) C3003 consists of an algal gene and will likely be regulated by USDA-APHIS as a GMO Trait.

(2) These traits are accessible using genome editing or other methods that do not result in the insertion of non-plant DNA. Such approaches have been deemed non-regulated by USDA-APHIS based on recent filings by ourselves and other groups.

(3) Traits in this area were developed in our T3 platform and all are potentially deployable through approaches which may be non-regulated by USDA-APHIS.

(4) Non-regulated status received from USDA-APHIS. Trait may be regulated by FDA or EPA.

Novel Yield Trait Gene C3003

C3003 represents the lead novel yield trait gene in our "Smart Carbon Grid for Plants" technology platform. C3003 is a scientific discovery made in one of our academic collaborations funded by ARPA-e, a division of the Department of Energy. Our academic collaborator is continuing work to characterize C3003. C3003 appears to be a very unique gene that impacts photorespiration, a biochemical pathway in C3 plants, which is responsible for significant losses in yield. Yield10 is progressing the introduction of the C3003 trait gene as well as improvements to the C3003 trait in Camelina, canola, soybean and rice. During 2018 we plan to conduct greenhouse and field tests to continue to generate additional yield and agronomic data on C3003 in a variety of important crops.

Camelina

In the 2016 growing season, we conducted a small scale field test which was designed primarily to establish our Camelina Fast Field Testing platform for the evaluation of C3003 and other yield traits. As part of this study, we planted stable Camelina seed lines expressing first generation C3003. The results from the field test showed that first generation C3003 produced significant improvements in seed yield in which the best C3003 line produced a 23 percent increase as measured by average seed weight per hectare. This result was statistically significant ($p<0.05$) as compared to control plants. In addition, the highest yielding line expressing the C3003 gene matured an average of six days earlier than the control plants. Expression of C3003 did not change the percentage of oil content in the seed as measured by the weight of the oil in relation to the weight of the seed. While expression of first generation C3003 enabled some of the Camelina lines we tested to produce higher seed yields by weight per hectare, the individual seed weight in these lines was decreased as compared to controls, likely due to a change in carbon partitioning in the plant. This reduction in seed weight was expected based on data from prior greenhouse trials. We believe that the results of our 2016 field tests in Camelina are encouraging and suggest that our approach to engineering new metabolic pathways in plants has the potential to produce step-changes in crop yield.

Based on prior greenhouse data suggesting that constitutive expression of C3003 in Camelina could increase overall seed yield, but produce this increase with the production of lighter weight seeds, we produced a second generation C3003 where the C3003 gene is expressed only in seed tissue. We believe that the reason for the smaller seeds is that the added influx of carbon produced by C3003 produces a “bottleneck” in plant metabolism that results in the production of more, but lighter weight seeds. In 2016, we tested second generation C3003 in Camelina in greenhouse studies. In early 2017, we reported preliminary greenhouse data showing that the second generation C3003 produced an increase in seed yield, while maintaining typical seed weight.

In our 2017 fast field test program, we tested both first and second generation versions of C3003 in Camelina. In the field tests, we monitored key agronomic and growth parameters of the plants throughout the field test and collected yield data including total harvested seed weight, individual seed weight and oil content in our transformed plants as compared to control plants. In January 2018, we reported encouraging results from our field tests of C3003 in Camelina. We conducted these field tests of C3003 at two sites in Canada. The main objectives of the studies were to evaluate the performance of C3003 in Camelina and canola. Yield10 researchers transformed plants with genetic constructs intended to optimize expression of C3003 during different stages of plant and seed development and tested these events in the field tests. The best events for second generation C3003 in Camelina produced improvements in seed yield (up to 7.7 percent), harvest index and overall agronomic performance as compared to control plants. The studies also met the objective for bulking up seed to enable further evaluation of C3003 in Camelina in field tests planned for spring 2018. A new second generation construct using a new promoter was tested in the minicage plots used for seed bulk up and produced plants showing indications of strong agronomic performance and seed yield. We plan to study two versions of second generation C3003 in Camelina in field tests planned for 2018.

Based on encouraging data produced in Camelina with first and second generation C3003, we are continuing to progress the evaluation of the C3003 yield trait gene in parallel in canola, soybean and rice, key target crops where step-change increases in seed yield would improve the prospects for global food security and we believe create considerable economic value.

Canola

Canola is an important North American oilseed crop harvested for its oil content. In our 2017 Fast Field Testing program, we studied first generation C3003 in canola. In these field tests, we monitored key agronomic and growth parameters of the plants throughout the field test and collected yield data including total weight of harvested seed, individual seed weight and oil content in our transformed plants as compared to control plants. In December 2017, we reported encouraging results from our field tests of C3003 in canola. The best events for first generation C3003 in canola produced improvements in seed yield (up to 13.1 percent) as compared to control plants. The studies also met the objective for bulking up seed to enable further evaluation of C3003 in canola in field tests planned for spring 2018. In 2018, we plan to repeat tests with first generation C3003 and, pending permitting and availability of seed, conduct initial tests with second generation C3003 in canola.

The results we obtained in canola were similar to results obtained in prior studies with Camelina, illustrating that our Fast Field Testing system in Camelina may be a valuable tool for effectively screening novel yield trait genes and

dynamically adapting our approach to trait development as we work to translate these improvements into commercially important crops.

Soybean

Because soybean is the leading North American oilseed crop, we accelerated deployment of both first and second generation C3003 into soybean in 2016 and through an academic collaborator generated early greenhouse data in late 2017. Preliminary observations based on a small number of events suggest that results for C3003 obtained in Camelina and canola are translating into soybean. First generation C3003 produced seeds with lower individual seed weight while typical individual seed weight was observed with second generation C3003 in soybean. Further, our greenhouse results show that there is an increase in branching in the plants for some of the events tested. This is significant because more branching provides more sites on the soybean plant for seed pods to develop which is associated with obtaining higher yielding plants. We expect additional development work will continue in soybean with our collaborator in 2018.

In December 2017, we granted a non-exclusive research license to Monsanto Company to evaluate our novel C3003 and C3004 yield traits in soybean. Under the license, Monsanto has begun work with C3003 in its soybean program as a strategy to improve seed yield. Monsanto also plans to conduct research with our C3004 yield trait, a trait accessible through genome editing, in combination with C3003 to evaluate the effect of the combination to improve seed yield in soybean.

Other Crops

Results from our studies with C3003 to date suggest that it may provide an entirely new strategy to improve seed yield in oilseeds and other C3 photosynthetic crops by bringing in new metabolic functionality from non-plant systems. We plan to continue to generate data on C3003 in field tests and greenhouse studies in 2018. Rice is an important staple food crop. We have initiated the introduction of the first and second generation versions of the C3003 yield trait gene in rice and expect to report our observations from those studies when testing has been completed and results have been analyzed. We plan to leverage third party services where the resources and infrastructure are already in place to transform and test novel traits in corn lines. We believe this will enable us to cost effectively expand our capabilities and enable us to progress our corn targets at least to the stage of initial corn hybrid field results.

Oil Enhancing Traits

In light of the increasing focus on health and wellness, food safety and sustainability in developed countries, we anticipate a rise in demand for new varieties of food and food ingredients with improved nutritional properties. This concept is currently being implemented in Ag biotech, in both canola and soybean which have been modified to alter the composition of the oil produced. High oleic canola and soybean oils are being marketed as a "healthier" than other oils; we believe the ability to make similar marketing claims directly to the consumer will be a feature of newly developed products in this space. We expect consumer demand for identity preserved specialty ingredients will rise, and we believe that Yield10's crop yield technologies and crop gene editing targets could be useful in this emerging field.

Based on our study of metabolic pathways in oilseed crops, we believe there is an opportunity to apply genome editing to gene targets involved in oil biosynthesis to significantly increase oil content in oilseed crops including canola, soybean, sunflower and safflower. In 2017, we received confirmation from USDA-APHIS’s Biotechnology Regulatory Services (BRS) that our genome-edited Camelina plant line developed using CRISPR genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content. We are currently evaluating combinations of the genome editing targets to optimize oil content in Camelina and canola, and plan to do so in soybean with the objective of achieving non-regulated status from USDA-APHIS.

In 2017, we took an option to an exclusive global license from University of Missouri for advanced oilseed technology including C3007 and a related target involved in oil biosynthesis. We are conducting research with C3007 alone and in combination with other targets in the oil biosynthesis pathway with the objective of increasing oil content through methods that could achieve non-regulated status with USDA-APHIS.

C4000 Series Traits

We have used our T3 Platform to study global transcription factors and identify novel yield traits. These traits may be powerful regulators of plant growth and represent a potentially valuable resource for identifying genome editing traits for crops. We have recently shown that traits from the C4000 series can significantly increase photosynthetic efficiency as well as aboveground and belowground biomass production in our switchgrass plants. Our early experiments have been successful in demonstrating the potential to increase the rate of photosynthesis even in a high yielding C4 crop. Initially, we have been able to progress the C4003 trait gene in rice using our internal resources and we expect to report initial rice data as soon as it is available. Traits in this series also provide us with an opportunity to selectively partner with others for the development of these traits in row crops as well as forage crops.

In June 2017, we reported that our novel C4001 trait, a global regulatory gene or transcription factor, has been shown to significantly increase plant biomass yield in switchgrass. Switchgrass plants expressing C4001 had significantly more aboveground biomass (75-100 percent increase in dry weight) as compared to controls and more root biomass (85-145 percent increase in dry weight) as compared to controls. The C4001 trait in switchgrass plants increased a key measure of photosynthetic efficiency, the electron transport rate, by approximately 75 percent. Yield10 researchers challenged the C4001 plants by engineering a novel carbon sink, the production of a biopolymer that typically reduces plant yield when expressed and accumulated at high levels in plants. Expression of C4001 in biopolymer producing plants partially restored biomass production, yielding plants that were healthier in terms of size and weight as compared to control plants, while producing the same amount of biopolymer. As a next step, we are planning to evaluate C4001-like traits in forage crops and major commercial crops including corn and rice. We are currently evaluating the trait in rice in greenhouse studies, where we are seeing evidence of increased biomass and are awaiting results from ongoing research to determine the impact on seed yield.

Metabolix Oilseeds, Inc., signed a two-year collaboration with the National Research Council of Canada in 2017 to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors (“GTFs”). We have shown that these trait genes have the potential to significantly increase photosynthesis and yield in certain crops. Research with the C4000 series of traits will allow the discovery of additional gene targets in wheat that could enhance the yield and/or drought tolerance of the crop. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world. We expect NRC will continue to conduct work with our traits in wheat in 2018.

Target Crops

Our initial work in our C3000 and C4000 series traits suggests that our technology may be applicable to a wide range of crops harvested for food and animal feed uses. We believe that if novel yield traits could be successfully developed and commercialized in any of these crops, farmers would be able to improve the productivity of their land to meet rising demand for food and feed, creating significant economic value.

In considering our strategy to develop our technologies we segregate our trait genes into two classes: trait genes based on using non-plant genes to add new functionality to crops which are by definition GM; and trait genes which we may be able to deploy outside of the GM regulations, which encompasses our trait genes which are based exclusively on plant genes. We see the opportunity to deploy our trait technology in a broader set of food and feed crops many of which are not currently GM. We plan to pursue our GM trait genes in crops which are currently GM and where the economics can sustain the cost and timelines for deregulation. We are aware of the current USDA-APHIS GM crop regulation review and the reality that GM likely will remain an issue for some NGO groups regardless of the science. For our GM yield trait genes, we are targeting seed yield increases on the order of 10 to 20 percent over the current elite seed lines, increases which reflect the order of magnitude step-changes necessary to address global food security.

The crops we are targeting for development are described below.

Camelina or *Camelina sativa* is an oilseed crop in limited cultivation in North America and Europe. Camelina has received recent attention as an industrial oilseed for the production of biofuels, novel industrial lipids, and oleochemicals. In addition, its meal has been identified for development as an animal and fish feed supplement. While it is not currently a commercially significant crop, research suggests that efforts to improve seed yield, oil content and fatty acid composition, and tolerance to heat stress may expand the commercial adoption and cultivation of Camelina.

Canola or *Brassica napus* is a cultivar of rapeseed which produces a higher value edible oil favored by consumers because it has a healthier fatty acid profile than corn or soybean oil. The canola crop was developed in Canada where it is

primarily grown today with additional acreage grown in the U.S. Currently the vast majority of the canola grown in North America contains two seed enhancement technologies, herbicide tolerance and hybrid seed. Both Roundup Ready (Monsanto) and Liberty-Link (Bayer) varieties of canola are grown and were introduced to the market in 1990s. Approximately 25.6 million acres were planted in Canada and the U.S. in the 2017 growing season. Yield10 is targeting a 20 percent or greater increase in canola seed yield. With a 2017 harvest of 939 million bushels of canola (Statistics Canada) and assuming an average farm gate price of $10.00 per bushel, a 20 percent yield increase in canola represents a total potential added annual value of $1.9 billion that could be shared among the players in the canola value chain.

Soybean or *Glycine max* is an oilseed crop used for food, food ingredients, food additives and animal feed. The soybean can be harvested for oil used in food and industrial applications, and soybean meal is a significant source of protein for use mostly in animal feed but also for direct human consumption. Fermented soy foods include soy sauce and tempeh, and non-fermented food uses include soy milk and tofu. Soybeans are widely cultivated in North and South America, where a majority of the seed planted is genetically modified. An estimated 96.7 million acres of soybean will be planted in the U.S. and Canada in the 2017/2018 growing season. According to the USDA, the U.S., Brazil and Argentina together represent approximately 80 percent of global soybean production. Yield10 is targeting a 20 percent or greater increase in soybean seed yield. Assuming a 2017/2018 U.S. harvest of 4.4 billion bushels (USDA) and an average farm gate price of $10.00 per bushel, a 20 percent yield increase in soybean represents a total potential added annual value of $8.8 billion that could be shared among the players in the soybean value chain.

Corn is a crop grown globally and used for animal feed and for producing starch which can be used as a raw material for producing food ingredients and food additives, as well as for use in the production of paper, packaging materials and other items. GM maize was grown for the first time in the U.S. and Canada in 1997. Currently, about 80 percent of maize/corn production in the U.S. is genetically modified. It was estimated that more than 86 million acres of corn were planted in North America in the 2017 growing season. The traits commonly used in today's corn cultivars provide insect resistance and herbicide tolerance. In many GM seeds sold today, both of these traits are expressed (or "stacked" which refers to the practice of adding multiple traits to an elite plant line). Europe has limited production of GM corn, where Spain is a leading producer of GM corn. In this case, the most widely used GM trait (Bt) protects against the corn borer insect. Special protocols must be followed in Europe to avoid mixing of GM corn with conventional corn. Corn has the more efficient C4 photosynthesis system and Yield10 is targeting a 10 percent yield increase in corn. With a projected 2017/2018 U.S. harvest of 14.6 billion bushels and an average per bushel price of $3.50, a 10 percent yield increase in corn represents a total potential added annual value of $10.2 billion that could be shared among the players in the corn value chain.

Rice is the staple food for over 50 percent of the global population. World crop production of rice for 2017/2018 is estimated at approximately 485 million metric tons. Rice is grown in tropical and subtropical regions around the world. Rice cultivation takes place primarily in China, India and Southeast Asia. Typically, improvements to rice yield have been achieved through traditional plant breeding approaches. Genetic engineering approaches are being investigated to protect rice from weeds and insect pests. Additional biotechnology approaches are being taken to improve the nutritional value of rice. While Yield10 has not established a target for yield improvement in rice, early work is underway to evaluate the potential of our technologies in this globally important food crop.

Wheat is a species of grass cultivated broadly worldwide as a staple cereal crop. Wheat requires processing to be used as food, mainly in the form of flour for bread, baked goods and pasta. Wheat may also be used as an industrial starch, as a food additive or as a production component in the textile and paper industries. Improvements to wheat yield have typically been achieved through plant breeding approaches. Wheat production ranks third among U.S. field crops in planted acreage, production and gross farm receipts behind corn and soybeans. The planted area for wheat in the U.S. and Canada combined for 2017/2018 is projected at 57 million acres.

Forage crops are grown expressly for biomass used for feeding livestock. Typical forage crops include both annual and perennial crops such as various grasses, silage corn, alfalfa and sorghum. Biotechnology traits have been previously introduced into silage corn and alfalfa. Other forage crops could be amenable to gene editing strategies to increase biomass yield per acre. We believe that our technology and traits that increase biomass may have application to forage crops.

Regulatory Requirements

Since the first successful commercialization of a biotechnology-derived crop in the 1990s, many new GM crop varieties have been developed and made available to U.S. farmers and farmers worldwide. U.S. farmers have rapidly adopted many of these new GM varieties, so that in 2016, 92 percent of the corn, 93 percent of the cotton, and 94 percent of the

soybeans planted in the U.S. were varieties produced through genetic engineering. A significant percentage of the production of other crops, such as alfalfa, papaya and sugar beet, are also biotech-derived.

Genetically modified crops are subject to a significant amount of regulation in the U.S. and around the world. Field tests and field trials of GM crops need to ensure that traits in development do not escape or mix with native plants. The U.S. Government agencies responsible for oversight of the products of modern agricultural biotechnology are the United States Department of Agriculture, the U.S. Environmental Protection Agency (EPA), and the U.S. Food and Drug Administration (FDA). Depending on its characteristics, a product may be subject to the jurisdiction of one or more of these agencies under the federal government's 1986 Coordinated Framework for the Regulation of Biotechnology (most recently updated in January 2017). Regulatory officials from the three agencies regularly communicate and exchange information to ensure that any safety or regulatory issues that may arise are appropriately resolved within the scope of authority afforded to each agency under their respective statutes. Other environmental laws or regulations also may be implicated, depending on the specific product.

Within USDA, APHIS is responsible for protecting agricultural plants from pests, diseases and noxious weeds. Under the Plant Protection Act, USDA-APHIS has regulatory oversight over products of modern biotechnology that could pose such a risk. Accordingly, USDA-APHIS regulates organisms and products that are known or suspected to be plant pests or to pose a plant pest risk, including those that have been altered or produced through genetic engineering. These are called "regulated articles." USDA-APHIS regulates the import, handling, interstate movement, and release into the environment of regulated organisms that are products of biotechnology, including organisms undergoing confined experimental use or field trials. Regulated articles are reviewed to ensure that, under the proposed conditions of use, they do not present a plant pest risk through ensuring appropriate handling, confinement and disposal. The developer may then petition USDA-APHIS for a determination of non-regulated status for the article. If the agency determines that the Genetically Engineered ("GE") plant is unlikely to present a greater plant pest risk than its unmodified counterpart, the new crop will no longer be subject to the permitting and other regulatory processes that are overseen by USDA-APHIS (*i.e.*, it will no longer be treated as a potential plant pest).

In June 2017, we submitted an "Am I Regulated?" letter to USDA-APHIS's Biotechnology Regulatory Services (BRS) to confirm that our genome-edited Camelina plant line developed using CRISPR genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations, and in September 2017, we received confirmation that the BRS agrees with that conclusion. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. There are three copies of this gene in the Camelina genome, and complete editing of all copies was achieved. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content, including C3007.

Subsequently, depending on the intended use of the non-regulated genetically engineered plant, the developer may need to work within separate EPA or FDA oversight rules before commercial introduction of the final product. EPA primarily regulates products of biotechnology that are intended for use as pesticides, under the authorities granted to EPA by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FDA is the agency responsible for overseeing the safety of biotechnology-derived products that are intended to be used as human or animal food, or that may end up in the food supply. Since 1992, FDA has had in place a voluntary consultation process for developers of bioengineered food. Final agency decisions and other information from these Biotechnology Consultations are made publicly available by FDA. Consultations are data-intensive and examine the new food product's safety and nutritional profile, among other issues. Generally, FDA has found that such food products do not pose unique health risks to humans or animals, but if a novel allergen or other distinction from the conventional food is present in the new plant variety, the agency may require specific label statements on the product to ensure that consumers are made aware of material differences between GE and conventional versions.

In Canada, the largest producer of GM canola, GM crops and the food products into which they are incorporated also are regulated by multiple government agencies under a federal framework for the regulation of biotechnology products that is similar to the U.S. system. First, the Canadian Food Inspection Agency (CFIA) is the lead agency for ensuring that a new agricultural biotechnology crop will not pose new risks to Canadian plants, animals and other agricultural commodities. The CFIA's Plant Biosafety Office (PBO) is responsible for conducting environmental assessments of biotechnology-derived plants. Authority for the PBO includes both approving confined field trials with the GM crop through permits and authorizing their "unconfined release" as a first step towards commercialization.

Second, under the Food and Drugs Act and related regulations, Health Canada is responsible for reviewing a pre-market safety assessment that must be submitted by the manufacturer or importer of a “novel food,” a term of art which includes GM or biotechnology-derived foods. The safety assessment should provide assurances that the novel food is safe when prepared or consumed according to its intended use. A multi-disciplinary team of experts from Health Canada will evaluate the data and information about the novel food and make a determination regarding whether it can be sold in Canada, and whether any restrictions are warranted under applicable law or the product’s safety profile. Health Canada’s final decision documents regarding the safety of these novel foods are made available to the public by the government.

As the lead agency for public health and safety, Health Canada also works in conjunction with the CFIA on food labeling oversight when it has identified a potential health or safety issues with a food that could be mitigated through labeling or other disclosures. For example, if the biotechnology-derived food contains a new allergen that is otherwise not present in the conventional version of the food, then specific label statements will be required to alert consumers to that important health information. However, the CFIA has primary oversight over non-health issues related to food labeling, packaging and advertising. Accordingly, the CFIA is the lead agency for ensuring that food labeling and advertising meet the legal requirements of the Food and Drugs Act, and that labeling representations do not create a potential risk of fraud or consumer confusion and are compliant with Canada’s voluntary disclosure standard for genetically engineered food ingredients.

Finally, Environment Canada is available to serve as a regulatory “safety net” if a novel product does not naturally fall within the jurisdiction of the CFIA, Health Canada, or the Pest Management Regulatory Agency that oversees pesticide products.

Our work involving the development, greenhouse testing and field testing of novel yield trait genes in crop plants requires certain government and municipal permits and we must ensure compliance with all applicable regulations including regulations relating to GM crops. With laboratories and greenhouse in both the U.S. and Canada, we are subject to regulations governing the shipment of seeds and other plant material (including GM seeds and GM plant material) between our facilities in the U.S. and Canada, including USDA-APHIS permits for the import and export of plant materials that could pose a risk to domestic agriculture.

License Agreement with the University of Massachusetts

Pursuant to a license agreement with the University of Massachusetts ("UMASS") dated as of June 30, 2015, we have an exclusive, worldwide license under certain patents and patent applications to make, have made, use, offer for sale, sell, have sold and import any transgenic plant seed or plant grown there from or transgenic plant material developed for sale to a farmer or grower for planting in the field, which transgenic plant seed or plant grown therefrom or transgenic plant material is covered by, embodies or is derived from (in whole or in part) one or more issued or pending claims of the licensed patents or patent applications. The licensed patent rights include issued patents covering our yield trait gene C3003.

We are required to use diligent efforts to develop licensed products throughout the field of use and to introduce licensed products into the commercial market. In that regard, we are obligated to fulfill certain development and regulatory milestones relating to C3003, including completion of multi-site field demonstrations of a crop species in which C3003 has been introduced, and filing for regulatory approval of a crop species in which C3003 has been introduced within a specified period. Our failure to achieve any milestone provided for under the agreement would, if we are unable to reach agreement with UMASS as to a potential adjustment of the applicable milestone, give UMASS the right to terminate the agreement, following a notice period.

We are obligated to pay UMASS milestone payments relating to any regulatory filings and approvals covered by the agreement, royalties on any sales of licensed products following regulatory approval, as well as a percentage of any sublicense income related to the licensed products.

We may terminate the agreement at any time upon 90 days prior written notice to UMASS. Either party may terminate for material breach immediately upon written notice for a breach that is not cured within 60 days after receiving written notice of the breach. In addition, UMASS may terminate this agreement with respect to certain patent rights immediately upon written notice in the event we contest the validity or enforceability of such patent rights.

Agricultural Industry Landscape

Following advances in biotechnology in the 1970s through early 1990s, the first genetically modified crops were commercially introduced in the U.S. in the years 1994 and 1995. Today, the U.S. leads the world in the adoption of GM

crops in terms of crop value and acreage planted. GM crops have had both their supporters and their detractors over the years. Consumer sentiment including concerns about the safety of GM crops have limited the introduction and adoption of GM crops in Europe. However, recent studies by the National Academy of Science continue to support the 20 year history of safe use of GM crops.

The International Service for the Acquisition of Agri-Biotech Applications (ISAAA), an industry research group, reported that 457 million acres worldwide were planted with GM crops in 2016, the most recent year where data is available. The planting of GM crops is centered in the Americas with North America at approximately 45 percent of the acres and Latin America at approximately 43 percent. China and India follow with approximately 8 percent and the balance of the total worldwide GM crop acreage in 2016 was planted in European Union and the rest of world. The primary GM crops in the U.S. are corn, soybean, cotton and sugar beet. In Canada, the oilseed crop canola is the primary GM crop. Cotton is the primary GM crop grown in India and China.

In contrast to the Americas, the European Union has been relatively slow to adopt GM crops and has relied heavily on plant breeding programs for capturing crop yield improvements over the last 20 years. In 2016, Spain was the largest producer of GM crops in Europe, based on cultivation of GM corn representing approximately 20 percent of the country's crop that year. Certain GM crops have been approved for cultivation in some European countries, while other countries have imposed outright bans on cultivation of GM crops.

According to the market research firm, Research and Markets, the total global seed business was estimated at $53 billion in 2014 and is projected to grow to more than $100 billion by 2022. According to an ISAAA report, the global GM seed business represented a $15.8 billion market in 2016. The traits being commercialized today by the agricultural industry mainly address crop protection, which involves preventing crop damage by weeds, insects and other pests that lower expected crop yield. As technology has advanced, "trait stacking," or the practice of adding multiple traits to an elite plant line, has become commonplace as a strategy to protect yield. As the industry has developed, the practice of inter-licensing traits between research and development driven seed companies has led to a proliferation of branded seed products on the market today.

The GM seed business is dominated by large multinational companies and their subsidiaries including BASF, Bayer, DowDuPont, Monsanto, Syngenta and AgReliant. These companies have significant resources, experience and track records of successfully developing, testing and commercializing high performing seed lines as well as new traits for GM crops. They offer farmers conventional and biotechnology seeds as well as crop protection chemicals, biologicals, fertilizers and other products and technologies aimed at supporting the on-farm efficiency of managing crops in the field as well as managing the overall cost of crop production to successful harvest. Many of these companies are involved in the current sector consolidation with the DowDupont merger and the acquisition of Syngenta by ChemChina completed in 2017, and the acquisition of Monsanto by Bayer anticipated in 2018.

Privately owned, U.S. retail seed companies play a key role in the industry by developing, marketing and selling high performing seed to U.S. farmers. These companies include Beck's Hybrids and Stine Seed. These companies have capabilities in both biotechnology and plant breeding. They source traits from the multinational companies and input these traits into elite plant germplasm to produce seeds optimized for a variety of soil, climate and field conditions. Both companies offer a broad arrange of GM corn and soybean products to their customers.

Recent advances in biotechnology including gene editing have led to the formation of companies focusing on yield trait discovery, biologicals for pest control, agbiome strategies and precision agriculture. There are startups, privately held and publicly traded companies involved in this space. Such companies include AgBiome, Arcadia Biosciences, Benson Hill Biosystems, Calytx, Cibus, Evogene, Indigo, Kaiima, and Marrone Bio Innovation, many of which have greater resources and experience than we have.

Intellectual Property

Our continued success depends in large part on our proprietary technology. As of December 31, 2017, we owned or held exclusive rights to 15 pending patent applications worldwide related to advanced technologies for increasing yield in crops. Our portfolio of patent applications includes plant science technologies we have in-licensed globally and exclusively from The University of Massachusetts and North Carolina State University related to the yield trait gene C3003 and other advanced technologies based on advanced metabolic engineering methods to improve carbon capture and selectively control carbon partitioning in plants.

We continue to seek, develop and evaluate new technologies and related intellectual property that might enhance our Company's business strategy, industry position or deployment options.

Employees

As of December 31, 2017, we had 20 full-time employees. Of those employees, 16 were in research and development. Among our staff, 8 hold Ph.D.'s and 12 hold masters' or bachelors' degrees in their respective disciplines. Our technical staff has expertise in the following areas: plant genetics, plant biology, microbial genetics, bioinformatics, metabolic engineering and systems biology. Our headquarters are located in Massachusetts, and we maintain a research and development facility, including greenhouse facilities, in Saskatoon, Canada. None of our employees are subject to a collective bargaining agreement. We consider our relationship with our employees to be good.

Corporate History and Investor Information

We changed our name to Yield10 Bioscience, Inc. in January 2017 to reflect our change in mission around innovations in agricultural biotechnology focused on developing disruptive technologies for step-change improvements in crop yield. In 1992, our Company was incorporated in Massachusetts under the name Metabolix, Inc. In September 1998, we reincorporated in Delaware. Financial and other information about our Company is available on our website at www.yield10bio.com.

The information on our website is not incorporated by reference into this annual report on Form 10-K and should not be considered to be part of this annual report on Form 10-K. We make available on our website, free of charge, copies of our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the Securities and Exchange Commission (the "SEC").

Investors should note that we announce material information to our investors using our website, SEC filings, press releases, public conference calls and webcasts. We use these channels, as well as social media, to communicate with our shareholders and the public about our Company, our products and other matters. It is possible that the information we post on social media could be deemed to be material information. Therefore, we encourage investors, the media, and others interested in our Company to review the information we post on the social media channels listed at the top of our website.

In addition, the public may read and copy any materials that we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. Also, our filings with the SEC may be accessed through the SEC's website at www.sec.gov.

ITEM 1A. RISK FACTORS

Our business is subject to numerous risks. We caution you that the following important factors, among others, could cause our actual results to differ materially from those expressed in forward-looking statements made by us or on our behalf in filings with the SEC, press releases, communications with investors and oral statements. Any or all of our forward-looking statements in this Annual Report on Form 10-K and in any other public statements we make may turn out to be wrong. They can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties. Many factors mentioned in the discussion below will be important in determining future results. Consequently, no forward-looking statement can be guaranteed. Actual future results may differ materially from those anticipated in forward-looking statements. We undertake no obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosure we make in our reports filed with the SEC.

All dollar amounts, except per share amounts, are stated in thousands.

Risks Relating to our Financial Position

We have a history of net losses and our future profitability is uncertain.

We have recorded losses in every year since our inception, with the exception of 2012. As of December 31, 2017 our accumulated deficit was $342,753. Since 1992, we have been engaged primarily in research and development and early-stage commercial activities. Because our crop science technology is at an early stage of development, we cannot be certain that the Yield10 Bioscience business will generate sufficient revenue to become profitable. We expect to continue to have significant losses and negative cash flow for at least the next several years, as we incur additional costs and expenses for the continued development of our technology, including the ongoing expenses of research, development, commercialization and administration. The amount we spend will impact our need for capital resources as well as our ability to become profitable and this will depend, in part, on the number of new technologies that we attempt to develop. We may not achieve any or all of these goals and, thus, we cannot provide assurances that we will ever be profitable or achieve significant revenues.

We will need to secure additional funding to finance our operations and may not be able to do so when necessary, and/or the terms of any financings may not be advantageous to us.

As of December 31, 2017, we held unrestricted cash and cash equivalents of $14,487. We believe that these resources and the cash generated from existing grants will be sufficient to meet our projected operating requirements until mid-2019.

We continue to face significant challenges and uncertainties and, as a result, our available capital resources may be consumed more rapidly than currently expected due to any or all of the following:

- lower than expected revenues from grants, licenses, and service fees related to our Yield10 Bioscience technologies;
- changes we may make to the business that affect ongoing operating expenses;
- further changes we may make to our business strategy;
- changes in our research and development spending plans; and
- other items affecting our forecasted level of expenditures and use of cash resources.

In 2016, we completed a strategic restructuring under which Yield10 Bioscience has become our core business, with a focus on developing disruptive technologies for step-change improvements in crop yield to enhance global food security.

We will require additional capital resources to support the implementation of this strategy and we may pursue one or more of a variety of financing options, including public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, as well as licensing or other collaborative arrangements. There can be no assurance that our financing efforts will be successful. If we are not able to secure such additional capital resources or otherwise fund our operations, we may be forced to explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

We completed two offerings of equity securities in 2017, for combined net proceeds of approximately $15,063. If we issue equity or debt securities to raise additional funds in the future, we may incur fees associated with such issuances, our existing stockholders may experience dilution from the issuance of new equity securities, we may incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. In addition, utilization of our net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986 due to ownership changes resulting from equity financing transactions. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies, or grant licenses on terms that are not favorable to us.

We have recently changed our corporate strategy to focus on the crop science industry, and our technologies in this area are at a very early stage of development. We may never commercialize a technology or product that will generate meaningful, or any, revenues.

In July 2016, our Board of Directors approved a plan to implement a strategic restructuring under which Yield10 Bioscience has become our core business. As part of the restructuring, we discontinued our biopolymer operations, eliminated positions in our biopolymer operations and corporate organization, and sold certain of our biopolymer business assets. We currently anticipate that our annual net cash used in operations, including anticipated payments for final restructuring costs of $489 as of December 31, 2017, will be approximately $8,500 - $9,000.

The remaining cash restructuring costs associated with our strategic repositioning have various payment due dates through May 2018 . The reduction in cash used in operations resulting from the restructuring may be less than expected. If we are not successful in reducing our cash used in operations, we may require more financing than anticipated or we may be forced to wind down our remaining operations.

The products and technologies we are currently developing as a result of our strategic repositioning are at a very early stage of development, and the process of developing them is lengthy and uncertain. In addition, our current management has limited experience in developing technologies for the crop science industry, and has never commercialized a product or technology in this industry. We may never reach a point at which our efforts result in products that allow us to achieve revenue from their license or sale.

There can be no assurance that we will be able to comply with the continued listing standards of The Nasdaq Capital Market.

We cannot assure you that we will be able to comply with the standards that we are required to meet in order to maintain a listing of our common stock on The Nasdaq Capital Market. Nasdaq provides various continued listing requirements that a company must meet in order for its stock to continue trading on The Nasdaq Capital Market. Among these requirements is the requirement that our stock trades at a minimum closing bid price of $1.00 per share. On June 30, 2016, we received a deficiency letter from The Nasdaq Stock Market which provided us a grace period of 180 calendar days, or until December 27, 2016, to regain compliance with the minimum bid price requirement; we subsequently received an additional 180 days (until June 26, 2017) to regain compliance with the requirement. On May 24, 2017, our stockholders approved an amendment to our amended and restated certificate of incorporation, as amended, authorizing a reverse stock split of our common stock. A 1-for-10 ratio for the reverse stock split was subsequently approved by our Board of Directors, and the reverse stock split took effect on May 30, 2017. As a result of the reverse stock split, every ten shares of our common stock were automatically combined and converted into one issued and outstanding share of our common stock, with no change in the par value per share. As of June 12, 2017, we had regained compliance with the minimum bid price requirement.

If we fail to continue to meet all applicable Nasdaq Capital Market requirements in the future and Nasdaq determines to delist our common stock, the delisting could substantially decrease trading in our common stock and adversely affect the market liquidity of our common stock; adversely affect our ability to obtain financing on acceptable terms, if at all, for the continuation of our operations; and harm our business. Additionally, the market price of our common stock may decline further and stockholders may lose some or all of their investment.

Currently, our revenue is generated from government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.

Historically, a portion of our revenue has been generated from payments to us from government entities in the form of government grants whereby we are reimbursed for certain expenses incurred in connection with our research and development activities, subject to our compliance with the specific requirements of the applicable grant, including rigorous documentation requirements. To the extent that we do not comply with these requirements, our expenses incurred may not be reimbursed. Any of our existing grants or new grants that we may obtain in the future may be terminated or modified.

Our ability to obtain grants or incentives from government entities in the future is subject to the availability of funds under applicable government programs and approval of our applications to participate in such programs. The application process for these grants and other incentives is highly competitive. We may not be successful in obtaining any additional grants, loans or other incentives. Recent political focus on reducing spending at the U.S. federal and state levels may continue to reduce the scope and amount of funds dedicated to crop science products, if such funds will continue to be available at all. To the extent that we are unsuccessful in being awarded any additional government grants in the future, we would lose a potential source of revenue.

Our government grants may subject us to government audits, which could expose us to penalties.

We may be subject to audits by government agencies as part of routine audits of our activities funded by our government grants. As part of an audit, these agencies may review our performance, cost structures and compliance with applicable laws, regulations and standards and the terms and conditions of the grant. If any of our costs are found to be allocated improperly, the costs may not be reimbursed and any costs already reimbursed for such contract may have to be refunded. Accordingly, an audit could result in a material adjustment to our results of operations and financial condition. Moreover, if an audit uncovers improper or illegal activities, we may be subject to civil and criminal penalties and administrative sanctions.

Risks Relating to our Yield10 Bioscience Crop Science Program

Our crop science product development cycle is lengthy and uncertain and will depend heavily on future collaborative partners.

The technology and processes used in our crop science program and the application of our technology to enhance photosynthetic efficiency of crops are at an early stage of development. Research and development in the seed, agricultural biotechnology, and larger agriculture industries is expensive and prolonged and entails considerable uncertainty. Completion of our development work will require a significant investment of both time and money, if it can be completed at all. We expect that collaborations with established agricultural industry companies will be required to successfully develop and commercialize our innovations. For example, in 2017 we entered into a research license with Monsanto Company, pursuant to which we granted Monsanto a non-exclusive research license to evaluate our novel C3003 and C3004 yield traits in soybean. The industry is highly concentrated and dominated by a small number of large players, which could impact efforts to form such collaborations. We may not be successful in establishing or maintaining additional suitable partnerships, and may not be able to negotiate additional collaboration agreements having terms satisfactory to us or at all. In addition, industry collaborators have significant resources and development capabilities and may develop products and technologies that compete with or negatively impact the development and commercialization of our technologies.

Our crop science program may not be successful in developing commercial products.

We and our potential future collaborators may spend many years and dedicate significant financial and other resources developing traits that will never be commercialized. Seeds containing the traits that we develop may never become commercialized for any of the following reasons:

- our traits may not be successfully validated in the target crops;
- our traits may not achieve our targeted yield improvements;
- we may not be able to secure sufficient funding to progress our traits through development and commercial validation;
- our traits may not have the desired effect sought by future collaborators for the relevant crops;
- development and validation of traits, particularly during field trials, may be adversely affected by environmental or other circumstances beyond our control;
- we or our future collaborators may be unable to obtain the requisite regulatory approvals for the seeds containing our traits;
- competitors may launch competing or more effective seed traits or seeds;
- a market may not exist for seeds containing our traits or such seeds may not be commercially successful;
- future collaborators may be unable to fully develop and commercialize products containing our seed traits or may decide, for whatever reason, not to commercialize such products; and
- we may be unable to patent our traits in the necessary jurisdictions.

If any of these things were to occur, it could have a material adverse effect on our business and our results of operations. Research and development in the crop science industry is expensive and prolonged, and entails considerable uncertainty. Because of the stringent product performance and safety criteria applied in development of crop science products, products currently under development may neither survive the development process nor ultimately receive the requisite regulatory approvals needed to market such products. Even when such approvals are obtained, there can be no assurance that a new product will be commercially successful. In addition, research undertaken by competitors may lead to the launch of competing or improved products, which may affect sales of any products that we are able to develop.

Even if we or our collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.

Our strategy depends upon our or our collaborators' ability to incorporate our traits into a wide range of crops in significant markets and geographies. Even if we or our collaborators, such as Monsanto, are able to develop commercial products that incorporate our traits, any such products may not achieve commercial success for one or more of the following reasons, among others:

- products may fail to be effective in particular crops, geographies, or circumstances, limiting their commercialization potential;
- our competitors may launch competing or more effective traits or products;
- significant fluctuations in market prices for agricultural inputs and crops could have an adverse effect on the value of our traits;
- farmers are generally cautious in their adoption of new products and technologies, with conservative initial purchases and proof of product required prior to widespread deployment, and accordingly, it may take several growing seasons for farmers to adopt our or our collaborators' products on a large scale; and
- we may not be able to produce high-quality seeds in sufficient amounts to meet demand.

Our financial condition and results of operations could be materially and adversely affected if any of the above were to occur.

Consumer and government resistance to genetically modified organisms may negatively affect the ability to commercialize crops containing our traits, as well as our public image.

Food and feed made from genetically modified seeds are not accepted by many consumers and in certain countries production of certain genetically modified crops is effectively prohibited, including throughout the European Union, due to concerns over such products' effects on food safety and the environment. The high public profile of the biotechnology industry in food and feed production, and a lack of consumer acceptance of products to which we have devoted substantial resources, could have a negative impact on the commercial success of products that incorporate our traits and could materially and adversely affect our ability to obtain collaborations and to finance our crop science program. Further, we could incur substantial liability and/or legal expenses if there are claims that genetically-engineered crops damage the environment or contaminate other farm crops. This could distract our management and cause us to spend resources defending against such claims.

Actions by consumer groups and others may disrupt research and development or production of genetically modified seeds. In addition, some government authorities have enacted, and others in the future might enact, regulations regarding genetically modified organisms, which may delay and limit or even prohibit the development and sale of such products.

We may not be able to obtain or maintain the necessary regulatory approvals for our products, which could restrict our ability to sell those products in some markets.

Seeds containing the traits that we develop must receive regulatory approval before they can be marketed, but we may not be able to obtain such approvals. Regulatory standards and procedures in the crop science industry are continuously changing, and responding to these changes and meeting existing and new requirements will be costly and burdensome. Even if we are able to obtain approvals for the seeds containing the traits that we develop, changing regulatory standards may affect our ability to maintain compliance with such regulatory standards.

If ongoing or future field trials conducted by us or our collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.

The successful completion of multi-year, multi-site field trials is critical to the success of product development and marketing efforts for products containing our traits. If our ongoing or future field trials, or those of our collaborators, are unsuccessful or produce inconsistent results or unanticipated adverse effects on crops, or if we or our collaborators are unable to collect reliable data, regulatory review of products in development containing our traits could be delayed or commercialization of products in development containing our traits may not be possible. In addition, more than one growing season may be required to collect sufficient data to develop or market a product containing our traits, and it may be necessary to collect data from different geographies to prove performance for customer adoption. Even in cases where field trials are successful, we cannot be certain that additional field trials conducted on a greater number of acres, or in

different crops or geographies, will be successful. Generally, our collaborators conduct these field trials or we pay third parties, such as farmers, consultants, contractors, and universities, to conduct field trials on our behalf. Poor trial execution or data collection, failure to follow required agronomic practices, regulatory requirements, or mishandling of products in development by our collaborators or these third parties could impair the success of these field trials.

Many factors that may adversely affect the success of our field trials are beyond our control, including weather and climatic variations, such as drought or floods, severe heat or frost, hail, tornadoes and hurricanes, uncommon or unanticipated pests and diseases, or acts of protest or vandalism. For example, if there was prolonged or permanent disruption to the electricity, climate control, or water supply operating systems in our greenhouses or laboratories, the crops in which we or our collaborators are testing our traits and the samples we or our collaborators store in freezers, both of which are essential to our research and development activities including field tests, could be severely damaged or destroyed, adversely affecting these activities and thereby our business and results of operations. Unfavorable weather conditions including drought or excessive rain, or fluctuations in temperature, can also reduce both acreage planted and incidence, or timing of, certain crop diseases or pest infestations, each of which may halt or delay our field trials. Any field test failure we may experience may not be covered by insurance and, therefore, could result in increased cost for the field trials and development of our traits, which may negatively impact our business, results of operations, and ability to secure financing. Such factors outside of our control can create substantial volatility relating to our business and results of operations.

Competition in traits and seeds is intense and requires continuous technological development, and, if we are unable to compete effectively, our financial results will suffer.

We face significant competition in the markets in which we operate. The markets for traits and agricultural biotechnology products are intensely competitive and rapidly changing. In most segments of the seed and agricultural biotechnology market, the number of products available to consumers is steadily increasing as new products are introduced. At the same time, the expiration of patents covering existing products reduces the barriers to entry for competitors. We may be unable to compete successfully against our current and future competitors, which may result in price reductions, reduced margins and the inability to achieve market acceptance for products containing our traits. In addition, most of our competitors have substantially greater financial, marketing, sales, distribution, research and development, and technical resources than we have, and some of our collaborators have more experience in research and development, regulatory matters, manufacturing, and marketing. We anticipate increased competition in the future as new companies enter the market and new technologies become available. Our technologies may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors, which will prevent or limit our ability to generate revenues from the commercialization of our traits being developed.

Our business is subject to various government regulations and if we or our collaborators are unable to timely complete the regulatory process for our products in development, our or our collaborators' ability to market our traits could be delayed, prevented or limited.

Our business is generally subject to two types of regulations: regulations that apply to how we and our collaborators operate, and regulations that apply to products containing our traits. We apply for and maintain the regulatory permits necessary for our operations, particularly those covering our field trials, which we or our collaborators apply for and maintain regulatory approvals necessary for the commercialization of products containing our seed traits. Even if we and our collaborators make timely and appropriate applications for regulatory permits for our field trials, government delays in issuing such permits can significantly affect the development timelines for our traits, particularly if the planting period for a crop growing season expires before the necessary permits are obtained. In most of our key target markets, regulatory approvals must be received prior to the importation of genetically modified products. These regulatory processes are complex. For example, the U.S. federal government's regulation of biotechnology includes, but is not limited to, the USDA, which regulates the import, field testing, and interstate movement of genetically modified plants, and the FDA, which regulates foods derived from new plant varieties.

In addition to regulation by the U.S. government, products containing our traits may be subject to regulation in each country in which such products are tested or sold. International regulations may vary from country to country and from those of the United States. The difference in regulations under U.S. law and the laws of foreign countries may be significant and, in order to comply with the laws of foreign countries, we may have to implement global changes to our products or business practices. Such changes may result in additional expense to us and either reduce or delay product development or sales. Additionally, we or our collaborators may be required to obtain certifications or approvals by foreign governments to test and sell the products in foreign countries.

The regulatory process is expensive and time-consuming, and the time required to complete the process is difficult to predict and depends upon numerous factors, including the substantial discretion of the regulatory authorities. We have not completed all phases of the regulatory process for any of our traits in development. Our traits could require a significantly longer time to complete the regulatory process than expected, or may never gain approval, even if we and our collaborators expend substantial time and resources seeking such approval. The time required for regulatory approval, or any delay or denial of such approval, could negatively impact our ability to generate revenues and to achieve profitability and finance our ongoing operations. In addition, changes in regulatory review policies during the development period of any of our traits, changes in, or the enactment of, additional regulations or statutes, or changes in regulatory review practices for a submitted product application may cause a delay in obtaining approval or result in the rejection of an application for regulatory approval. Regulatory approval, if obtained, may be made subject to limitations on the intended uses for which we or our collaborators may market a product. These limitations could adversely affect our potential revenues. Failure to comply with applicable regulatory requirements may, among other things, result in fines, suspensions of regulatory approvals, product recalls, product seizures, operating restrictions, and criminal prosecution.

Our work with the Smart Carbon Grid for Crops and the T3 Platform has identified promising potential targets for gene editing, and we believe that these approaches may be subject to less regulatory complexity in the U.S. during development and along the path to commercialization. Gene editing techniques, including CRISPR, which involve making small targeted changes to the DNA of a target organism, have been of interest to the agricultural biotech industry because this approach is believed to have the potential to significantly reduce development costs and regulatory timelines for crop trait development and market introduction. Statements by USDA-APHIS regarding the regulatory path for genetically edited plants and mushrooms suggest that they will not be subject to regulations typically used for genetically modified crops (i.e., they will not be considered “regulated articles”) if the modified organisms do not contain any remaining genetic elements from the procedure used for gene editing. While we believe that these industry examples suggest that crops that are gene edited may not be subject to certain GMO regulations in the U.S., we cannot assure you that this regulatory path will be found to apply to any of our seed yield traits or that the regulatory agencies will not change this approach to the regulation of genome editing or introduce new regulatory procedures applicable to such technologies.

The products of third parties, or the environment itself, may be negatively affected by the unintended appearance of our yield trait genes.

The potential for unintended but unavoidable trace amounts, sometimes called “adventitious presence,” of yield trait genes in conventional seed, or in the grain or products produced from conventional or organic crops, could affect acceptance by the general public or by the agricultural industry of these traits. Trace amounts of yield trait genes may unintentionally be found outside our containment area in the products of third parties, which may result in negative publicity and claims of liability brought by such third parties against us. Furthermore, in the event of an unintended dissemination of our genetically engineered materials to the environment, we could be subject to claims by multiple parties, including environmental advocacy groups, as well as governmental actions such as mandated crop destruction, product recalls or additional stewardship practices and environmental cleanup or monitoring. The occurrence of any of these events could have a material adverse effect on our business and results of operations.

We rely on third parties to conduct, monitor, support, and oversee field trials and, in some cases, to maintain regulatory files for those products in development, and any performance issues by third parties, or our inability to engage third parties on acceptable terms, may impact our or our collaborators’ ability to complete the regulatory process for or commercialize such products.

We rely on third parties to conduct, monitor, support, and oversee field trials. As a result, we have less control over the timing and cost of these trials than if we conducted these trials with our own personnel. If we are unable to maintain or enter into agreements with these third parties on acceptable terms, or if any such engagement is terminated prematurely, we may be unable to conduct and complete our trials in the manner we anticipate. In addition, there is no guarantee that these third parties will devote adequate time and resources to our studies or perform as required by our contract or in accordance with regulatory requirements, including maintenance of field trial information regarding our products in development. If any of these third parties fail to meet expected deadlines, fail to transfer to us any regulatory information in a timely manner, fail to adhere to protocols, or fail to act in accordance with regulatory requirements or our agreements with them, or if they otherwise perform in a substandard manner or in a way that compromises the quality or accuracy of their activities or the data they obtain, then field trials of our traits in development may be extended or delayed with additional costs incurred, or our data may be rejected by the applicable regulatory agencies. Ultimately, we are responsible for ensuring that each of our field trials is conducted in accordance with the applicable protocol and with legal, regulatory and scientific standards, and our reliance on third parties does not relieve us of our responsibilities.

If our relationship with any of these third parties is terminated, we may be unable to enter into arrangements with alternative parties on commercially reasonable terms, or at all. Switching or adding service providers can involve substantial cost and require extensive management time and focus. Delays may occur, which can materially impact our ability to meet our desired development timelines. If we are required to seek alternative service arrangements, the resulting delays and potential inability to find a suitable replacement could materially and adversely impact our business.

In addition, there has been an increasing trend towards consolidation in the agricultural biotechnology industry. Consolidation among our competitors and third parties upon whom we rely could lead to a changing competitive landscape, capabilities, and strategic priorities among potential service providers, which could have an adverse effect on our business and operations.

If we lose key personnel or are unable to attract and retain necessary talent, we may be unable to develop or commercialize our products under development.

We are highly dependent on our key technical and scientific personnel, who possess unique knowledge and skills related to our research and technology. If we were to lose the services of these individuals, we may be unable to readily find suitable replacements with comparable knowledge and the experience necessary to advance the research and development of our products. Because of the unique talents and experience of many of our scientific and technical staff, competition for our personnel is intense. The loss of key personnel or our inability to hire and retain personnel who have the required expertise and skills could have a material adverse effect on our research and development efforts, our business, and our ability to secure additional required financing.

Risks Relating to Intellectual Property

Patent protection for our technologies is both important and uncertain.

Our commercial success may depend in part on our obtaining and maintaining patent protection for our technologies in the United States and other jurisdictions, as well as successfully enforcing and defending this intellectual property against third-party challenges. If we are not able to obtain or defend patent protection for our technologies, then we will not be able to exclude competitors from developing or marketing such technologies, and this could negatively impact our ability to generate sufficient revenues or profits from product sales and/or licensing to justify the cost of development of our technologies and to achieve or maintain profitability. Our currently issued patents relate to our historical business and have expiration dates ranging from 2020 through 2030. New outstanding patent applications owned by or licensed to us relating to crop yield improvements have filing dates ranging from 2013 through 2017.

Our patent position involves complex legal and factual questions. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. Patents may not be issued for any pending or future pending patent applications owned by or licensed to us, and claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Moreover, we may be unable to protect certain of our intellectual property in the United States or in foreign countries. Foreign jurisdictions may not afford the same protections as U.S. law, and we cannot ensure that foreign patent applications will have the same scope as the U.S. patents. There will be many countries in which we will choose not to file or maintain patents because of the costs involved. Competitors may also design around our patents or develop competing technologies.

Additionally, any issued patents owned by or licensed to us now or in the future may be challenged, invalidated, or circumvented. We could incur substantial costs to bring suits or other proceedings in which we may assert or defend our patent rights or challenge the patent rights of third parties. An unfavorable outcome of any such litigation could have a material adverse effect on our business and results of operations.

Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.

Various U.S. and foreign issued patents and pending patent applications owned by third parties exist in areas relevant to our products and processes. We could incur substantial costs to challenge third party patents. If third parties assert claims against us or our customers alleging infringement of their patents or other intellectual property rights, we could incur substantial costs and diversion of management resources in defending these claims, and the defense of these claims could have a material adverse effect on our business. In addition, if we are unsuccessful in defending against these claims, these third parties may be awarded substantial damages, as well as injunctive or other equitable relief against us, which could effectively block our ability to make, use, sell, distribute, or market our technologies and services based on our

technologies in the United States or abroad. Alternatively, we may seek licenses to such third party intellectual property. However, we may be unable to obtain these licenses on acceptable terms, if at all. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of some of our products based on our technologies and, therefore, could have a material adverse effect on our business.

Portions of our crop science technology are owned by or subject to retained rights of third parties.

We have licensed and optioned from academic institutions certain patent rights that may be necessary or important to the development and commercialization of our crop science technology. These licenses and options may not provide exclusive rights to use such intellectual property in all fields of use in which we may wish to develop or commercialize our technology. If we fail to timely exercise our option rights and/or we are unable to negotiate license agreements for optioned patent rights on acceptable terms, the academic institutions may offer such patent rights to third parties. If we fail to comply with our obligations under these license agreements, or if we are subject to a bankruptcy or insolvency proceeding, the licensor may have the right to terminate the license. In some circumstances, we may not have the right to control the preparation, filing and prosecution of licensed patent applications or the maintenance of the licensed patents. Therefore, we cannot be certain that these patents and applications will be prosecuted, maintained and enforced in a manner consistent with the best interests of our business. Furthermore, the research resulting in certain of our licensed and optioned patent rights was funded by the U.S. government. As a result, the government may have certain rights to such patent rights and technology.

We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.

We may be unable to acquire or in-license additional technologies from third parties that we decide we need in order to develop our business. A number of more established companies may also pursue strategies to license or acquire crop science technologies that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater development and commercialization capabilities. Any failure on our part to reach an agreement for any applicable intellectual property could result in a third party acquiring the related rights and thereby harm our business.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire relevant crop science technologies on terms that would allow us to make an appropriate return on our investment.

We expect that competition for acquiring and in-licensing crop science technologies that are attractive to us may increase in the future, which may mean fewer suitable opportunities for us as well as higher acquisition or licensing costs. If we are unable to successfully obtain rights to suitable crop science technologies on reasonable terms, or at all, our business and financial condition could suffer.

The intellectual property landscape around genome editing technology, such as CRISPR, is highly dynamic and uncertain, and any resolution of this uncertainty could have a material adverse effect on our business.

The field of genome editing, especially in the area of CRISPR technology, is still in its infancy, and no products using this technology have reached the market. We are currently negotiating a license for work in the CRISPR field in order to demonstrate the utility of our yield trait genes in this field. Due to the intense research and development that is taking place by several companies, including us and our competitors, in this field, the intellectual property landscape is in flux, and it may remain uncertain for the coming years. There has been, and may continue to be, significant intellectual property related litigation and proceedings relating to this area in the future. If we obtain a license to certain patent rights using the CRISPR technology, and it is later determined that such patent rights are invalid or owned by other parties, this could have a material adverse effect on our business.

We rely in part on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could harm our business.

We rely on trade secrets to protect some of our technology and proprietary information, especially where we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. Litigating a claim that a third party had illegally obtained and was using our trade secrets would be expensive and time consuming, and the outcome would be unpredictable. Moreover, if our competitors independently develop similar knowledge, methods and know-how, it will be difficult for us to enforce our rights and our business could be harmed.

Risks Relating to Owning our Common Stock

Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.

If we raise additional funds through equity offerings or offerings of equity-linked securities, including warrants or convertible debt securities, we expect that our existing stockholders will experience significant dilution, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may subject us to restrictive covenants that could limit our flexibility in conducting future business activities, including covenants limiting or restricting our ability to incur additional debt, dispose of assets or make capital expenditures. We may also incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance. If we raise additional funds through strategic partnerships or licensing agreements with third parties, we may have to relinquish valuable rights to our technologies or grant licenses on terms that are not favorable to us.

Trading volume in our stock can fluctuate and an active trading market for our common stock may not be available on a consistent basis to provide stockholders with adequate liquidity. Our stock price may be extremely volatile, and our stockholders could lose a significant part of their investment.

The public trading price for our common stock will be affected by a number of factors, including:

- any change in the status of our Nasdaq listing;
- the need for near-term financing to continue operations;
- reported progress in our efforts to develop crop related technologies, relative to investor expectations;
- changes in earnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' earnings estimates;
- quarterly variations in our or our competitors' results of operations;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- future issuances and/or sales of our securities;
- announcements or the absence of announcements by us, or our competitors, regarding acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- commencement of, or involvement in, litigation;
- any major change in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- announcements related to patents issued to us or our competitors and to litigation involving our intellectual property;
- a lack of, or limited, or negative industry or security analyst coverage;
- uncertainty regarding our ability to secure additional cash resources with which to operate our business;
- a decision by our significant shareholders to increase or decrease their holdings in our common stock;
- short-selling or similar activities by third parties; and
- other factors described elsewhere in these Risk Factors.

As a result of these factors, our stockholders may not be able to resell their shares at, or above, their purchase price. In addition, the stock prices of many technology companies have experienced wide fluctuations that have often been unrelated to the operating performance of those companies. Any negative change in the public's perception of the prospects of industrial or agricultural biotechnology companies could depress our stock price regardless of our results of operations. These factors may have a material adverse effect on the market price and liquidity of our common stock and affect our ability to obtain required financing.

Provisions in our certificate of incorporation and by-laws and Delaware law might discourage, delay or prevent a change of control of our company or changes in our management and, therefore, depress the trading price of our common stock.

Provisions of our certificate of incorporation and by-laws and Delaware law may discourage, delay or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which our stockholders might otherwise receive a premium for their shares of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management.

In addition, Section 203 of the Delaware General Corporation Law prohibits a publicly-held Delaware corporation from engaging in a business combination with an interested stockholder, which generally refers to a person which together with its affiliates owns, or within the last three years has owned, 15 percent or more of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

The existence of the foregoing provisions and anti-takeover measures could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our company, thereby reducing the likelihood that our stockholders could receive a premium for their common stock in an acquisition.

Concentration of ownership among our officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.

Based on the number of shares outstanding as of March 5, 2018 our officers, directors and stockholders who hold at least 5% of our stock own a combined total of approximately 41.4 percent of our outstanding common stock. If these officers, directors, and principal stockholders or a group of our principal stockholders act together, they will be able to exert a significant degree of influence over our management and affairs and control matters requiring stockholder approval, including the election of directors and approval of mergers, business combinations or other significant transactions. The interests of one or more of these stockholders may not always coincide with our interests or the interests of other stockholders. For instance, officers, directors, and principal stockholders, acting together, could cause us to enter into transactions or agreements that we would not otherwise consider. Similarly, this concentration of ownership may have the effect of delaying or preventing a change in control of our company otherwise favored by our other stockholders. As of March 5, 2018, Jack W. Schuler (and his related entities) owned approximately 40.1 percent of our common stock. To the extent that this or any other significant stockholders oppose any proposal put forth for stockholder approval by our board of directors, they control a sufficient percentage of our outstanding shares to cause such proposal to either fail or be very difficult to achieve without their support. This, in turn, could have a negative effect on the market price of our common stock. It could also prevent our stockholders from realizing a premium over the market prices for their shares of common stock. The concentration of ownership also may contribute to the low trading volume and volatility of our common stock.

The recently passed comprehensive tax reform bill could adversely affect our business and financial results.

On December 22, 2017, President Trump signed into law the "Tax Cuts and Jobs Act," or TCJA, that significantly reforms the Internal Revenue Code of 1986, as amended, or the Code. The TCJA, among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest and net operating loss carryforwards, allows for the expensing of capital expenditures, and puts into effect the migration from a "worldwide" system of taxation to a territorial system. Our net deferred tax assets and liabilities have been revalued at the newly enacted U.S. corporate rate as of December 31, 2017. We continue to examine the impact this tax reform legislation may have on our business and we urge our stockholders to consult with their legal and tax advisors with respect to such legislation and the potential tax consequences of investing in our common stock.

Our business and operations would suffer in the event of system failures.

We utilize information technology, or IT, systems and networks to process, transmit and store electronic information in connection with our business activities. As use of digital technologies has increased, cyber incidents, including deliberate attacks and attempts to gain unauthorized access to computer systems and networks, have increased in frequency and sophistication. These threats pose a risk to the security of our systems and networks and the confidentiality, availability and integrity of our data. There can be no assurance that we will be successful in preventing cyber-attacks or successful in mitigating their efforts.

Despite the implementation of security measures, our internal computer systems and those of our contractors and consultants are vulnerable to damage from such cyber attacks, including computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Such an event could cause interruption of our operations. For example, the loss of data from completed field tests for our yield traits could result in delays in our regulatory approval efforts and significantly increase our costs. To the extent that any disruption or security breach were to result in a loss of or damage to our data, or inappropriate disclosure of confidential or proprietary information, we could suffer reputational harm or face litigation or adverse regulatory action and the development of our product candidates could be delayed.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We do not own any real property. We are party to a lease agreement pursuant to which we lease approximately 30,000 square feet of office and research and development space located at 19 Presidential Way, Woburn, Massachusetts. The lease began on June 1, 2016 and will end on November 30, 2026. Under the terms of the lease agreement, the landlord paid $889 for tenant improvements to the facility and paid an additional $444 for tenant improvements that result in increased rental payments by the Company. Current and non-current portions of the lease incentive obligations related to the landlord’s contributions toward the cost of tenant improvements are recorded within accrued expenses and long-term lease incentive obligation, respectively, in the Company's consolidated balance sheet contained herein. The lease incentive obligation will be amortized to rent expense over the lease term. As of December 31, 2017, the Company has a total remaining lease incentive obligation of $1,132. Pursuant to the lease, the Company also pays certain taxes and operating costs associated with the premises during the term of the lease. To secure the lease, the Company provided the landlord with a deposit in the form of a letter of credit in the amount of $307.

The Company has a sublease agreement with a subsidiary of CJ CheilJedang Corporation ("CJ") for CJ's sublease of approximately 10,000 square feet of the Company's Woburn facility. The subleased space was determined to be in excess of the Company's needs as a result of its recent strategic shift and the related restructuring of its operations. The sublease is coterminous with the Company's master lease. CJ will pay rent and operating expenses equal to approximately one-third of the amounts payable to the landlord by the Company, as adjusted from time-to-time in accordance with the terms of the master lease. CJ has provided the Company with a security deposit of $103 in the form of an irrevocable letter of credit.

We also lease approximately 13,700 square feet of office and laboratory space at 650 Suffolk Street, Lowell, Massachusetts. Our lease for this facility expires in May 2020, with an option to renew for one five-year period. We are currently working with a commercial real estate broker to locate a subtenant for this space. Our wholly-owned subsidiary, Metabolix Oilseeds, Inc. ("MOI"), located in Saskatoon, Saskatchewan, Canada, leases approximately 4,100 square feet of office, laboratory and greenhouse space. MOI's leases for these facilities expire on July 31, 2018 and September 30, 2018. We expect to renew these leases prior to their expiration.

ITEM 3. LEGAL PROCEEDINGS

From time to time, the Company may be subject to legal proceedings and claims in the ordinary course of business. We are not currently aware of any such proceedings or claims that we believe will have, individually or in the aggregate, a material adverse effect on our business, financial condition or results of operations.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Our common stock is traded on the Nasdaq Capital Market under the symbol "YTEN." The following table sets forth, for the periods indicated, the high and low sales prices for our common stock, as reported by Nasdaq, for our two most recent fiscal years:

	Common Stock Price			
	2017		2016	
	High	Low	High	Low
First Quarter	$ 5.00	$ 2.82	$ 22.90	$ 8.62
Second Quarter	$ 9.30	$ 3.03	$ 19.20	$ 5.35
Third Quarter	$ 4.94	$ 2.18	$ 8.80	$ 2.60
Fourth Quarter	$ 8.67	$ 1.77	$ 6.70	$ 2.50

The closing price of our common stock, as reported by the Nasdaq Capital Market, was $1.67 on March 8, 2018. On May 26, 2017, the Company effected a 1-for-10 reverse stock split of its common stock. All share prices set forth above have been adjusted to reflect this reverse stock split.

Stockholders

As of March 8, 2018, there were 9,865,355 shares of our common stock outstanding held by 35 stockholders of record.

Dividends

We have never declared or paid any cash dividends on our capital stock and do not expect to pay any cash dividends for the foreseeable future. We intend to use future earnings, if any, in the operation and expansion of our business. Any future determination relating to our dividend policy will be made at the discretion of our board of directors, based on our financial condition, results of operations, contractual restrictions, capital requirements, business properties, restrictions imposed by applicable law and other factors our board of directors may deem relevant.

Equity Compensation Plan Information

Please see Part III, Item 12, for information regarding securities authorized for issuance under our equity compensation plans.

Unregistered Sales of Securities

On October 3, 2017, we issued 7,113 shares of common stock to participants in our Yield10 Bioscience, Inc. 401(k) Plan as a matching contribution. The issuance of these securities was exempt from registration pursuant to Section 3(a)(2) of the Securities Act of 1933 as amended.

Issuer Purchases of Equity Securities

During the quarter ended December 31, 2017, there were no repurchases made by us or on our behalf, or by any "affiliated purchasers," of shares of our common stock.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

Not applicable.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis should be read in conjunction with the Consolidated Financial Statements and Notes thereto included in this Annual Report on Form 10-K. All dollar amounts are stated in thousands.

Overview

Yield10 Bioscience, Inc. ("Yield10 Bioscience," "Yield10" or the "Company") was founded as Metabolix, Inc. in 1992 and changed its name in January 2017. Yield10 is an agricultural bioscience company focusing on the development of new technologies to enable step-change increases in crop yield to enhance global food security. Yield10 is using two proprietary advanced biotechnology trait gene discovery platforms to improve fundamental crop yield through enhanced photosynthetic carbon capture and increased carbon utilization efficiency to increase seed yield. These platforms are based on the principle that plants which capture and utilize carbon more efficiently will enable more robust crops capable of increased seed yield. Yield10 is working to develop, translate and demonstrate the commercial value of novel yield trait genes it has identified in major crops and to identify additional genome editing targets for improved crop performance in several key food and feed crops, including canola, soybean, rice and corn. Yield10 Bioscience is headquartered in Woburn, Massachusetts and has an additional agricultural science facility with greenhouses located in Saskatoon, Saskatchewan, Canada.

Government Grants

As of December 31, 2017, proceeds of $241 remain available under our U.S. government grants. This includes amounts for reimbursement to our subcontractors, as well as reimbursement for our employees' time, benefits and other expenses related to future performance. We are currently working with Michigan State University to finalize a Department of Energy funded subcontract that was awarded to us during 2017 entitled "A Systems Approach to Increasing Carbon Flux to Seed Oil." We anticipate that this five-year subcontract with Yield10 will be for $2,957 and will commence during 2018.

The status of our government grants is as follows:

Program Title	Funding Agency	Total Government Funds	Total received through December 31, 2017	Remaining amount available as of December 31, 2017	Contract/Grant Expiration
Production of High Oil, Transgene Free Camelina Sativa Plants through Genome Editing ("Camelina")	Department of Energy	$ 1,997	$ 1,756	$ 241	September 2018
Subcontract from NC State University (NCSU) project funded by DOE ARPA-E entitled "Jet Fuel from Camelina Sativa: A Systems Approach"	Department of Energy	276	276	—	March 2017
Total		$ 2,273	$ 2,032	$ 241	

Critical Accounting Estimates and Judgments

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, costs and expenses, and related disclosures. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates.

We believe that our significant accounting policies, which are described in Note 2 to our consolidated financial statements, involve a degree of judgment and complexity. Accordingly, we believe that the specific accounting policies described below are the most critical to aid in fully understanding and evaluating our consolidated financial condition and results of operations.

Grant Revenue

Government research grants currently represent our sole source of revenue. We recognize government grants as revenue because the grants are central to the Company's ongoing crop science program. Revenue is earned as research expenses related to the grants are incurred and revenue earned on government grants, but not yet invoiced as of the balance sheet date, are recorded as unbilled receivables in the accompanying consolidated balance sheets for the years ended December 31, 2017 and December 31, 2016. Funds received from government grants in advance of work being performed are recorded as deferred revenue until earned. At December 31, 2017 and December 31, 2016, we had no deferred revenue related to government research grants.

Stock-Based Compensation

The accounting standards for stock-based compensation require that all stock-based awards to employees be recognized as an expense in the consolidated financial statements and that such expense be measured based on the fair value of the award.

Determining the appropriate fair value model and calculating the fair value of stock-based payment awards requires the use of highly subjective assumptions, including the expected life of the stock-based payment awards and stock price volatility. We use the Black-Scholes option-pricing model to value our service-based option grants and to determine the related compensation expense. Generally, we recognize the fair value of stock awards evenly over their vesting periods provided the employee, director or non-employee receiving the award continues to meet continuing service conditions. The assumptions used in calculating the fair value of stock-based awards represent management's best estimates, but the estimates involve inherent uncertainties and the application of management judgment. See Note 9 to the consolidated financial statements for further discussion on the key assumptions used to determine the fair values of option grants pursuant to the Black-Scholes option pricing model.

Discontinued Operations

A discontinued operation is a component of an entity that has either been disposed of, or that is classified as held for sale, which represents a separate major line of business or geographical area of operations and is part of a single coordinated plan to dispose of a separate major line of business or geographical area of operations. In July 2016, the Company announced a strategic restructuring plan in which Yield10 Bioscience became its core business and which resulted in the sale of its biopolymer operations in September 2016. In accordance with the accounting guidance regarding the presentation of discontinued operations, the activity of our biopolymers component has been reclassified as a discontinued operation for the year ended December 31, 2016.

Results of Operations

The consolidated financial statements for the year ending December 31, 2016, have been presented to reflect the former biopolymer operations of Yield10 Bioscience as a discontinued operation.

Comparison of the Years Ended December 31, 2017 and 2016

Revenue

	Year ended December 31,		
	2017	**2016**	**Change**
Grant revenue	$ 944	$ 1,159	$ (215)

Total revenue from continuing operations was $944 and $1,159 for the years ended December 31, 2017 and 2016, respectively, and was derived solely from our research grants. Grant revenue for the year ended December 31, 2017 was primarily from $913 earned from the Company's Camelina grant with DOE. During the year ended December 31, 2016, grant revenue consisted of $913 earned from the Camelina grant and $246 from the Company's subcontract with North Carolina State University.

We do not anticipate that grant revenue will fluctuate significantly over the next twelve months. Our work on the DOE Camelina grant is expected to wind down as it nears completion during 2018 as our billable work on the five-year

DOE subcontract to be signed with Michigan State University ramps up. We expect this subcontract will become effective during 2018.

Expenses

	Year ended December 31,		
	2017	2016	Change
Research and development expenses	$ 4,597	$ 5,670	$ (1,073)
General and administrative expenses	5,630	5,737	(107)
Total costs and expense	$ 10,227	$ 11,407	$ (1,180)

Research and Development Expenses

Research and development expenses from continuing operations were $4,597 and $5,670 for the years ended December 31, 2017 and 2016, respectively. The decrease of $1,073 was primarily due to a $841 reduction in research facility expenses from $1,835 during the year ended December 31, 2016 to $994 for the year ended December 31, 2017. The favorable variance is the result of the Company's move during mid-2016 from its more expensive Cambridge, Massachusetts research facility to its new Woburn, Massachusetts location. The year-over-year decrease in research and development expenses is also the result of lower employee compensation and related benefit expenses. Employee compensation and related benefit expenses were $2,488 and $2,624 for the years ended December 31, 2017 and 2016, respectively. The decrease of $136 is primarily attributable to a reduction in headcount as a result of our strategic restructuring during 2016. We have also been able to reduce our research and development expenditures across many categories as a favorable consequence of our restructuring and our ongoing efforts to manage cash usage. Partially offsetting these expense reductions was a $146 increase in sponsored research expense as a result of the Company's Camelina field test and payments made to a third party for its work in support of one of the Camelina government grants.

We expect research and development expenses from continuing operations to increase during 2018 as a result of our plans to expand our field testing for crops across multiple site locations. We also plan to also hire a small number of additional research staff to support those tests.

General and Administrative Expenses

General and administrative expenses from continuing operations were $5,630 and $5,737 for the fiscal years ended December 31, 2017 and 2016, respectively. The decrease of $107 was primarily due to a reduction in employee compensation and related benefits expenses and a reduction in professional and consulting fees, offset by our recognition during 2017 of $622 of deferred equity offering costs related to a common stock purchase agreement with Aspire Capital Fund, LLC ("Aspire") that terminated. Employee compensation and related benefits expenses decreased by $178 from $2,661 for the year ended December 31, 2016 to $2,483 for the year ended December 31, 2017. The decrease was primarily attributable to the Company's restructuring completed during 2016 that eliminated a number of administrative positions, partially offset by the Company's reinstatement of employee bonuses during 2017. Professional service and consulting fees for accounting, patent and board fees decreased by a total of $376 during 2017 as a result of the Company's efforts to manage its available cash resources.

We expect our general and administrative expenses from continuing operations to decrease during 2018 in comparison to 2017 since we will not incur the write off of Aspire deferred offering costs again and as we continue efforts to carefully manage our use of cash resources.

Other Income (Net)

	Year ended December 31,		
	2017	2016	Change
Total other income (expense), net	$ (113)	$ (38)	$ (75)

Other income (expense), net, reflects net expense of $113 and $38 for the years ended December 31, 2017 and 2016, respectively. The expense for 2017 and 2016 is primarily the result of imputed interest charges recorded in connection with payments we are making through May 2018 related to the early termination of a third party manufacturing agreement.

Income from Discontinued Operations, before income tax

In July 2016, our Board of Directors approved a restructuring plan under which Yield10 Bioscience became the Company's core business with a focus on the development of new technologies to enable step-change increases in crop yield to enhance global food security. As a result of this strategic shift, during 2016 we completed the sale of certain biopolymer intellectual property, equipment and inventory to an affiliate of CJ CheilJedang Corporation ("CJ"). The $10,000 purchase price paid by CJ was primarily for the acquisition of intellectual property, including the Company’s PHA strains, patent rights, know-how and its rights, title and interest in certain license agreements. None of this intellectual property was previously capitalized on the Company’s balance sheet, resulting in a gain on the sale of approximately $9,868, net of equipment sold. The sale of our biopolymer assets contributed to income before income tax of $2,682 from discontinued operations for the year ended December 31, 2016.

Income Tax Benefit and Provision

For the year ended December 31, 2016, the Company recognized an income tax benefit within continuing operations of $1,097 and tax expense in discontinued operations of $1,097 related to taxable income generated during the year as a result of the sale of biopolymer assets to CJ as discussed above.

Deemed Dividend on Series A Convertible Preferred Stock Issuance

During December 2017, the Company closed on a public offering of securities that included 4,667,000 Class A Units, priced at a public offering price of $2.25 per unit, with each unit consisting of one share of common stock, a Series A five-year warrant to purchase one share of common stock at an exercise price of $2.25 per share, and a Series B nine-month warrant to purchase 0.5 share of common stock at an exercise price of $2.25 per share, and 3,987 Class B Units, priced at a public offering price of $1,000 per unit, with each unit consisting of one share of preferred stock convertible to 445 shares of common stock at a conversion price of $2.25 per common share, Series A five-year warrants to purchase 445 shares of common stock at an exercise price of $2.25 per share, and Series B nine-month warrants to purchase 223 shares of common stock with an exercise price of $2.25 per share. Proceeds received from the offering were allocated to the various elements of the offering based on their relative fair values.

The Series A Convertible Preferred Stock was valued on an as-if-converted basis based on the underlying common stock. The Series A and Series B warrants were valued using the Black-Scholes model with the following weighted-average input at the time of issuance:

- an expected term of 5.0 years and 0.75 years for the Series A and Series B warrants, respectively,
- risk free rates of 2.2 percent and 1.7 percent for the Series A and Series B warrants, respectively, based on the published rates of U.S. treasury bills with similar terms, and
- volatility of 125 percent based on the Company’s historical volatility.

After allocation of the proceeds, the effective conversion price of the Series A Convertible Preferred Stock was determined to be beneficial and, as a result, the Company recorded a non-cash deemed dividend of approximately $1,427 equal to the intrinsic value of the beneficial conversion feature. The Series A Convertible Preferred Stock is considered a participating security. In accordance with applicable accounting guidance, the Company's net loss of $9,396 from continuing operations has been increased by the amount of the deemed dividend from the beneficial conversion feature, resulting in a net loss attributable to common shareholders of $10,823, or $3.29 per common share.

As of March 5, 2018, holders of 3,879 , or 97%, of the 3,987 Series A Preferred Stock that was issued have elected to convert their shares into 1,724,000 shares of common stock.

Liquidity and Capital Resources

Currently, we require cash to fund our working capital needs, to purchase capital assets, to pay our operating lease obligations and other operating costs. The primary sources of our liquidity have historically included equity financings, government research grants and income earned on cash and short-term investments.

Since our inception, we have incurred significant expenses related to our research, development and commercialization efforts. With the exception of 2012, when we recognized $38,885 of deferred revenue from a terminated joint venture, we have recorded losses since the Company's initial founding, including its fiscal year ended December 31, 2017. As of December 31, 2017, we had an accumulated deficit of $342,753. Our total unrestricted cash and cash equivalents as of December 31, 2017, were $14,487 as compared to $7,309 at December 31, 2016. As of December 31, 2017, we had no outstanding debt.

Our cash and cash equivalents at December 31, 2017, were held for working capital purposes. As of December 31, 2017, we had restricted cash of $317. Restricted cash consists of $307 held in connection with the lease agreement for our Woburn, Massachusetts facility and $10 held in connection with our corporate credit card used for small and incidental purchases.

Investments are made in accordance with our corporate investment policy, as approved by our Board of Directors. The primary objective of this policy is to preserve principal and investments are limited to high quality corporate debt, U.S. Treasury bills and notes, money market funds, bank debt obligations, municipal debt obligations and asset-backed securities. The policy establishes maturity limits, concentration limits, and liquidity requirements. As of December 31, 2017, we were in compliance with this policy.

We believe that our existing funds, when combined with cash generated from from government grants and our access to additional financing sources, if needed, will be sufficient to fund operations and meet our obligations, including our final restructuring obligations, when due, for the foreseeable future. We follow the guidance of ASU 2014-15, *Presentation of Financial Statements-Going Concern (Subtopic 205-40)* in order to determine whether there is substantial doubt about the Company's ability to continue as a going concern for one year after the date its financial statements are issued. Based on our cash forecast, we have determined that the Company's present capital resources are sufficient to fund our planned operations until mid-2019.

During 2016, we completed a strategic restructuring of our operations to focus on the Yield10 Bioscience business. We reduced staffing levels to 20 full-time employees and incurred restructuring costs for contract termination and employee post-termination benefits of approximately $3,513 which are primarily reflected in discontinued operations within the Company's 2016 statement of operations. At December 31, 2017, $489 of these restructuring charges remain outstanding and are required to be paid out through May 2018. We currently anticipate that we will use approximately $8,500 - $9,000 of cash during 2018, including the final payments for restructuring costs.

If we issue equity or debt securities to raise additional funds, (i) the Company may incur fees associated with such issuance, (ii) our existing stockholders will experience dilution from the issuance of new equity securities, (iii) the Company may incur ongoing interest expense and be required to grant a security interest in Company assets in connection with any debt issuance, and (iv) the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. In addition, utilization of our net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986 due to ownership changes resulting from future equity financing transactions. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies, or grant licenses on terms that are not favorable to the Company.

Net cash used for operating activities was $8,202 during the year ended December 31, 2017, compared to net cash used by operating activities during 2016 of $14,404. Net cash used by operations during the year ended December 31, 2017, primarily reflects the net loss of $9,396, partially offset by non-cash expenses, including stock-based compensation expense of $1,395, depreciation expense of $206, and the Company's 401(k) stock matching contribution expense of $85. During 2017 the Company also paid down its lease incentive obligation and contract termination liability by a total of $616.

The following are the non-cash operating items and investing items related to discontinued operations for the year ended December 31, 2016.

	Year Ended December 31, 2016
Non-cash operating items:	
Depreciation	$ 326
Charge for 401(k) company common stock match	$ 118
Stock-based compensation	$ 217
Inventory impairment	$ 199
Non-cash restructuring expense paid through stock and equipment	$ 196
Gain on sale of discontinued operation and property and equipment	$ (9,833)

Net cash of $109 was provided by investing activities during the year ended December 31, 2017, compared to net cash provided by investing activities during 2016 of $9,752. Net cash provided by investing activities during the year ended December 31, 2017, was primarily the result of the release of $115 of restricted cash due to the discontinuation of our corporate credit card program used for employee business travel. Net cash provided by investing activities during the year ended December 31, 2016, was primarily the result of proceeds received from the sale of biopolymer assets of $10,317 and a net decrease in restricted cash of $187, partially offset by purchases of property and equipment of $752 to outfit the Woburn, Massachusetts facility.

Net cash of $15,272 was provided by financing activities during the year ended December 31, 2017, compared to net cash used by financing activities of $296 during the year ended December 31, 2016. During July 2017, we completed a registered direct offering of our securities, receiving cash proceeds from the transaction of $1,966, net of issuance costs of $317. In December 2017, we completed a public offering of our securities, receiving cash proceeds of $13,318, net of issuance costs of $1,171 that were paid as of December 31, 2017. The Company will pay additional costs of $221 related to this offering during its first quarter of 2018. These amounts are included in the Company's accrued expenses as of December 31, 2017. (See Note 8 - Capital Stock in our Notes to the Consolidated Financial Statements included in this Annual Report on Form 10-K). During the years ended December 31, 2017 and December 31, 2016, the Company paid taxes of $12 and $296, respectively, related to our net settlement of employee vested stock awards. These taxes include payment of minimum federal, state or Canadian provincial income tax withholdings associated with employee restricted stock units (RSUs) that vested during each year. As RSUs vest, we withhold a number of shares with aggregate fair market value equal to the minimum tax withholding amount from the common stock issuable at the vest date.

Off-Balance Sheet Arrangements

As of December 31, 2017, we had no off-balance sheet arrangements as defined in Item 303(a)(4) of the Securities and Exchange Commission's Regulation S-K.

Related Party Transactions

See Note 7 to our consolidated financial statements for a full description of our related party transactions.

Recent Accounting Standards Changes

For a discussion of recent accounting standards please read Note 2, Summary of Significant Accounting Policies, to our consolidated financial statements included in this report.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURE ABOUT MARKET RISK

Not applicable.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The consolidated financial statements and related financial statement schedules required to be filed are indexed on page F-1 and are incorporated herein.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Effectiveness of Disclosure Controls and Procedures

As of the end of the period covered by this Annual Report on Form 10-K, under the supervision of our Chief Executive Officer and our Chief Accounting Officer, we evaluated the effectiveness of our disclosure controls and procedures, as such term is defined in Rule 13a-15(e) and Rule 15d-15(e) under the Exchange Act. Based on this evaluation, our Chief Executive Officer and our Chief Accounting Officer concluded that as of December 31, 2017 our disclosure controls and procedures were effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act (1) is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms, and (2) is accumulated and communicated to our management, including our Chief Executive Officer and our Chief Accounting Officer, as appropriate to allow timely decisions regarding required disclosure. Our disclosure controls and procedures include components of our internal control over financial reporting. Management's assessment of the effectiveness of our internal control over financial reporting is expressed at the level of reasonable assurance because a control system, no matter how well designed and operated, can provide only reasonable, but not absolute, assurance that the control system's objectives will be met.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act, as amended. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Our internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting as of December 31, 2017. In making this assessment, management used the criteria set forth in the 2013 *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Based on its assessment of internal control over financial reporting, management has concluded that, as of December 31, 2017, our internal control over financial reporting was effective to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) of the Exchange Act that occurred during our last fiscal quarter in the period covered by this Annual Report on Form 10-K that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

Pursuant to General Instruction G to Form 10-K, the information required for Part III, Items 10, 11, 12, 13 and 14, is incorporated herein by reference from the Company's proxy statement for the Annual Meeting of Stockholders to be held on May 23, 2018, which is expected to be filed not later than 120 days after the fiscal year end covered by this Form 10-K.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this Report:

(1) **Financial Statements**

See Index to Financial Statements on page F-1.

(2) **Supplemental Schedules**

All schedules have been omitted because the required information is not present in amounts sufficient to require submission of the schedule, or because the required information is included in the consolidated financial statements or notes thereto.

(3) **Exhibits**

See Item 15(b) below.

(b) The following exhibits are filed as part of, or incorporated by reference into, this Annual Report on Form 10-K:

Exhibit Number		Description
2.1	(13)	Purchase Agreement between Metabolix, Inc. and CJ Research Center LLC, dated September 16, 2016.
3.1	*	Amended and Restated Certificate of Incorporation of the Registrant.
3.2	(14)	Amended and Restated By-laws of the Registrant.
4.1	(1)	Specimen Stock Certificate for shares of the Registrant's Common Stock.
4.1.1	(16)	Form of Investor Warrant to Purchase Common Stock
4.2	(11)	Registration Rights Agreement, dated October 7, 2015, between Metabolix, Inc. and Aspire Capital Fund, LLC
4.2.2	(17)	Form of Series A Convertible Preferred Stock Certificate
4.3	(18)	Form of Series A Common Warrant to purchase shares of Common Stock
4.4	(18)	Form of Series B Common Warrant to purchase shares of Common Stock
10.1	†(1)	2006 Stock Option and Incentive Plan.
10.1.1	†(1)	2006 Stock Option and Incentive Plan, Form of Incentive Stock Option Agreement.
10.1.2	†(1)	2006 Stock Option and Incentive Plan, Form of Non-Qualified Stock Option Agreement.
10.1.3	†(1)	2006 Stock Option and Incentive Plan, Form of Director Non-Qualified Stock Option Agreement.

10.2	†(8)	2014 Stock Option and Incentive Plan, Revised and Restated.
10.2.1	†(9)	2014 Stock Option and Incentive Plan, Form of Incentive Stock Option Award.
10.2.2	†(9)	2014 Stock Option and Incentive Plan, Form of Non-Qualified Stock Option Award.
10.2.3	†(9)	2014 Stock Option and Incentive Plan, Form of Restricted Stock Unit Award.
10.3	†(15)	Employment Agreement between the Company and Oliver P. Peoples dated March 28, 2017.
10.4	†(15)	Employment Agreement between the Company and Charles B. Haaser dated March 28, 2017.
10.5	†(5)	Severance Agreement between the Company and Sarah P. Cecil executed July 1, 2013.
10.6	†(15)	Employment Agreement between the Company and Lynne H. Brum dated March 28, 2017.
10.7	†(6)	Employment Agreement between the Company and Joseph Shaulson dated December 19, 2013.
10.8	†(15)	Employment Agreement between the Company and Kristi Snell dated March 28, 2017.
10.9	†(15)	Noncompetition, Confidentiality and Inventions Agreement between the Company and each of Oliver Peoples, Charles Haaser, Lynne H. Brum and Kristi Snell, dated March 28, 2017.
10.10	†(7)	Non-Qualified Stock Option Agreement between the Company and Joseph Shaulson dated December 19, 2013.
10.11	†(7)	Restricted Stock Unit Award Agreement between the Registrant and Joseph Shaulson dated March 24, 2014.
10.12	†(1)	Form of Indemnification Agreement between the Registrant and its Directors and Officers.
10.13	(2)	Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated March 30, 2007.
10.13.1	(4)	First Amendment of Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated February 29, 2012.
10.13.2	(6)	Second Amendment of Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated October 24, 2013.
10.14	(10)	Securities Purchase Agreement dated June 15, 2015 between the Company and the Investors named therein.
10.15	(10)	Standstill Agreement dated June 19, 2015 between the Company and Jack W. Schuler, Renate Schuler and the Schuler Family Foundation.
10.16	(12)	Lease Agreement between the Company and ARE MA Region No. 20, LLC dated January 20, 2016 for the premises located at 19 Presidential Way, Woburn, MA
10.17	(11)	Common Stock Purchase Agreement, dated October 7, 2015 between Metabolix, Inc. and Aspire Capital Fund, LLC.
10.18	†(15)	Separation Agreement between the Company and Joseph Shaulson, dated as of November 3, 2016.
10.19	@(15)	Exclusive License Agreement, dated as of June 30, 2015, between the Company and the University of Massachusetts.
10.20	(15)	Sublease between CJ Research Center LLC and the Company, dated as of September 16, 2016.
10.21	(16)	Form of Securities Purchase Agreement dated July 3, 2017 between the Company and the Purchasers named therein.
14.1	(3)	Yield10 Bioscience, Inc. Code of Business Conduct and Ethics.
21.1	*	Subsidiaries of the Registrant.

23.1	*	Consent of RSM US LLP, an independent registered public accounting firm.
31.1	*	Certification Pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934.
31.2	*	Certification Pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934.
32.1	*	Certification Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.1	*	The following financial information from the Yield10 Bioscience, Inc. Annual Report on Form 10-K for the year ended December 31, 2017 formatted in XBRL; (i) Consolidated Balance Sheets, December 31, 2017 and December 31, 2016; (ii) Consolidated Statements of Operations, Years Ended December 31, 2017 and 2016; (iii) Consolidated Statements of Comprehensive Income (Loss), Years Ended December 31, 2017 and 2016; (iv) Consolidated Statements of Cash Flows, Years Ended December 31, 2017 and 2016; and (v) Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2017 and 2016; and (vi) Notes to Consolidated Financial Statements.
101.INS	*	XBRL Instance Document.
101.SCH	*	XBRL Taxonomy Extension Schema.
101.CAL	*	XBRL Taxonomy Extension Calculation Linkbase.
101.DEF	*	XBRL Taxonomy Extension Definition Linkbase.
101.LAB	*	XBRL Taxonomy Extension Label Linkbase.
101.PRE	*	XBRL Taxonomy Extension Presentation Linkbase.

† Indicates a management contract or any compensatory plan, contract or arrangement.

* Filed herewith

@ Confidential treatment has been requested for certain portions of this document.

(1) Incorporated by reference herein to the exhibits to the Company's Registration Statement on Form S-1 (File No. 333-135760)

(2) Incorporated by reference herein to the exhibits to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2007 (File No. 001-33133)

(3) Incorporated by reference herein to the exhibits to the Company's 2011 Annual Report on Form 10-K filed March 12, 2012 (File No. 001-33133)

(4) Incorporated by reference herein to the exhibits to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012 (File No. 001-33133)

(5) Incorporated by reference herein to the exhibits to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2013 (File No. 001-33133)

(6) Incorporated by reference herein to the exhibits to the Company's 2013 Annual Report on Form 10-K filed March 28, 2014 (File No. 001-33133)

(7) Incorporated by reference herein to the exhibits to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014 (File No. 001-33133)

(8) Incorporated herein by reference herein to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015 (File No. 001-33133)

(9) Incorporated by reference herein to the exhibits to the Company's 2014 Annual Report on Form 10-K filed March 25, 2015 (File No. 001-33133)

(10) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on June 17, 2015 (File No. 001-33133)

(11) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on October 7, 2015 (File No. 001-33133)

(12) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on January 26, 2016 (File No. 001-33133)

(13) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on September 21, 2016 (File No. 001-33133)

(14) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on January 6, 2017 (File No. 001-33133)

(15) Incorporated by reference herein to the exhibits to the Company's Annual Report on Form 10-K filed March 30, 2017 (File No. 001-33133)

(16) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on July 5, 2017 (File No. 001-33133)

(17) Incorporated by reference herein to the exhibits to the Company's Registration Statement on Form S-1 (File No. 333-220040)

(18) Incorporated by reference herein to the exhibits to the Company's Registration Statement on Form S-1/A filed December 15, 2017 (File No. 333-221283)

ITEM 16. FORM 10-K SUMMARY

Registrants may voluntarily include a summary of information required by Form 10-K under this Item 16. We have elected not to include such summary.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

YIELD10 BIOSCIENCE, INC.

March 12, 2018 By: /s/ OLIVER P. PEOPLES

Dr. Oliver P. Peoples, Ph.D.
President and Chief Executive Officer
(Principal Executive Officer)

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Oliver P. Peoples, Charles B. Haaser, and Lynne H. Brum, jointly and severally, his or her attorney-in-fact, with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his or her substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Name	Title	Date
/s/ OLIVER P. PEOPLES Oliver P. Peoples	President and Chief Executive Officer and Director (Principal Executive Officer)	March 12, 2018
/s/ CHARLES B. HAASER Charles B. Haaser	Vice President, Finance, and Chief Accounting Officer (Principal Financial and Accounting Officer)	March 12, 2018
/s/ PETER N. KELLOGG Peter N. Kellogg	Director	March 12, 2018
/s/ RICHARD W. HAMILTON Richard W. Hamilton, Ph.D.	Director	March 12, 2018
/s/ JOSEPH SHAULSON Joseph Shaulson	Director	March 12, 2018
/s/ ANTHONY J. SINSKEY Anthony J. Sinskey, Sc.D.	Director	March 12, 2018
/s/ ROBERT L. VAN NOSTRAND Robert L. Van Nostrand	Chairman	March 12, 2018

YIELD10 BIOSCIENCE, INC.
Index to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Yield10 Bioscience, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Yield10 Bioscience, Inc. and its subsidiaries (the Company) as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, stockholders' equity and cash flows for each of the two years in the period ended December 31, 2017, and the related notes to the consolidated financial statements and schedules (collectively, the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Basis of Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ RSM US LLP

We have served as the Company's auditor since 2017.

Boston, Massachusetts
March 12, 2018

YIELD10 BIOSCIENCE, INC.
(formerly known as Metabolix, Inc.)

CONSOLIDATED BALANCE SHEETS

(In thousands, except share and per share amounts)

	December 31, 2017	December 31, 2016
Assets		
Current Assets:		
Cash and cash equivalents	$ 14,487	$ 7,309
Accounts receivable	54	66
Due from related parties	—	1
Unbilled receivables	65	121
Prepaid expenses and other current assets	311	363
Total current assets	14,917	7,860
Restricted cash	317	432
Property and equipment, net	1,539	1,739
Deferred equity financing costs	—	622
Other assets	109	95
Total assets	$ 16,882	$ 10,748
Liabilities and Stockholders' Equity		
Current Liabilities:		
Accounts payable	$ 76	$ 56
Accrued expenses	2,299	2,702
Total current liabilities	2,375	2,758
Lease incentive obligation, net of current portion	1,005	1,132
Contract termination obligation, net of current portion (Note 13)	—	489
Total liabilities	3,380	4,379
Commitments and contingencies (Note 6)		
Stockholders' Equity:		
Series A Convertible Preferred Stock ($0.01 par value per share); 5,000,000 authorized at December 31, 2017 and 2016, respectively; 1,826 and zero shares issued and outstanding at December 31, 2017 and 2016, respectively	818	—
Common stock ($0.01 par value per share); 40,000,000 shares and 250,000,000 shares authorized at December 31, 2017 and 2016, respectively; 9,089,159 and 2,834,244 shares issued and outstanding at December 31, 2017 and 2016, respectively	91	28
Additional paid-in capital	355,431	339,782
Accumulated other comprehensive loss	(85)	(84)
Accumulated deficit	(342,753)	(333,357)
Total stockholders' equity	13,502	6,369
Total liabilities and stockholders' equity	$ 16,882	$ 10,748

The accompanying notes are an integral part of these consolidated financial statements.

YIELD10 BIOSCIENCE, INC.
(formerly known as Metabolix, Inc.)

CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except share and per share amounts)

	Years Ended December 31,	
	2017	**2016**
Revenue:		
Grant revenue	$ 944	$ 1,159
Total revenue	944	1,159
Expenses:		
Research and development	4,597	5,670
General and administrative	5,630	5,737
Total expenses	10,227	11,407
Loss from continuing operations	(9,283)	(10,248)
Other income (expense), net	(113)	(38)
Net loss from continuing operations before income tax benefit	(9,396)	(10,286)
Income tax benefit	—	1,097
Net loss from continuing operations	(9,396)	(9,189)
Discontinued operations		
Income from discontinued operations	—	2,682
Income tax provision	—	(1,097)
Total net income from discontinued operations	—	1,585
Net loss	$ (9,396)	$ (7,604)
Loss attributable to common shareholders and loss per common share:		
Net loss	$ (9,396)	$ (7,604)
Deemed dividend on Series A Convertible Preferred Stock issuance	(1,427)	—
Net loss applicable to common shareholders	$ (10,823)	$ (7,604)
Basic and Diluted net loss per share:		
Net loss from continuing operations	$ (3.29)	$ (3.30)
Net income from discontinued operations	—	0.57
Net loss per share	$ (3.29)	$ (2.73)
Number of shares used in per share calculations:		
Basic & Diluted	3,288,618	2,781,185

The accompanying notes are an integral part of these consolidated financial statements.

YIELD10 BIOSCIENCE, INC.
(formerly known as Metabolix, Inc.)

CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(In thousands)

	Years Ended December 31,	
	2017	**2016**
Net loss	$ (9,396)	$ (7,604)
Other comprehensive income (loss):		
Change in foreign currency translation adjustment	(1)	(12)
Total other comprehensive loss	(1)	(12)
Comprehensive loss	$ (9,397)	$ (7,616)

The accompanying notes are an integral part of these consolidated financial statements.

YIELD10 BIOSCIENCE, INC.
(formerly known as Metabolix, Inc.)

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)

	Years Ended December 31,	
	2017	**2016**
Cash flows from operating activities		
Net loss	$ (9,396)	$ (7,604)
Adjustments to reconcile net loss to cash used in operating activities:		
Depreciation	206	515
Expense for 401(k) company common stock match	85	281
Stock-based compensation	1,395	848
Inventory impairment	—	199
Gain on sale of discontinued operation and property and equipment	—	(9,833)
Non-cash restructuring expense paid through stock and equipment	—	196
Changes in operating assets and liabilities:		
Accounts receivable	12	172
Due from related parties	1	145
Unbilled receivables	56	29
Inventory	—	180
Prepaid expenses and other assets	660	1,302
Accounts payable	17	(51)
Accrued expenses	(622)	(845)
Contract termination obligation and other long-term liabilities	(616)	339
Deferred revenue	—	(277)
Net cash used in operating activities	(8,202)	(14,404)
Cash flows from investing activities		
Purchase of property and equipment	(6)	(752)
Proceeds from sale of discontinued operation and property and equipment	—	10,317
Change in restricted cash	115	187
Net cash provided by investing activities	109	9,752
Cash flows from financing activities		
Proceeds from private placement offering, net of issuance costs	1,966	—
Proceeds from public stock offerings, net of issuance costs	13,318	—
Taxes paid on employees' behalf related to vesting of stock awards	(12)	(296)
Net cash provided by (used in) financing activities	15,272	(296)
Effect of exchange rate changes on cash and cash equivalents	(1)	(12)
Net increase (decrease) in cash and cash equivalents	7,178	(4,960)
Cash and cash equivalents at beginning of period	7,309	12,269
Cash and cash equivalents at end of period	$ 14,487	$ 7,309
Supplemental Cash Flow Disclosure:		
Interest paid	$ 116	$ 45
Supplemental Disclosure of Non-cash Information:		
Stock offering costs remaining in accounts payable and accrued expenses	$ 221	$ —
Deemed dividend related to Series A Convertible Preferred Stock beneficial conversion feature	$ 1,427	$ —
Lease incentive paid by lessor	$ —	$ 1,332
Transfer of equipment to settle contractual liability	$ —	$ 111
Issuance of common stock to settle contractual liability	$ —	$ 85

The accompanying notes are an integral part of these consolidated financial statements

YIELD10 BIOSCIENCE, INC.
(formerly known as Metabolix, Inc.)

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(In thousands, except share amounts)

	Series A Convertible Preferred Stock		Common Stock					
	Shares	Par Value	Shares	Par Value	Additional Paid-In Capital	Accumulated other Comprehensive Income (loss)	Accumulated Deficit	Total Stockholders' Equity
Balance, December 31, 2015	—	$ —	2,733,144	$ 27	$ 338,826	$ (72)	$ (325,753)	$ 13,028
Non-cash stock-based compensation expense	—	—	—	—	848	—	—	848
Issuance of common stock for 401k match	—	—	31,912	—	320	—	—	320
Issuance of stock for restricted stock unit release, net of 18,850 shares withheld for employee taxes (See Note 9)	—	—	41,688	1	(297)	—	—	(296)
Issuance of stock in connection with contract termination	—	—	27,500	—	85	—	—	85
Effect of foreign currency translation	—	—	—	—	—	(12)	—	(12)
Net loss	—	—	—	—	—	—	(7,604)	(7,604)
Balance, December 31, 2016	—	$ —	2,834,244	$ 28	$ 339,782	$ (84)	$ (333,357)	$ 6,369
Non-cash stock-based compensation expense	—	—	—	—	1,395	—	—	1,395
Issuance of common stock for 401k match	—	—	22,493	—	84	—	—	84
Issuance of stock for restricted stock unit release, net of 2,724 shares withheld for employee taxes (See Note 9)	—	—	34,193	1	(13)	—	—	(12)
Issuance of stock in connection with registered direct offering, net of offering costs of $317	—	—	570,784	5	1,961	—	—	1,966
Issuance of common stock, preferred stock and warrants in connection with public offering, net of offering costs of $1,392	3,987	1,786	4,667,000	47	11,264	—	—	13,097
Beneficial conversion feature of Series A Convertible Preferred Stock	—	(1,427)	—	—	1,427	—	—	—
Deemed dividend to Series A Convertible Preferred Stockholders	—	1,427	—	—	(1,427)	—	—	—
Issuance of common stock upon conversion of Series A Convertible Preferred Stock	(2,161)	(968)	960,445	10	958	—	—	—
Effect of foreign currency translation	—	—	—	—	—	(1)	—	(1)
Net loss	—	—	—	—	—	—	(9,396)	(9,396)
Balance, December 31, 2017	1,826	$ 818	9,089,159	$ 91	$ 355,431	$ (85)	$ (342,753)	$ 13,502

The accompanying notes are an integral part of these consolidated financial statements

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1. Nature of Business and Basis of Presentation

Yield10 Bioscience, Inc. ("Yield10 Bioscience," "Yield10," or the "Company") was founded as Metabolix, Inc. in 1992 and changed its name in January 2017. Yield10 Bioscience is an agricultural bioscience company focusing on the development of new technologies to enable step-change increases in crop yield to enhance global food security. Yield10 is using two proprietary advanced biotechnology trait gene discovery platforms to improve fundamental crop yield through enhanced photosynthetic carbon capture and increased carbon utilization efficiency to increase seed yield. These platforms are based on the principle that plants which capture and utilize carbon more efficiently will enable more robust crops capable of increased seed yield. Yield10 is working to translate and demonstrate the commercial value of novel yield trait genes it has identified in major crops and to identify additional genome editing targets for improved crop performance in several key food and feed crops, including canola, soybean, rice and corn. Yield10 Bioscience is headquartered in Woburn, Massachusetts and has an additional agricultural science facility with greenhouses located in Saskatoon, Saskatchewan, Canada.

The accompanying consolidated financial statements have been prepared on a basis which assumes that the Company will continue as a going concern and which contemplates the realization of assets and satisfaction of liabilities and commitments in the normal course of business. With the exception of 2012, when the Company recognized $38,885 of deferred revenue from a terminated joint venture, the Company has recorded losses since its initial founding, including its fiscal year ending December 31, 2017. During 2016, the Company completed a strategic restructuring under which Yield10 Bioscience became its core business. In connection with the restructuring, the Company discontinued its pilot biopolymer production and other biopolymer operations, sold substantially all of its biopolymer assets to CJ CheilJedang Corporation ("CJ") and reduced staffing levels to approximately twenty full-time employees in order to focus on crop science activities and significantly reduce the Company's cash burn rate used in operations. During 2016, the Company recorded restructuring charges of $3,513 and as of December 31, 2017, restructuring obligations of $489 remain outstanding with payment due dates through May 2018.

As of December 31, 2017, the Company held unrestricted cash and cash equivalents of $14,487. The Company follows the guidance of ASU 2014-15, *Presentation of Financial Statements-Going Concern (Subtopic 205-40)* in order to determine whether there is substantial doubt about its ability to continue as a going concern for one year after the date its financial statements are issued. Based on its cash forecast, management has determined that the Company's present capital resources are sufficient to fund its planned operations for at least the next twelve month period from the date that these financial statements are issued.

If the Company issues equity or debt securities to raise additional funds, (i) the Company may incur fees associated with such issuance, (ii) its existing stockholders may experience dilution from the issuance of new equity securities, (iii) the
Company may incur ongoing interest expense and be required to grant a security interest in Company assets in connection with any debt issuance, and (iv) the new equity or debt securities may have rights, preferences and privileges senior to those of the Company’s existing stockholders. In addition, utilization of the Company’s net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986 due to ownership changes resulting from equity financing transactions. If the Company raises additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to its potential products or proprietary technologies, or grant licenses on terms that are not favorable to the Company.

2. Summary of Significant Accounting Policies

Principles of Consolidation

The Company's consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America. The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany transactions were eliminated, including transactions with its Canadian subsidiary, Metabolix Oilseeds, Inc. During 2016, the Company completed the sale of its biopolymer intellectual property and certain equipment and inventory to an affiliate of CJ in a transaction that met the requirements for discontinued operations reporting in accordance with ASU No. 2014-08, *Reporting Discontinued Operations and Disclosures of Disposals*

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of Components of an Entity. The consolidated financial statements for the year ended December 31, 2016 have been presented to reflect the Company's biopolymer operation as a discontinued operation.

Reverse Stock Split

On May 26, 2017, the Company effected a 1-for-10 reverse stock split of its common stock. Unless otherwise indicated, all share amounts, per share data, share prices, and conversion rates set forth in these notes and the accompanying financial statements have, where applicable, been adjusted retroactively to reflect this reverse stock split.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments purchased with an original maturity date of ninety days or less at the date of purchase to be cash equivalents.

Investments

The Company considers all investments purchased with an original maturity date of ninety days or more at the date of purchase and a maturity date of one year or less at the balance sheet date to be short-term investments. All other investments are classified as long-term. The Company held no short or long-term investments at December 31, 2017 or December 31, 2016.

Unrealized gains and temporary losses on investments are included in accumulated other comprehensive income (loss) as a separate component of stockholders' equity. Realized gains and losses, dividends, interest income and declines in value judged to be other-than-temporary credit losses are included in other income (expense). Any premium or discount arising at purchase is amortized and/or accreted to interest income.

Restricted Cash

The Company had restricted cash in the amount of $317 and $432 at December 31, 2017, and December 31, 2016, respectively. At December 31, 2017, restricted cash consists primarily of funds held in connection with the lease agreement for the Company's Woburn, Massachusetts facility.

Deferred Equity Financing Costs

The Company entered into a common stock purchase agreement in 2015 with Aspire Capital Fund, LLC, (Aspire) under which Aspire committed to purchase up to an aggregate of $20,000 of the Company's common stock over a 30-month period. Offering costs incurred to establish this agreement were recorded as deferred equity financing costs. These costs were expected be charged to additional paid-in-capital as shares were issued under the agreement. Aspire purchase transactions would have utilized pricing formulas that qualified them as variable rate transactions, as defined in the securities purchase agreement entered into in connection with the Company's securities offering completed in July 2017. Because variable rate transactions are prohibited by the securities agreement, the Aspire facility was no longer available to the Company as a source of capital. Therefore, the deferred equity offering costs can no longer be offset against future common stock issuances to Aspire. As such, the Company recognized the full deferral of $622 during the year ended December 31, 2017 within general and administrative expense.

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Foreign Currency Translation

Foreign denominated assets and liabilities of the Company's wholly-owned foreign subsidiaries are translated into U.S. dollars at the prevailing exchange rates in effect on the balance sheet date. Revenues and expenses are translated at average exchange rates prevailing during the period. Any resulting translation gains or losses are recorded in accumulated other comprehensive income (loss) in the consolidated balance sheet. When the Company dissolves, sells or substantially sells all of the assets of a consolidated foreign subsidiary, the cumulative translation gain or loss of that subsidiary is released from comprehensive income (loss) and included within its consolidated statement of operations during the fiscal period when the dissolution or sale occurs.

Comprehensive Income (Loss)

Comprehensive income (loss) is comprised of net income (loss) and certain changes in stockholders' equity that are excluded from net income (loss). The Company includes unrealized gains and losses on marketable securities and foreign currency translation adjustments in other comprehensive income (loss).

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk primarily consist of cash and cash equivalents and accounts receivable. The Company has historically invested its cash equivalents in highly rated money market funds, corporate debt, federal agency notes and U.S. treasury notes. Investments are acquired in accordance with the Company's investment policy which establishes a concentration limit per issuer. At December 31, 2017, the Company's cash equivalents were invested solely in a money market fund.

The Company's receivables related to government grants are believed to have a low risk of default. At December 31, 2017, the Company's accounts and unbilled receivables of $119, include $104, or 87%, that are amounts due from research grants with the U.S. government under which the Company serves as either the primary contractor or as a subcontractor. At December 31, 2016, the Company's accounts and unbilled receivables of $187 are all from government research grants.

Fair Value Measurements

The carrying amounts of the Company's financial instruments as of December 31, 2017 and 2016, which include cash equivalents, accounts receivable, unbilled receivables, receivables due from related parties, accounts payable, and accrued expenses, approximate their fair values due to the short-term nature of these instruments. See Note 3 for further discussion on fair value measurements.

Segment Information

The accounting guidance for segment reporting establishes standards for reporting information on operating segments in annual financial statements. The Company is an agricultural bioscience company operating in one segment, which is the development of new technologies to enable step-change increases in crop yield to enhance global food security. The Company's chief operating decision-maker does not manage any part of the Company separately, and the allocation of resources and assessment of performance are based on the Company's consolidated operating results. As of December 31, 2017 and December 31, 2016, less than 10% of the Company's combined total assets were located outside of the United States. In addition, the reported net income (loss) outside of the United States was less than 10% of the combined net income (loss) of the consolidated Company.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation. Repairs and maintenance are charged to operations as incurred. Depreciation is computed using the straight-line method over the estimated useful lives of the assets once they are placed in service as follows:

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Asset Description	Estimated Useful Life (years)
Equipment	3
Furniture and Fixtures	5
Software	3
Leasehold improvements	Shorter of useful life or term of lease

The Company records incentive payments received from its landlords as a lease incentive obligation and amortizes these amounts as reductions to lease expense over the lease term.

Impairment of Long-Lived Assets

Long-lived assets, such as property and equipment, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. The guidance further requires that companies recognize an impairment loss only if the carrying amount of a long-lived asset is not recoverable based on its undiscounted future cash flows and measure an impairment loss as the difference between the carrying amount and fair value of the asset.

Grant Revenue

The Company's source of continuing revenue is from its government research grants in which it serves as either the primary contractor or as a subcontractor. These grants are considered an ongoing major and central operation of the Company's business. Revenue is earned as research expenses related to the grants are incurred. Revenue earned on government grants, but not yet invoiced as of the balance sheet date, are recorded as unbilled receivables in the accompanying consolidated balance sheets for the years ended December 31, 2017 and December 31, 2016. Funds received from government grants in advance of work being performed are recorded as deferred revenue until earned.

Research and Development

All costs associated with internal research and development are expensed as incurred. Research and development expenses include, among others, direct costs for salaries, employee benefits, subcontractors, product trials, facility related expenses, depreciation, and stock-based compensation. Costs related to revenue-producing contracts and government grants are recorded as research and development expenses.

General and Administrative Expenses

The Company's general and administrative expense includes costs for salaries, employee benefits, facilities expenses, consulting and professional service fees, travel expenses, depreciation expenses and office related expenses incurred to support the administrative operations of the Company.

Intellectual Property Costs

The Company includes all costs associated with the prosecution and maintenance of patents within general and administrative expenses in the consolidated statement of operations.

Stock-Based Compensation

All share-based payments to employees, members of the Board of Directors and non-employees are recognized in the statement of operations based on their fair values. For employees and members of the Company's Board of Directors, who receive nearly all of the Company's stock awards, stock compensation expense is recognized based on the grant-date fair value of the award, adjusted for estimated forfeitures, and is recognized on a straight-line basis over the period during which the recipient is required to provide service in exchange for the award. See Note 9 for a description of the types of stock-based awards granted, the compensation expense related to such awards and detail of equity-based awards outstanding.

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Basic and Diluted Net Loss per Share

Basic net income (loss) per share is computed by dividing net income (loss) available to common shareholders by the weighted-average number of common shares outstanding. Diluted net loss per share is computed by dividing net income available to common shareholders by the weighted-average number of dilutive common shares outstanding during the period. Diluted shares outstanding is calculated by adding to the weighted shares outstanding any potential (unissued) shares of common stock from outstanding stock options and warrants based on the treasury stock method, as well as weighted shares outstanding of any potential (unissued) shares of common stock from restricted stock units. In periods when a net loss is reported, such as the Company's fiscal years ending December 31, 2017 and 2016, all common stock equivalents are excluded from the calculation because they would have an anti-dilutive effect, meaning the loss per share would be reduced. Therefore, in periods when a loss is reported, there is no difference in basic and dilutive loss per share. Common stock equivalents include stock options, restricted stock awards, convertible preferred stock and warrants.

The Company follows the two-class method when computing net loss per share, when it has issued shares that meet the definition of participating securities. The two-class method determines net income per share for each class of common and participating securities according to dividends declared or accumulated and participating rights in undistributed earnings. The two-class method requires for the period to be allocated between common and participating securities based on their respective rights to receive dividends, as if all income for the period has been distributed or losses to be allocated if they are contractually required to fund losses. In periods of net loss, a participating security that does not have a contractual obligation to share in the loss is not allocated a portion of the net loss when determining loss per share under the two-class method. During December 2017, the Company completed an offering of its securities that included preferred shares meeting the definition of participating securities (See Note 8). However, due to the Company's net loss in 2017, no allocation of the net loss was allocated to the preferred shares as the holders of the preferred shares do not have a contractual obligation to fund losses and loss per share has been computed and presented based on the loss being fully assigned to the Company's weighted average outstanding common shares during the year. There were no amounts allocated to participating securities during the year ended December 31, 2016. as the Company had no outstanding securities that met the definition of participating securities.

The number of shares of potentially dilutive common stock presented on a weighted average basis, related to options, restricted stock units, convertible preferred stock and warrants (prior to consideration of the treasury stock method) that were excluded from the calculation of dilutive shares since the inclusion of such shares would be anti-dilutive for the years ended December 31, 2017 and 2016, respectively, are shown below:

	Year Ended December 31,	
	2017	**2016**
Options	622,329	89,862
Restricted stock awards	16,165	70,748
Series A Convertible Preferred Stock	30,553	—
Warrants	943,749	393,300
Total	1,612,796	553,910

In July 2016, the Board of Directors of the Company approved a strategic restructuring plan under which Yield10 Bioscience became its core business with a focus on developing new technologies for step-change improvements in crop yield to enhance global food security. In connection with this restructuring, the Company discontinued its biopolymer operations. The Company's consolidated statement of operations for the year ending December 31, 2016, included in this annual report has been prepared to present basic and diluted earnings per share from continuing and discontinued operations.

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Income Taxes

The Company accounts for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in the consolidated financial statements or in the Company's tax returns. Under this method, deferred tax assets and liabilities are determined based on the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. A valuation allowance is provided to reduce the deferred tax asset to a level which, more likely than not, will be realized. See Note 10 for further discussion of income taxes. The Company had no amounts recorded for any unrecognized tax benefits as of December 31, 2017 and 2016.

The Company accounts for uncertain tax positions using a "more-likely-than-not" threshold for recognizing and resolving uncertain tax positions. The evaluation of uncertain tax positions is based on factors that include, but are not limited to, changes in tax law, the measurement of tax positions taken or expected to be taken in tax returns, the effective settlement of matters subject to audit, new audit activity and changes in facts or circumstances related to a tax position. The provision for income taxes includes the effects of any resulting tax reserves or unrecognized tax benefits that are considered appropriate as well as the related net interest and penalties, if any. The Company evaluates uncertain tax positions on a quarterly basis and adjusts the level of the liability to reflect any subsequent changes in the relevant facts surrounding the uncertain positions.

Restructuring Charges

In July 2016, the Company announced a strategic restructuring under which Yield10 Bioscience became its core business and its biopolymer operations were discontinued. The Company records estimated restructuring charges for employee severance and contract termination costs as a current period expense as those costs become contractually fixed, probable and estimable. The long and short-term obligations associated with these charges is reduced or adjusted as payments are made or the Company's estimates are revised.

Recent Accounting Standards Changes

From time to time, new accounting pronouncements are issued by the Financial Accounting Standards Board ("FASB") or other standard setting bodies that the Company adopts as of the specified effective date.

In March 2016, the FASB issued Accounting Standards Update ("ASU") No. 2016-06, *Derivatives and Hedging (Topic 815): Contingent Put and Call Options in Debt Instruments*. The new standard simplifies the embedded derivative analysis for debt instruments containing contingent call or put options by removing the requirement to assess whether a contingent event is related to interest rates or credit risks. The new standard was effective for Yield10 Bioscience on January 1, 2017. The adoption of this standard did not have an impact on the Company's financial position or results of operations.

In March 2016, the FASB issued ASU No. 2016-07, *Investments - Equity Method and Joint Ventures (Topic 323): Simplifying the Transition to the Equity Method of Accounting*. The new standard eliminates the requirement that when an investment qualifies for use of the equity method as a result of an increase in the level of ownership interest or degree of influence, an adjustment must be made to the investment, results of operations and retained earnings retroactively on a step-by-step basis as if the equity method had been in effect during all previous periods that the investment had been held. The new standard was effective for the Company on January 1, 2017. The adoption of this standard did not have an impact on our financial position or results of operations.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation - Stock Compensation (Topic 718)*: *Improvements to Employee Share-Based Payment Accounting*. The new standard involves several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities and classification on the statement of cash flows. The Company adopted the new standard effective January 1, 2017 and the adoption did not have a material impact on the Company's financial statements.

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606).* The ASU is the result of a joint project by the FASB and the International Accounting Standards Board ("IASB") to clarify the principles

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for recognizing revenue and to develop a common revenue standard for GAAP and International Financial Reporting Standards ("IFRS") that would: remove inconsistencies and weaknesses, provide a more robust framework for addressing revenue issues, improve comparability of revenue recognition practices across entities, jurisdictions, industries, and capital markets, improve disclosure requirements and resulting financial statements, and simplify the presentation of financial statements. The core principle of the new guidance is that an entity should recognize revenue to depict the transfer of promised goods or services in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The ASU was effective for annual reporting periods beginning after December 15, 2016 and early adoption was not permitted. On July 9, 2015, the FASB voted to delay the effective date of the new revenue standard by one year, but to permit entities to choose to adopt the standard as of the original date. The Company will adopt the new standard effective January 1, 2018, electing to utilize the modified retrospective method of adoption. The Company evaluated the effect the new revenue standard will have on its consolidated financial statements and related disclosures and has determined that its grant revenue, which is its sole source of revenue, does not fall within the guidance of the new standard. The Company will review future sources of revenue agreements against the guidance provided by ASU No. 2014-09 to ensure that revenue is recorded appropriately.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*. The new standard clarifies certain aspects of the statement of cash flows, including the classification of debt prepayment or debt extinguishment costs, settlement of zero-coupon debt instruments or other debt instruments with coupon interest rates that are insignificant in relation to the effective interest rate of the borrowing, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims, proceeds from the settlement of corporate-owned life insurance policies, distributions received from equity method investees and beneficial interests in securitization transactions. The new standard also clarifies that an entity should determine each separately identifiable source or use within the cash receipts and cash payments on the basis of the nature of the underlying cash flows. In situations in which cash receipts and payments have aspects of more than one class of cash flows and cannot be separated by source or use, the appropriate classification should depend on the activity that is likely to be the predominant source or use of cash flows for the item. The new standard became effective for the Company on January 1, 2018 and is not expected to have a material impact on the Company's financial statements.

In January 2016, the FASB issued ASU No. 2016-01, *Financial Instruments - Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*. The new standard amends certain aspects of accounting and disclosure requirements of financial instruments, including the requirement that equity investments with readily determinable fair values be measured at fair value with changes in fair value recognized in the Company's results of operations. The new standard does not apply to investments accounted for under the equity method of accounting or those that result in consolidation of the investee. Equity investments that do not have readily determinable fair values may be measured at fair value or at cost minus impairment adjusted for changes in observable prices. A financial liability that is measured at fair value in accordance with the fair value option is required to be presented separately in other comprehensive income for the portion of the total change in the fair value resulting from change in the instrument-specific credit risk. In addition, a valuation allowance should be evaluated on deferred tax assets related to available-for-sale debt securities in combination with other deferred tax assets. The new standard became effective for Yield10 Bioscience on January 1, 2018. The Company does not expect the new guidance to have a material impact on its financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842).* The new standard requires that all lessees recognize the assets and liabilities that arise from leases on the balance sheet and disclose qualitative and quantitative information about its leasing arrangements. The new standard will be effective for Yield10 Bioscience on January 1, 2019. The Company is in the process of evaluating the impact of this new guidance.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. The new standard changes the impairment model for most financial assets and certain other instruments. Under the new standard, entities holding financial assets and net investment in leases that are not accounted for at fair value through net income are to be presented at the net amount expected to be collected. An allowance for credit losses will be a valuation account that will be deducted from the amortized cost basis of the financial asset to present the net carrying value at the amount expected to be collected on the financial asset. The new standard will be effective for the Company on January 1, 2020. The Company is in the process of evaluating the impact of this new guidance.

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In October 2016, the FASB issued ASU No. 2016-16, *Income Taxes (Topic 740): Intra-Entity Transfer of Assets Other Than Inventory*. This new standard eliminates the deferral of the tax effects of intra-entity asset transfers other than inventory. As a result, the income tax consequences from the intra-entity transfer of an asset other than inventory and associated changes to deferred taxes will be recognized when the transfer occurs. The new standard became effective for Yield10 Bioscience on January 1, 2018. The Company does not expect the new guidance to have a material impact on its financial statements.

In August 2017 the FASB issued ASU No. 2017-12, *Derivatives and Hedging (Topic 815): Targeted Improvement to Accounting for Hedging Activities*. This new standard is intended to simplify hedge accounting by better aligning how an entity's risk management activities and hedging relationships are presented in its financial statements and simplifies the application of hedge accounting guidance in certain situations. This new standard expands and refines hedge accounting for both non-financial and financial risk components and aligns the recognition and presentation of the effects of the hedging instrument and the hedged item in the financial statements. The new standard will become effective for the Company on January 1, 2020. The Company does not expect the new guidance to have a material impact on its financial statements.

3. Fair Value Measurements

The Company has certain financial assets recorded at fair value which have been classified as Level 1 within the fair value hierarchy as described in the accounting standards for fair value measurements. Fair value is the price that would be received from the sale of an asset or the price paid to transfer a liability in an orderly transaction between independent market participants at the measurement date. Fair values determined by Level 1 inputs utilize observable data such as quoted prices in active markets for identical instruments. Fair values determined by Level 2 inputs utilize data points other than quoted prices in active markets that are observable either directly or indirectly. Fair values determined by Level 3 inputs utilize unobservable data points in which there is little or no market data, which require the reporting entity to develop its own assumptions. The fair value hierarchy level is determined by the lowest level of significant input. At December 31, 2017 and 2016, the Company did not own any Level 2 or Level 3 financial assets or liabilities and there were no transfers of financial assets or liabilities between category levels for the years then ended.

The Company's assets are measured at fair value on a recurring basis. The balance of Level 1 assets as of December 31, 2017 and December 31, 2016 were $11,025 and $1,018, respectively, and for both years the assets were in a money market fund classified within cash and cash equivalents.

4. Property and Equipment, Net

Property and equipment consist of the following:

	Year ended December 31,	
	2017	**2016**
Equipment	$ 1,059	$ 1,048
Furniture and fixtures	119	226
Leasehold improvements	1,749	1,825
Software	96	116
Total property and equipment, at cost	3,023	3,215
Less: Accumulated depreciation	(1,484)	(1,476)
Property and equipment, net	$ 1,539	$ 1,739

Depreciation expense for continuing operations for the years ended December 31, 2017 and 2016, was $206 and $177, respectively.

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5. Accrued Expenses

Accrued expenses consist of the following:

	Year ended December 31,	
	2017	2016
Employee compensation and benefits	$ 646	$ 713
Commercial manufacturing	489	939
Professional services	335	459
Other	829	591
Total accrued expenses	$ 2,299	$ 2,702

Included within accrued professional services at December 31, 2017 is $216 of professional fees related to the Company's securities offering that was completed in December. Included within accrued employee compensation and benefits at December 31, 2016 is $626 of employee post-employment severance associated with the Company's restructuring that was completed during 2016. See Note 13. There were no further severance accruals remaining at December 31, 2017.

Accrued commercial manufacturing expenses at December 31, 2017 and December 31, 2016, is comprised of the current portion of the Company's terminated biopolymer manufacturing contract obligation See Note 13.

6. Commitments and Contingencies

Leases

The Company rents its facilities under operating leases, which expire at various dates through December 2026. Rent expense within continuing operations under operating leases for the years ended December 31, 2017 and 2016, was $954 and $1,889, respectively.

At December 31, 2017, the Company's future minimum payments required under operating leases are as follows:

Year ended December 31,	Minimum lease payment
2018	$ 917
2019	855
2020	734
2021	654
2022	676
2023 and thereafter	2,832
Total	$ 6,668

Lease Commitments

In 2016 the Company entered into a lease agreement, pursuant to which the Company leases approximately 29,622 square feet of office and research and development space located at 19 Presidential Way, Woburn, Massachusetts. The lease began on June 1, 2016 and will end on November 30, 2026. The Company provided the landlord with a security deposit in the form of a letter of credit in the amount of $307. Pursuant to the lease, the Company also will pay certain taxes and operating costs associated with the premises throughout the term of the lease. During the buildout of the rented space, the landlord paid $889 for tenant improvements to the facility and an additional $444 for tenant improvements that result in increased rental payments by the Company. The current and non-current portions of the lease incentive obligations related to

the landlord’s contributions toward the cost of tenant improvements are recorded within accrued expenses and long-term lease incentive obligation, respectively, in the Company's consolidated balance sheet contained herein.

On October 10, 2016, the Company entered into a sublease agreement with a subsidiary of CJ for the sublease of approximately 9,874 square feet of its leased facility located in Woburn, Massachusetts. The subleased space was determined to be in excess of the Company's needs as a result of its strategic shift to Yield10 Bioscience and the related 2016 restructuring of its operations. The sublease is coterminous with the Company's master lease. CJ will pay rent and operating expenses equal to approximately one-third of the amounts payable to the landlord by the Company, as adjusted from time-to-time in accordance with the terms of the master lease. Total future minimum operating lease payments of $6,668 shown above are net of the CJ sublease payments. In October 2016, CJ provided the Company with a security deposit of $103 in the form of an irrevocable letter of credit.

The Company also leases approximately 13,702 square feet of office and laboratory space at 650 Suffolk Street, Lowell, Massachusetts. The lease for this facility expires in May 2020, with an option to renew for one five-year period. The Company is currently working with a commercial real estate broker to locate a subtenant for this space. The Company's wholly-owned subsidiary, Metabolix Oilseeds, Inc. ("MOI"), located in Saskatoon, Saskatchewan, Canada, leases approximately 4,100 square feet of office, laboratory and greenhouse space. MOI's leases for its various leased facilities expire between July 31, 2018 and September 30, 2018.

Contractual Commitments

In connection with the wind down of its biopolymer operations, the Company ceased pilot production of biopolymer material and reached agreements with the owner-operators of its biopolymer production facilities regarding the termination of their services. The Company recorded contract termination costs related to these manufacturing agreements of $2,641 during 2016, which is included within discontinued operations in the Company's statement of operations for the year ended December 31, 2016. As of December 31, 2017, approximately $489 of the obligations remain outstanding with the last payment due by May 2018. This remaining contractual liability is included in accrued expenses within the Company's consolidated balance sheet at December 31, 2017.

Litigation

From time to time, the Company may be subject to legal proceedings and claims in the ordinary course of business. The Company is not currently aware of any such proceedings or claims that it believes will have, individually or in the aggregate, a material adverse effect on the business, financial condition or the results of operations.

Guarantees

As of December 31, 2017 and 2016, the Company did not have significant liabilities recorded for guarantees.

The Company enters into indemnification provisions under various agreements with other companies in the ordinary course of business, typically with business partners, contractors, and customers. Under these provisions, the Company generally indemnifies and holds harmless the indemnified party for losses suffered or incurred by the indemnified party as a result of its activities. These indemnification provisions generally survive termination of the underlying agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification provisions is unlimited. However, to date Yield10 Bioscience has not incurred material costs to defend lawsuits or settle claims related to these indemnification provisions. As a result, the estimated fair value of these agreements is minimal. Accordingly, the Company has no liabilities recorded for these agreements as of December 31, 2017 and December 31, 2016.

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7. License Agreements and Related Parties

The Company previously licensed certain technology to Tepha, Inc., ("Tepha") a related party, for use in medical applications. Dr. Sinskey, a member of Yield10's Board of Directors, serves on the board of Tepha, Dr. Peoples and Dr. Sinskey are stockholders of Tepha and Yield10 owns 648,149 shares of Tepha's Series A redeemable convertible preferred stock. During May 2016, the Company entered into an amendment to its license agreement with Tepha in which the Company received a lump sum payment of $2,000 in consideration for an early buyout of all future royalties under the agreement and the licensing of two additional production strains and related intellectual property that was fully delivered to Tepha during 2016. The Company recognized $2,272 of license and royalty revenue from Tepha for the year ended December 31, 2016. During 2016, the Company also received $11 from Tepha in connection with their purchase of certain laboratory equipment previously used in the Company's biopolymer operations. At December 31, 2016, the Company had outstanding receivables due from Tepha of $1. After 2016, the Company has had no further licensing or royalty arrangements with Tepha that would generate revenue or incur expenses.

During June 2016, the Company entered into a purchase and licensing agreement with a third party in which the Company received a lump sum payment of $1,000 in consideration for the sale of certain biopolymer inventory and a non-exclusive license to certain patents owned or controlled by the Company related to biopolymers. The Company recorded license fee and royalty revenue of $850 and product sales of $150 for the year ended December 31, 2016, related to this agreement.

The patents underlying these license agreements are now owned by CJ. As a consequence of this sale and the Company's discontinuation of its biopolymer operations, license fee and royalty revenue is included within income (loss) from discontinued operations within the Company's consolidated statements of operations for the year ended December 31, 2016. See Note 14.

8. Capital Stock

Common Stock

On December 27, 2017, the Company held a special meeting of its stockholders in which the stockholders approved an amendment to the Company's Certificate of Corporation to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of common stock that are authorized to be issued. As a result of this vote, the Company filed a Certificate of Amendment to its Amended and Restated Certificate of Incorporation with the Secretary of State of the State of Delaware to decrease the number of authorized shares effective on the date of the special meeting.

During December 2017, the Company closed on a public offering of its securities, receiving cash proceeds of $13,318, net of issuance costs of $1,171 that were paid as of December 31, 2017. The Company will pay remaining offering costs of $221 during its first quarter of 2018. The offering included 4,667,000 Class A Units, priced at a public offering price of $2.25 per unit, with each unit consisting of one share of common stock, a Series A five-year expiration warrant to purchase one share of common stock at an exercise price of $2.25 per share, and a Series B nine-month expiration warrant to purchase 0.5 share of common stock at an exercise price of $2.25 per share, and 3,987 Class B Units, priced at a public offering price of $1,000 per unit, with each unit consisting of one share of preferred stock, having a conversion price of $2.25, Series A five-year warrants to purchase 445 shares of common stock at an exercise price of $2.25 per share, and Series B nine-month warrants to purchase 223 shares of common stock with an exercise price of $2.25 per share. The Company determined that both the preferred stock and the warrants should be recorded within stockholders' equity at December 31, 2017.

Proceeds received from the offering were allocated to the various elements of the offering based on their relative fair values. The fair value of the Common Stock is its closing market price on the December 21, 2017, the closing date of the offering. The Series A Convertible Preferred Stock was valued on an as-if-converted basis based on the underlying common stock and the Series A and Series B warrants were valued using the Black-Scholes model with the following weighted-average input at the time of issuance:

- an expected term of 5.0 years and 0.75 years for the Series A and Series B warrants, respectively,

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- risk free rates of 2.2 percent and 1.7 percent for the Series A and Series B warrants, respectively, based on the published rates of U.S. treasury bills with similar terms, and
- volatility of 125 percent based on the Company’s historical volatility.

After allocation of the proceeds, the effective conversion price of the Series A Convertible Preferred Stock was determined to be beneficial and, as a result, the Company immediately recorded a one-time non-cash deemed dividend of $1,427 equal to the intrinsic value of the beneficial conversion feature. The Series A Convertible Preferred Stock does not have a stated redemption date, and as a consequence, accounting guidance requires immediate recognition of a beneficial conversion feature rather than amortization of the benefit over time. The Series A Convertible Preferred Stock is considered a participating security. In accordance with applicable accounting guidance, the Company's loss of $9,396 from continuing operations has been increased by the amount of the deemed dividend resulting in a net loss attributable to common shareholders of $10,823. As of December 31, 2017, preferred shareholders have converted 2,161 of the preferred shares into 960,445 shares of common stock.

On September 12, 2017, the Company issued warrants to purchase 30,000 shares of common stock to the Company's investor relations consultant, in consideration for services rendered and to be rendered by the consultant. These warrants have an exercise price of $2.90 per share and are exercisable in whole or part at any time during the period commencing on September 12, 2017 and ending on September 11, 2024. The Company reviewed the accounting guidance for warrants and determined that the warrants should be recorded as equity within additional paid-in capital.

On July 7, 2017, the Company completed a registered direct offering of its securities. Proceeds from the transaction were approximately $1,966, net of estimated issuance costs of $317. Investors participating in the transaction purchased a total of 570,784 shares of common stock at a price of $4.00 per share and an equal number of warrants with an exercise price of $5.04 per share, exercisable beginning on the six-month anniversary of the date of issuance. The warrants expire on the sixth anniversary of the date that they become exercisable. The Company reviewed the accounting guidance for warrants and determined that the warrants should be recorded as equity within additional paid-in capital.

On May 26, 2017, the Company effected a 1-for-10 reverse stock split of its common stock. The ratio for the reverse stock split was determined by the Company's board of directors following approval by stockholders at the Company's annual meeting held on May 24, 2017. The reverse stock split reduced the number of shares of the Company's common stock outstanding at the time of the reverse stock split from approximately 28.7 million shares to approximately 2.9 million shares. Proportional adjustments were made to the Company's outstanding stock options and restricted stock units and to the number of shares issued and issuable under the Company's equity compensation plans. The number of authorized shares of the Company's common stock at that time remained at 250,000,000 shares.

In connection with the 2016 wind down of biopolymer operations, the Company ceased pilot production of biopolymer material at its third-party biopolymer pilot production facilities. In September 2016, the Company entered into an early termination agreement with the owner-operator of one of the biopolymer production facilities. As part of the consideration for the early termination, the Company issued 27,500 unregistered shares of Yield10 Bioscience common stock (see Note 13).

In October 2015, the Company entered into a common stock purchase agreement with Aspire Capital Fund, LLC (Aspire) under which Aspire committed to purchase, at the Company's direction, up to an aggregate of $20,000 of shares of Company common stock over a 30 month period. Aspire purchase transactions would have utilized pricing formulas that qualify them as variable rate transactions, as defined in the securities purchase agreement entered into in connection with the Company's securities offering completed in July 2017. Because variable rate transactions are prohibited by the securities agreement entered into in conjunction with the Company's July 7, 2017 offering, the Aspire facility is no longer available to the Company as a source of capital. During the year ended December 31, 2017, the Company wrote off its deferred equity offering costs of $622 related to the Aspire agreement since the Company no longer intends to pursue transactions under this agreement. Expense related to this write off of deferred equity offering costs are included within general and administrative expense within the Company's condensed consolidated statements of operations for the year ended December 31, 2017, included herein.

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Preferred Stock

The Company's certificate of incorporation, as amended and restated, authorizes it to issue up to 5,000,000 shares of $0.01 par value preferred stock.

As discussed above, during December 2017 the Company closed on a public offering of its securities that included issuance of 3,987 shares of Series A Convertible Preferred Stock. Each preferred share is convertible, at the holder's option, into 445 shares of common stock at a conversion price of $2.25 per share, subject to adjustments as a result of stock dividends and stock splits. Holders of the Series A Convertible Preferred Stock are entitled to certain purchase rights that provide them with the opportunity to participate in subsequent rights offerings on the same terms that holders of Common Stock would receive as if the preferred stock were fully converted into common shares. If the Company enters into certain Fundamental Transactions, as defined in the offering documents, including mergers, asset sales or other business combinations, preferred shareholders are entitled to participate and receive value equal to common shareholders, on a converted basis. The Series A Convertible Preferred Stock has no maturity date and holders of the Series A Convertible Preferred Stock have no voting rights, with the exception that an affirmative vote of a majority of the holders of any remaining outstanding preferred shares is required in order to change the preferences or rights of the preferred shares. The Series A Preferred Stock is not redeemable by the Company and preferred shareholders are entitled to receive dividends on the preferred shares equal to and in the same form as dividends paid on shares of Common Stock. Upon liquidation, dissolution or winding-up of the Company, holders of the Series A Convertible Preferred Stock are entitled to receive out of the assets, whether capital or surplus, the same amount that holders of common stock would receive as if the preferred stock were fully converted to common shares. The Series A Preferred Stock is convertible, at the Company's option, if during any 30 consecutive trading days the closing market price of the Company's Common Stock exceeds $6.75 per share, subject to certain adjustments for stock splits, recapitalizations and stock dividends, and the daily dollar trading volume exceeds $175.

The Company determined the Series A Convertible Preferred Stock should be classified as equity as it is not mandatorily redeemable, there are no unconditional obligations requiring the Company to settle in a variable number of common shares or settle through the transfer of assets and the monetary value of the preferred shares is fixed. As of December 31, 2017, 2,161 preferred shares had been converted to 960,445 shares of common stock, leaving a remaining balance of 1,826 shares of the Series A Convertible Preferred Stock outstanding as of that date. Through March 5, 2018, an additional 1,718 shares of the Company's Series A Convertible Preferred Stock were converted into 763,556 shares of common stock. Once converted, the shares of converted Series A Convertible Preferred Stock are restored to the status of authorized but unissued shares of preferred stock, subject to reissuance by the Board of Directors. At December 31, 2016 there were no shares of preferred stock issued or outstanding.

Warrants

The following table summarizes information with regard to outstanding warrants to purchase common stock as of December 31, 2017:

Issuance	Number of Shares Issuable Upon Exercise of Outstanding Warrants	Exercise Price	Expiration Date
June 2015 Private Placement	393,300	$ 39.80	June 15, 2019
July 2017 Registered Direct Offering	570,784	$ 5.04	January 7, 2024
December 2017 Public Offering - Series A	6,439,000	$ 2.25	December 21, 2022
December 2017 Public Offering - Series B	3,219,502	$ 2.25	September 21, 2018
Consultant	30,000	$ 2.90	September 11, 2024
Total	10,652,586		

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Reserved Shares

The following common stock shares were reserved for future issuance upon exercise of stock options, release of Restricted Stock Units ("RSUs"), conversion of outstanding Series A Convertible Preferred Stock and conversion of outstanding warrants:

	December 31, 2017	December 31, 2016
Stock Options	702,033	605,077
RSUs	14,367	21,735
Series A Convertible Preferred Stock	811,555	—
Warrants	10,652,586	393,300
Total number of common shares reserved for future issuance	12,180,541	1,020,112

9. Stock-Based Compensation

The Company adopted a stock plan in 2006 (the "2006 Plan"), which provided for the granting of incentive stock options, nonqualified stock options, stock appreciation rights, deferred stock awards, restricted stock awards, unrestricted stock awards, cash-based awards and dividend equivalent rights. In October 2014, the 2006 Plan was terminated and the Company adopted a new plan (the "2014 Plan"). No further grants or awards were subsequently made under the 2006 Plan. A total of 146,724 options were awarded from the 2006 Plan and as of December 31, 2017, 24,984 of these options remain outstanding and eligible for future exercise.

The 2014 Plan provides for the granting of incentive stock options, nonqualified stock options, stock appreciation rights, deferred stock awards, restricted stock awards, unrestricted stock awards, cash-based awards and dividend equivalent rights. A total of 663,104 options have been awarded from the 2014 Plan and as of December 31, 2017, 657,882 of these options remain outstanding and eligible for future exercise. A total of 144,541 restricted stock awards have been awarded from the 2014 Plan and as of December 31, 2017, 14,367 of these restricted stock awards are unvested and outstanding.

Expense Information for Employee Stock Awards

The Company recognized stock-based compensation expense, related to employee stock awards, including awards to non-employees and members of the Board of Directors, of $1,395 and $848 for the years ended December 31, 2017 and 2016, respectively. At December 31, 2017, there was approximately $986 of stock-based compensation expense related to unvested awards not yet recognized which is expected to be recognized over a weighted average period of 0.81 years.

Stock Options

Options granted under the 2006 Plan and the 2014 Plan (the "Plans") generally vest ratably over periods of one to four years from the date of hire for new employees, or date of award for existing employees, or date of commencement of services with the Company for non-employees, and generally expire ten years from the date of issuance. The Company's policy is to issue new shares upon the exercise of stock options.

On October 26, 2016, the Company's Compensation Committee granted stock options for a total of 456,000 shares to employees who remained with the Company after the Company's strategic restructuring was completed. Each option has an exercise price per share equal to the fair market value of the Company's common stock on the date of grant, vests in 4 equal semi-annual installments at a rate of 25 percent per installment over 2 years, and has a term of ten years from the date of grant.

On November 4, 2016, the Company's former chief executive officer ("CEO"), was granted stock options for 75,000 shares upon the execution of separation and release agreements relating to the termination of his employment with the Company. These options have an exercise price per share equal to the fair market value of the Company's common stock on

the date of grant, were fully vested on the date of grant, became exercisable on the effective date of the release agreement, and will remain exercisable through December 19, 2023. The Company recognized the full fair value of this award as stock compensation expense in its fiscal year ended December 31, 2016.

In December 2013, the Company's Board of Directors granted a non-qualified stock option award for the purchase of 19,167 shares of common stock to its former CEO in connection with his agreement to serve as a member of the Company's Board and to accept employment as its President and Chief Executive Officer. Upon execution of his separation agreement on November 4, 2016, the 14,375 remaining unvested stock options under this award became fully vested. The Company accounted for this vesting as an award modification and recorded the new fair value of the remaining options as expense during the Company's fiscal year ended December 31, 2016.

A summary of the activity related to the shares of common stock covered by outstanding options is as follows:

	Number of Shares	Weighted Average Exercise Price	Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Balance at December 31, 2016	605,077	$34.49		
Granted	122,998	2.75		
Exercised	—	—		
Forfeited	(2,534)	5.55		
Expired	(23,508)	417.30		
Balance at December 31, 2017	702,033	16.21	8.40	$—
Vested and expected to vest at December 31, 2017	702,033	16.21	8.38	—
Exercisable at December 31, 2017	436,522	22.87	8.12	—

The weighted average grant date fair value per share of options granted during fiscal years 2017 and 2016, was $2.10, and $3.06, respectively. No options were exercised during 2017 and 2016, and therefore the intrinsic value for exercised options during the two years was not applicable. The weighted average remaining contractual term for options outstanding as of December 31, 2017 was 8.4 years.

For the years ended December 31, 2017, and 2016, the Company determined the fair value of stock options using the Black-Scholes option pricing model with the following assumptions for option grants, respectively:

	Year Ended December 31,	
	2017	2016
Expected dividend yield	—	—
Risk-free rate	1.79% - 2.20%	1.24% - 2.04%
Expected option term (in years)	5.3-5.5	5.4-5.7
Volatility	97% - 104%	93% - 96%

The Company determined its volatility assumption based on actual market price fluctuations experienced during its trading history. The risk-free interest rate used for each grant is equal to the U.S. Treasury yield curve in effect at the time of grant for instruments with a term similar to the expected life of the related option. The expected term of the options is based upon evaluation of historical and expected future exercise behavior.

The stock price volatility and expected terms utilized in the calculation involve management's best estimates at that time, both of which impact the fair value of the option calculated under the Black-Scholes methodology and, ultimately, the expense that will be recognized over the life of the option. The accounting standard for stock-based compensation requires that the Company recognize compensation expense for only the portion of options that vest. The Company recognizes stock option forfeitures resulting from award terminations in the period in which the occurs.

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Restricted Stock Units

The Company records stock compensation expense for RSUs on a straight line basis over their vesting period based on each RSU's award date market value. During the year ended December 31, 2017, the Company awarded a total of 25,337 RSUs to its non-employee directors in lieu of cash compensation for their services. These RSUs vested upon issuance resulting in immediate recognition of stock compensation expense for the fair value of the awards.

The Company initiated use of RSUs as a broad-based form of long-term compensation incentive for its officers, directors and employees during 2015. During 2015, the Company awarded 20,397 RSUs under the 2014 Plan to members of senior management pursuant to elections previously made by the senior managers to convert a portion of their 2014 performance bonuses from cash to equity. These RSUs vested one year later on April 1, 2016. During the year ended December 31, 2015, the Company also awarded a total of 90,682 additional long-term incentive RSUs to senior management and employees. These RSUs vest in 4 equal annual installments beginning one year after the date of grant, subject to service conditions. Also during 2015, the Company awarded 8,125 RSUs to its non-employee directors that vested on May 28, 2016.

Upon execution of the separation agreement with our former CEO on November 4, 2016, the Company accelerated the vesting of 15,125 previously outstanding RSUs awarded to him in 2015. The Company recorded stock compensation expense for the fair value of these RSUs during its fiscal year ended December 31, 2016, as a result of the accelerated vesting. The accelerated vesting of the RSUs and existing stock options previously discussed was provided pursuant to the terms of the separation agreement in lieu of any cash severance and a 2016 cash bonus payable under the CEO's previous employment agreement.

The Company will pay minimum required income tax withholding associated with RSUs for its employees. As the RSUs vest, the Company will withhold a number of shares with an aggregate fair market value equal to the minimum tax withholding amount (unless the employee makes other arrangements for payment of the tax withholding) from the common stock issuable at the vest date. During the years ended December 31, 2017 and December 31, 2016, the Company withheld vested shares with a fair value of $12 and $296 to pay for minimum tax withholding associated with RSU vesting.

A summary of RSU activity for the year ended December 31, 2017 is as follows:

	Number of RSUs	Weighted Average Remaining Contractual Life (years)
Outstanding at December 31, 2016	21,735	
Awarded	25,337	
Released	(32,542)	
Forfeited	(163)	
Outstanding at December 31, 2017	14,367	0.75
Weighted average remaining recognition period (years)	1.25	
Weighted average grant date fair value of RSUs granted during the year ended December 31, 2017	$ 4.63	

Expense Information for Non-employee Stock Awards

During the year ended December 31, 2016, the Company granted stock options to purchase 5,500 shares of common stock to non-employee members of the Company's scientific advisory board. The compensation expense related to these options is to be recognized over a period of 2 years. The granted options vest 50% annually and such vesting is contingent upon future services provided by the advisors to the Company. No options were awarded for the year ended December 31, 2017 to non-employees. Options remaining unvested for non-employees are subject to remeasurement each reporting period prior to their vesting in full. Since the fair market value of the options issued to non-employees is subject to change in the future, the compensation expense recognized each year may not be indicative of future stock-based compensation charges.

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10. Income Taxes

Tax Cuts and Jobs Act

In December 2017, the Tax Cuts and Jobs Act, or the Tax Act ("TCJA"), was signed into law. Among other things, the Tax Act permanently lowers the corporate federal income tax rate to 21% from the existing maximum rate of 35%, effective for tax years including or commencing January 1, 2018. As a result of the reduction of the corporate federal income tax rate to 21%, U.S. GAAP requires companies to revalue their deferred tax assets and deferred tax liabilities as of the date of enactment, with the resulting tax effects accounted for in the reporting period of enactment. This revaluation resulted in a provision of $10,609 to income tax expense in continuing operations and a corresponding reduction the Company's valuation allowance. There is no impact, therefore, to the Company's income statement for the year ended December 31, 2017 as a result of the reduction in federal income tax rates. The Company's preliminary estimate of the TCJA and the remeasurement of its deferred tax assets and liabilities is subject to the finalization of management's analysis related to certain matters, such as developing interpretations of the provisions of the TCJA, changes to certain estimates and the filing of its tax returns. U.S. Treasury regulations, administrative interpretations or court decisions interpreting TCJA may require further adjustments and changes to the Company's estimates. The final determination of the TCJA and the remeasurement of the Company's deferred assets and liabilities will be completed as additional information becomes available, but no later than one year from the enactment of the TCJA.

Income Taxes and Deferred Tax Assets and Liabilities

The components of loss from continuing operations before provision for income taxes consist of the following:

	Year Ended December 31,	
	2017	2016
Domestic	$ (9,523)	$ (10,318)
Foreign	126	48
Loss before taxes	$ (9,397)	$ (10,270)

Significant components of the Company's net deferred tax assets are as follows:

	Year Ended December 31,	
	2017	2016
Deferred Tax Assets:		
Net operating loss carryforward	$ 20,490	$ 25,182
Capitalization of research and development expense	1,606	2,634
Credit carryforwards	2,493	2,048
Depreciation	990	1,505
Stock compensation	1,035	2,414
Other temporary differences	794	1,202
Total deferred tax assets.	27,408	34,985
Valuation allowance	(27,408)	(34,985)
Net deferred tax assets	—	—
Deferred Tax Liabilities:		
Other temporary differences	—	—
Net deferred taxes	$ —	$ —

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The reported amount of income tax expense for the years differs from the amount that would result from applying domestic federal statutory tax rates to pretax losses primarily because of changes in valuation allowance and due to a reduction in deferred tax assets as a result of the rate reduction under TCJA.

Tax Rate

The items accounting for the difference between the income tax benefit computed at the federal statutory rate of 34% and the provision for income taxes were as follows:

	Year Ended December 31,	
	2017	2016
Federal income tax at statutory federal rate	34.0 %	34.0 %
State taxes	4.9 %	5.0 %
Permanent differences	(2.3)%	(1.9)%
Tax credits	3.7 %	7.4 %
Federal rate change under tax reform	(112.9)%	0.0 %
State rate change on deferred balances	0.1 %	(0.6)%
Impact of ownership change	0.0 %	(6.1)%
Stock compensation	(12.7)%	(22.9)%
Other	1.2 %	(0.5)%
Change in valuation allowance	84.0 %	(3.7)%
Total	0.0 %	10.7 %

Tax Attributes

At December 31, 2017, the Company had net operating loss carryforwards (NOLs) for federal, state and international income tax purposes of approximately $72,941, $68,028 and $2,702, respectively. The Company's existing federal and state net operating loss carryforwards will begin to expire on various dates through 2037. The Company also had available research and development and investment tax credits for federal and state income tax purposes of approximately $1,282 and $787, respectively. These federal and state research and development credits will begin to expire on various dates through 2037. Management of the Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating loss carryforwards and research and development credits. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets. Accordingly, a full valuation allowance has been established against the deferred tax assets.

Utilization of the net operating loss and research and development credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986 due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and research and development credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. The Company completed an evaluation of its ownership changes through December 31, 2015 and determined that an ownership change occurred on August 22, 2014 in connection with an equity offering. As a consequence of this ownership change, the Company's NOLs, tax credit carryforwards and other tax deductions allocable to the tax periods preceding the ownership change became subject to limitation under Section 382. The Company has reduced its associated deferred tax assets accordingly. The Company has not yet completed an evaluation of ownership changes for the years 2016 and 2017. To the extent an ownership change occurs in the future, the net operating loss, credit carryforwards and other deferred tax assets may be subject to further limitations.

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Other

The tax years 2014 through 2017 remain open to examination by major taxing jurisdictions to which the Company is subject, which are primarily in the U.S. The statute of limitations for net operating losses utilized in future years will remain open beginning in the year of utilization.

The Company's policy is to record estimated interest and penalties related to uncertain tax positions as income tax expense. As of December 31, 2017 and 2016, the Company had no accrued interest or penalties recorded related to uncertain tax positions.

For the year ended December 31, 2016, the Company recognized tax expense of $1,097 as a result of net income recorded for discontinued operations. This tax expense is offset in consolidation by a tax benefit of $1,097 as a result of the Company's net loss from continuing operations during that tax year.

No additional provision has been made for U.S. income taxes related to the undistributed earnings of the wholly-owned subsidiaries of Yield10 Bioscience, Inc. or for unrecognized deferred tax liabilities for temporary differences related to investments in subsidiaries as the amounts are not significant. As such, earnings are expected to be permanently reinvested, the investments are essentially permanent in duration, or the Company has concluded that no additional tax liability will arise as a result of the distribution of such earnings. A liability could arise if amounts are distributed by such subsidiaries or if such subsidiaries are ultimately disposed. It is not practical to estimate the additional income taxes related to permanently reinvested earnings or the basis differences related to investment in subsidiaries. Unremitted earnings at December 31, 2017 and December 31, 2016 approximated $482 and $346, respectively. As a result of TCJA, the Company is reviewing its position but does not believe there will be a material impact. The Company will finalize its analysis by the fourth quarter of 2018.

11. Employee Benefits

The Company maintains a 401(k) savings plan in which substantially all of its regular U.S. employees are eligible to participate. Participants may contribute up to 60% of their annual compensation to the plan, subject to eligibility requirements and annual IRS limitations. The Company's plan provides for a matching contribution in common stock of up to 4.5% of a participant's total compensation dependent upon the level of participant contributions made during the plan year. Pursuant to this plan, the Company issued 22,493, and 31,912 shares of common stock during the years ended December 31, 2017, and 2016, respectively, and recorded $86, and $281, respectively, of related expense. Company contributions are fully vested upon issuance.

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12. U.S. Department of Energy Grants

In 2015, the Company entered into a multi-year $1,997 grant agreement entitled, *Production of High Oil, Transgene Free Camelina Sativa Plants through Genome Editing*, with the U.S. Department of Energy for the development of Camelina sativa feedstock. The Company is using the funds to perform research to increase oil content and/or seed yield to maximize oil yields per acre. Continued receipt of grant proceeds is contingent upon the availability of government appropriated funds and the Company's ability to make substantial progress towards meeting the objectives of the award. The Company recognizes revenue from the grant over the term of the agreement as it incurs related research and development costs and provided it meets its prorated cost-sharing obligation of approximately $500. During the years ended December 31, 2017 and 2016, the Company recognized $913 and $913, respectively, in revenue related to this grant. The grant is expected to complete in June 2018.

In 2011, the Company entered into a multi-year $6,000 grant agreement entitled, *Renewable Enhanced Feedstocks for Advanced Biofuels and Bioproducts*, with the U.S. Department of Energy for the development of switchgrass. The Company used the funds to perform research to enhance the yield of bio-based products, biopower, or fuels made from switchgrass to produce denser biomass and other products that can be further processed to make fuels such as butanol, chemicals such as propylene, and other materials to improve the economic competitiveness of future biorefineries. The Company recognized revenue from the grant over the term of the agreement as it incurred related research and development costs and it met its prorated cost-sharing obligation of approximately $3,900. During the year ended December 31, 2016, the Company recognized the final $1,028 in revenue related to this grant.

13. Restructuring

In July 2016, the Company announced a strategic restructuring under which Yield10 Bioscience became the core business and the biopolymer operations were discontinued. As part of its strategic restructuring, the Company substantially reduced staffing levels, and in January 2017, the Company formally changed its name to Yield10 Bioscience, Inc. See Note 14, Discontinued Operations.

In connection with the wind down of biopolymer operations, the Company ceased pilot production of biopolymer materials and reached agreements with the owner-operators of its biopolymer production facilities regarding the termination of their services. Through December 31, 2017, the Company made cumulative cash payments of $1,956, issued 27,500 shares of company common stock with a fair market value of $85 and transferred certain biopolymer-related production equipment with a net book value of $111 to settle a portion of these agreements and other restructuring activities. Remaining cash restructuring costs at December 31, 2017, of $489 are expected to be paid out at various times through May 2018.

	Biopolymer Production Agreements	Employee Severance and Related Costs	Total
Aggregate Charges and Amounts Accrued	$ 2,641	$ 872	$ 3,513
Paid in Cash	(1,956)	(872)	(2,828)
Paid through Stock and Equipment	(196)	—	(196)
Ending Balance Accrued at December 31, 2017	$ 489	$ —	$ 489

With the exception of approximately $226 of the $872 in employee severance and related costs incurred for non-biopolymer employees, total restructuring costs shown in the table above were classified within discontinued operations in the Company's consolidated statement of operations for the year ended December 31, 2016. Amounts related to the biopolymer production agreements were included in research and development expenses within discontinued operations for the year ended December 31, 2016, as shown in Note 14. Remaining unpaid manufacturing contract termination costs of $489 are included in accrued expenses in the Company's consolidated balance sheet at December 31, 2017.

14. Discontinued Operation

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(In thousands, except for share and per share amounts)

In July 2016, the Company announced a strategic restructuring plan under which Yield10 Bioscience became its core business. Yield10 Bioscience discontinued its biopolymer operations and eliminated approximately 45 positions in its biopolymer operations and corporate organization.

As part of this strategic shift, the Company completed the sale of its biopolymer intellectual property and certain equipment and inventory to an affiliate of CJ during September 2016. The $10,000 purchase price paid by CJ was primarily for the acquisition of intellectual property, including the Company's PHA strains, patent rights, know-how and its rights, title and interest in certain license agreements. None of this intellectual property was previously capitalized to the Company's balance sheet. As such, the transaction resulted in a gain on the sale of approximately $9,868, net of the book value of the equipment sold. In addition to the CJ purchase, other parties acquired various capital equipment of the biopolymer operation for a total purchase price of approximately $428, resulting in a net loss on sale of this equipment of approximately $35.

The Company has not and will not have further involvement in the operations of the discontinued biopolymer business.

The following are the major items comprising income or loss from discontinued operations for the year ended December 31, 2016.

	Year Ended December 31, 2016
Total revenue	$ 4,945
Costs and expenses:	
Cost of product revenue	793
Research and development	9,854
Selling, general and administrative	1,449
Net gain on sales of biopolymer assets	(9,833)
Total costs and expenses	2,263
Income from discontinued operations before income tax provision	$ 2,682
Income tax provision	(1,097)
Total net income (loss) from discontinued operations	$ 1,585

The following are the non-cash operating items and investing items related to discontinued operations for the year ended December 31, 2016.

	Year Ended December 31, 2016
Non-cash operating items:	
Depreciation	$ 326
Charge for 401(k) company common stock match	$ 118
Stock-based compensation	$ 217
Inventory impairment	$ 199
Non-cash restructuring expense paid through stock and equipment	$ 196
Gain on sale of discontinued operation and property and equipment	$ (9,833)
Investing item:	
Purchases of property and equipment	$ 193

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(In thousands, except for share and per share amounts)

15. Geographic Information

The geographic distribution of the Company's revenues and long-lived assets from continuing operations is summarized as follows:

	U.S.	Canada	Eliminations	Total
Year Ended December 31, 2017				
Net revenues to unaffiliated customers	$ 944	$ —	$ —	$ 944
Inter-geographic revenues	—	1,154	(1,154)	—
Net revenues	$ 944	$ 1,154	$ (1,154)	$ 944
Identifiable long-lived assets	$ 1,533	$ 6	$ —	$ 1,539
Year Ended December 31, 2016				
Net revenues to unaffiliated customers	$ 1,159	$ —	$ —	$ 1,159
Inter-geographic revenues	—	906	(906)	—
Net revenues	$ 1,159	$ 906	$ (906)	$ 1,159
Identifiable long-lived assets	$ 1,739	$ —	$ —	$ 1,739

Foreign revenue is based on the country in which the Company's subsidiary that earned the revenue is domiciled. During 2017, grant revenue earned from the Company's Camelina grant with the Department of Energy and subaward with North Carolina State University totaled $913 and $30, or 97% and 3%, respectively, of total revenue. During 2016, revenue earned from the Company's Camelina grant and subaward with North Carolina State University totaled $913 and $246, or 79% and 21% of total revenue.

Exhibit 3.1

CERTIFICATE OF AMENDMENT

OF

AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

YIELD10 BIOSCIENCE, INC.

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

YIELD10 BIOSCIENCE, INC., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

1. The name of the corporation (hereinafter called the **"Corporation"**) is Yield10 Bioscience, Inc.

2. The Certificate of Incorporation of the Corporation was filed with the Secretary of State of the State of Delaware on September 1, 1998. An Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on November 15, 2006 and thereafter Certificates of Designation were filed on July 8, 2009 and August 22, 2014 with the Secretary of State of the State of Delaware and Certificates of Amendment were filed on October 30, 2014 and May 26, 2015 with the Secretary of State of the State of Delaware and a Certificate of Designation was filed on September 11, 2015 with the Secretary of State of the State of Delaware. Certificates of Amendment were filed on January 6, 2017 and May 25, 2017 with the Secretary of State of the State of Delaware. A Certificate of Designation was filed on December 19, 2017 with the Secretary of State of the State of Delaware.

3. The first paragraph of Article IV of the Corporation's Amended and Restated Certificate of Incorporation, as amended, is hereby deleted and replaced in its entirety with:

> "The total number of shares of capital stock which the Corporation shall have authority to issue is forty-five million (45,000,000) shares, of which (i) forty million (40,000,000) shares shall be a class designated as common stock, par value $.01 per share (the "Common Stock"), (ii) four million nine hundred ninety-six thousand thirteen (4,996,013) shares shall be a class designated as undesignated preferred stock, par value $.01 per share (the "Undesignated Preferred Stock"), and (iii) three thousand nine hundred eighty-seven (3,987) shares shall be a class designated as Series A convertible preferred stock", par value $.01 per share.

4. The Board of Directors of the Corporation has duly adopted resolutions (i) authorizing the Corporation to execute and file with the Secretary of State of the State of Delaware this Certificate of Amendment, and (ii) declaring this Certificate of Amendment to be advisable and recommended for approval by the stockholders of the Corporation.

5. This Certificate of Amendment was duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware by the Board of Directors and stockholders of the Corporation.

6. This Certificate of Amendment shall take effect on December 27, 2017.

[Remainder of this page intentionally left blank.]

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to Certificate of Incorporation to be signed by its duly authorized President and Chief Executive Officer this 27th day of December, 2017.

YIELD10 BIOSCIENCE, INC.

By: /s/ Oliver P. Peoples
Name: Oliver P. Peoples, Ph.D.
Title: President and Chief Executive Officer

YIELD10 BIOSCIENCE, INC.

CERTIFICATE OF DESIGNATION OF PREFERENCES,
RIGHTS AND LIMITATIONS
OF
SERIES A CONVERTIBLE PREFERRED STOCK

PURSUANT TO SECTION 151 OF THE
DELAWARE GENERAL CORPORATION LAW

The undersigned, Oliver P. Peoples and Charles B. Haaser, do hereby certify that:

1. They are the President and Assistant Secretary, respectively, of Yield10 Bioscience, Inc., a Delaware corporation (the "Corporation").

2. The Corporation is authorized to issue 5,000,000 shares of preferred stock, none of which have been issued.

3. The following resolutions were duly adopted by the board of directors of the Corporation (the "Board of Directors"):

WHEREAS, the certificate of incorporation of the Corporation provides for a class of its authorized stock known as preferred stock, consisting of 5,000,000 shares, $0.01 par value per share, issuable from time to time in one or more series;

WHEREAS, the Board of Directors is authorized to fix the dividend rights, dividend rate, voting rights, conversion rights, rights and terms of redemption and liquidation preferences of any wholly unissued series of preferred stock and the number of shares constituting any series and the designation thereof, of any of them; and

WHEREAS, it is the desire of the Board of Directors, pursuant to its authority as aforesaid, to fix the rights, preferences, restrictions and other matters relating to a series of the preferred stock, which shall consist of, except as otherwise set forth in the Underwriting Agreement, up to 3,987 shares of the preferred stock which the Corporation has the authority to issue, as follows:

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors does hereby provide for the issuance of a series of preferred stock for cash or exchange of other securities, rights or property and does hereby fix and determine the rights, preferences, restrictions and other matters relating to such series of preferred stock as follows:

TERMS OF PREFERRED STOCK

Section 1. Definitions. For the purposes hereof, the following terms shall have the following meanings:

"Affiliate" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 of the Securities Act.

"Alternate Consideration" shall have the meaning set forth in Section 7(d).

"Beneficial Ownership Limitation" shall have the meaning set forth in Section 6(d).

"Business Day" means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

"Buy-In" shall have the meaning set forth in Section 6(c)(iv).

"Commission" means the United States Securities and Exchange Commission.

"Common Stock" means the Corporation's common stock, par value $0.01 per share, and stock of any other class of securities into which such securities may hereafter be reclassified or changed.

"Common Stock Equivalents" means any securities of the Corporation or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

"Conversion Amount" means the sum of the Stated Value at issue.

"Conversion Date" shall have the meaning set forth in Section 6(a).

"Conversion Price" shall have the meaning set forth in Section 6(b).

"Conversion Shares" means, collectively, the shares of Common Stock issuable upon conversion of the shares of Preferred Stock in accordance with the terms hereof.

"Equity Conditions" means, during the period in question, (a) the Corporation shall have duly honored all conversions scheduled to occur or occurring by virtue of one or more Notices of Conversion of the applicable Holder on or prior to the dates so requested or required, if any, (b) the Corporation shall have paid all liquidated damages and other amounts

owing to the applicable Holder in respect of the Preferred Stock, (c)(i) there is an effective registration statement pursuant to which either (A) the Corporation may issue Conversion Shares or (B) the Holders are permitted to utilize the prospectus thereunder to resell all of the shares of Common Stock issuable pursuant to the Transaction Documents (and the Corporation believes, in good faith, that such effectiveness will continue uninterrupted for the foreseeable future) or (ii) all of the Conversion Shares may be issued to the Holder pursuant to Section 3(a)(9) of the Securities Act and immediately resold without restriction, (d) the Common Stock is trading on a Trading Market and all of the shares issuable pursuant to the Transaction Documents are listed or quoted for trading on such Trading Market (and the Corporation believes, in good faith, that trading of the Common Stock on a Trading Market will continue uninterrupted for the foreseeable future), (e) there is a sufficient number of authorized, but unissued and otherwise unreserved, shares of Common Stock for the issuance of all of the shares then issuable pursuant to the Transaction Documents, (f) the issuance of the shares in question to the applicable Holder would not violate the limitations set forth in Section 6(d) herein and (g) the applicable Holder is not in possession of any information provided by the Corporation, any of its Subsidiaries, or any of their officers, directors, employees, agents or Affiliates, that constitutes, or may constitute, material non-public information.

"Exchange Act" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

"Forced Conversion Date" shall have the meaning set forth in Section 6(e).

"Forced Conversion Notice" shall have the meaning set forth in Section 6(e).

"Forced Conversion Notice Date" shall have the meaning set forth in Section 6(e).

"Fundamental Transaction" shall have the meaning set forth in Section 7(d).

"GAAP" means United States generally accepted accounting principles.

"Holder" shall have the meaning given such term in Section 2.

"Liquidation" shall have the meaning set forth in Section 5.

"New York Courts" shall have the meaning set forth in Section 8(d).

"Notice of Conversion" shall have the meaning set forth in Section 6(a).

"Original Issue Date" means the date of the first issuance of any shares of the Preferred Stock regardless of the number of transfers of any particular shares of Preferred Stock and regardless of the number of certificates which may be issued to evidence such Preferred Stock.

"Person" means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

"Preferred Stock" shall have the meaning set forth in Section 2.

"Representative" means Ladenburg Thalmann & Co. Inc.

"Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

"Share Delivery Date" shall have the meaning set forth in Section 6(c).

"Stated Value" shall have the meaning set forth in Section 2, as the same may be increased pursuant to Section 3.

"Successor Entity" shall have the meaning set forth in Section 7(d).

"Trading Day" means a day on which the principal Trading Market is open for business.

"Trading Market" means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE American, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market, or the New York Stock Exchange (or any successors to any of the foregoing).

"Transfer Agent" means American Stock Transfer & Trust Company, LLC, the current transfer agent of the Corporation with a mailing address of 6201 15th Avenue, Brooklyn, New York 11219, and a facsimile number of (718) 765-8712, and any successor transfer agent of the Corporation.

"Underwriting Agreement" means the underwriting agreement, dated as of December 19, 2017, among the Corporation and the Representative, as representative of the underwriters named therein, as amended, modified or supplemented from time to time in accordance with its terms.

"VWAP" means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time)), (b) if OTCQB or OTCQX is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on OTCQB or OTCQX as applicable, (c) if the Common Stock is not then

listed or quoted for trading on OTCQB or OTCQX and if prices for the Common Stock are then reported in the "Pink Sheets" published by OTC Markets, Inc. (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Holders of a majority in interest of the Preferred Stock then outstanding and reasonably acceptable to the Corporation, the fees and expenses of which shall be paid by the Corporation.

Section 2. Designation, Amount and Par Value. The series of preferred stock shall be designated as the Corporation's Series A Convertible Preferred Stock (the "Preferred Stock") and the number of shares so designated shall be up to 3,987 (which shall not be subject to increase without the written consent of all of the holders of the then-outstanding shares of Preferred Stock (each, a "Holder" and collectively, the "Holders")). Each share of Preferred Stock shall have a par value of $0.01 per share and a stated value equal to $1,000, subject to increase set forth in Section 3 below (the "Stated Value"). The Preferred Stock will initially be issued in book-entry form and shall initially be represented only by one or more global certificates deposited with the Depository Trust Company ("DTC") and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. In addition, a beneficial owner of Preferred Stock has the right, upon written notice by such beneficial owner to the Corporation, to request the exchange of some or all of such beneficial owner's interest in Preferred Stock represented by one or more global Preferred Stock certificates deposited with Cede & Co. (or its successor) for a physical Preferred Stock certificate (a "Preferred Stock Certificate Request Notice" and the date of delivery of such Preferred Stock Certificate Request Notice by a beneficial owner, the "Preferred Stock Certificate Request Notice Date" and the deemed surrender upon delivery by the beneficial owner of a number of global shares of Preferred Stock for the same number of shares of Preferred Stock represented by a physical stock certificate, a "Preferred Stock Exchange", and such physical certificate(s), a "Preferred Stock Certificate"). Upon delivery of a Preferred Stock Certificate Request Notice, the Corporation shall promptly effect the Preferred Stock Exchange and shall promptly issue and deliver to the beneficial owner a physical Preferred Stock Certificate for such number of shares of Preferred Stock represented by its interest in such global certificates in the name of the beneficial owner. Such Preferred Stock Certificate shall be dated the original issue date and shall be executed by an authorized signatory of the Corporation. In connection with a Preferred Stock Exchange, the Corporation agrees to deliver the Preferred Stock Certificate to the Holder within two (2) Business Days of the delivery of a properly completed and executed Preferred Stock Certificate Request Notice pursuant to the delivery instructions in the Preferred Stock Certificate Request Notice. The Corporation covenants and agrees that, upon the date of delivery of the properly completed and executed Preferred Stock Certificate Request Notice, the Holder shall be deemed to be the holder of the Preferred Stock Certificate and, notwithstanding anything to the contrary set forth herein, the Preferred Stock Certificate shall be deemed for all purposes to represent all of the terms and conditions of the Preferred Stock evidenced by such global Preferred Stock certificates and the terms hereof.

Section 3. Dividends. Except for stock dividends or distributions for which adjustments are to be made pursuant to Section 7, Holders shall be entitled to receive, and the

Corporation shall pay, dividends on shares of Preferred Stock equal (on an as-if-converted-to-Common-Stock basis, disregarding for such purpose any conversion limitations hereunder) to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends shall be paid on shares of Preferred Stock. The Corporation shall not pay any dividends on the Common Stock unless the Corporation simultaneously complies with this provision.

Section 4. Voting Rights. Except as otherwise provided herein or as otherwise required by law, the Preferred Stock shall have no voting rights. However, as long as any shares of Preferred Stock are outstanding, the Corporation shall not, without the affirmative vote of the Holders of a majority of the then outstanding shares of the Preferred Stock, (a) alter or change adversely the powers, preferences or rights given to the Preferred Stock or alter or amend this Certificate of Designation, (b) amend its certificate of incorporation or other charter documents in any manner that adversely affects any rights of the Holders, (c) increase the number of authorized shares of Preferred Stock, or (d) enter into any agreement with respect to any of the foregoing.

Section 5. Liquidation. Upon any liquidation, dissolution or winding-up of the Corporation, whether voluntary or involuntary (a "Liquidation"), the Holders shall be entitled to receive out of the assets, whether capital or surplus, of the Corporation the same amount that a holder of Common Stock would receive if the Preferred Stock were fully converted (disregarding for such purposes any conversion limitations hereunder) to Common Stock which amounts shall be paid pari passu with all holders of Common Stock. The Corporation shall mail written notice of any such Liquidation, not less than 45 days prior to the payment date stated therein, to each Holder.

Section 6. Conversion.

a) Conversions at Option of Holder. Each share of Preferred Stock shall be convertible, at any time and from time to time from and after the Original Issue Date at the option of the Holder thereof, into that number of shares of Common Stock (subject to the limitations set forth in Section 6(d)) determined by dividing the Stated Value of such share of Preferred Stock by the Conversion Price. Holders shall effect conversions by providing the Corporation with the form of conversion notice attached hereto as Annex A (a "Notice of Conversion"). Each Notice of Conversion shall specify the number of shares of Preferred Stock to be converted, the number of shares of Preferred Stock owned prior to the conversion at issue, the number of shares of Preferred Stock owned subsequent to the conversion at issue and the date on which such conversion is to be effected, which date may not be prior to the date the applicable Holder delivers by facsimile or e-mail such Notice of Conversion to the Corporation (such date, the "Conversion Date"). If no Conversion Date is specified in a Notice of Conversion, the Conversion Date shall be the date that such Notice of Conversion to the Corporation is deemed delivered hereunder. No ink-original Notice of Conversion shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Conversion form be required. The calculations and entries set forth in the Notice of Conversion shall control in the absence of manifest or mathematical error. To effect conversions of shares of Preferred Stock, a Holder shall not be required to surrender the certificate(s) representing the shares of Preferred Stock to the Corporation

unless all of the shares of Preferred Stock represented thereby are so converted, in which case such Holder shall deliver the certificate representing such shares of Preferred Stock promptly following the Conversion Date at issue. Shares of Preferred Stock converted into Common Stock or redeemed in accordance with the terms hereof shall be canceled and shall not be reissued. Notwithstanding the foregoing in this Section 6(a), a holder whose interest in the Preferred Stock is a beneficial interest in certificate(s) representing the Preferred Stock held in book-entry form through DTC (or another established clearing corporation performing similar functions), shall effect conversions made pursuant to this Section 6(a) by delivering to DTC (or such other clearing corporation, as applicable) the appropriate instruction form for conversion, complying with the procedures to effect conversions that are required by DTC (or such other clearing corporation, as applicable), subject to a Holder's right to elect to receive Preferred Stock in certificated form pursuant to Section 2, in which case this sentence shall not apply, and, provided, however, as between the Corporation and a beneficial owner of Preferred Stock held in book-entry form through DTC (or another established clearing corporation performing similar functions) shall have all of the rights and remedies of a "Holder" hereunder.

b) Conversion Price. The conversion price for the Preferred Stock shall equal $2.25, subject to adjustment as provided for herein (the "Conversion Price").

c) Mechanics of Conversion

i. Delivery of Conversion Shares Upon Conversion. Not later than the earlier of (i) two (2) Trading Days and (ii) the number of Trading Days comprising the Standard Settlement Period (as defined below) after each Conversion Date (the "Share Delivery Date"), the Corporation shall deliver, or cause to be delivered, to the converting Holder (A) the number of Conversion Shares being acquired upon the conversion of the Preferred Stock, which Conversion Shares shall be free of restrictive legends and trading restrictions, and (B) a bank check in the amount of accrued and unpaid dividends, if any. The Corporation shall use its best efforts to deliver the Conversion Shares required to be delivered by the Corporation under this Section 6 electronically through the Depository Trust Company or another established clearing corporation performing similar functions. As used herein, "Standard Settlement Period" means the standard settlement period, expressed in a number of Trading Days, on the Corporation's primary Trading Market with respect to the Common Stock as in effect on the date of delivery of the Notice of Conversion. Notwithstanding the foregoing, with respect to any Notice(s) of Conversion delivered by 12:00 p.m. (New York City time) on the Original Issue Date, the Corporation agrees to deliver the Conversion Shares subject to such notice(s) by 4:00 p.m. (New York City time) on the Original Issue Date.

ii. Failure to Deliver Conversion Shares. If, in the case of any Notice of Conversion, such Conversion Shares are not delivered to or as directed by the applicable Holder by the Share Delivery Date, the Holder shall be entitled to elect by written notice to the Corporation at any time on or before its receipt of such

Conversion Shares, to rescind such Conversion, in which event the Corporation shall promptly return to the Holder any original Preferred Stock certificate delivered to the Corporation and the Holder shall promptly return to the Corporation the Conversion Shares issued to such Holder pursuant to the rescinded Notice of Conversion.

iii. Obligation Absolute; Partial Liquidated Damages. The Corporation's obligation to issue and deliver the Conversion Shares upon conversion of Preferred Stock in accordance with the terms hereof are absolute and unconditional, irrespective of any action or inaction by a Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by such Holder or any other Person of any obligation to the Corporation or any violation or alleged violation of law by such Holder or any other person, and irrespective of any other circumstance which might otherwise limit such obligation of the Corporation to such Holder in connection with the issuance of such Conversion Shares; provided, however, that such delivery shall not operate as a waiver by the Corporation of any such action that the Corporation may have against such Holder. In the event a Holder shall elect to convert any or all of the Stated Value of its Preferred Stock, the Corporation may not refuse conversion based on any claim that such Holder or any one associated or affiliated with such Holder has been engaged in any violation of law, agreement or for any other reason, unless an injunction from a court, on notice to Holder, restraining and/or enjoining conversion of all or part of the Preferred Stock of such Holder shall have been sought and obtained, and the Corporation posts a surety bond for the benefit of such Holder in the amount of 110% of the Stated Value of Preferred Stock which is subject to the injunction, which bond shall remain in effect until the completion of arbitration/litigation of the underlying dispute and the proceeds of which shall be payable to such Holder to the extent it obtains judgment. In the absence of such injunction, the Corporation shall issue Conversion Shares and, if applicable, cash, upon a properly noticed conversion. If the Corporation fails to deliver to a Holder such Conversion Shares pursuant to Section 6(c)(i) by the Share Delivery Date applicable to such conversion, the Corporation shall pay to such Holder, in cash, as liquidated damages and not as a penalty, for each $5,000 of Stated Value of Preferred Stock being converted, $25 per Trading Day (increasing to $50 per Trading Day on the third Trading Day and increasing to $100 per Trading Day on the sixth Trading Day after such damages begin to accrue) for each Trading Day after the Share Delivery Date until such Conversion Shares are delivered or Holder rescinds such conversion. Nothing herein shall limit a Holder's right to pursue actual damages for the Corporation's failure to deliver Conversion Shares within the period specified herein and such Holder shall have the right to pursue all remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief. The exercise of any such rights shall not prohibit a Holder from seeking to enforce damages pursuant to any other Section hereof or under applicable law.

iv. Compensation for Buy-In on Failure to Timely Deliver Conversion Shares Upon Conversion. In addition to any other rights available to the Holder, if the Corporation fails for any reason to deliver to a Holder the applicable Conversion Shares by the Share Delivery Date pursuant to Section 6(c)(i), and if after such Share Delivery Date such Holder is required by its brokerage firm to purchase (in an open market transaction or otherwise), or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by such Holder of the Conversion Shares which such Holder was entitled to receive upon the conversion relating to such Share Delivery Date (a "Buy-In"), then the Corporation shall (A) pay in cash to such Holder (in addition to any other remedies available to or elected by such Holder) the amount, if any, by which (x) such Holder's total purchase price (including any brokerage commissions) for the Common Stock so purchased exceeds (y) the product of (1) the aggregate number of shares of Common Stock that such Holder was entitled to receive from the conversion at issue multiplied by (2) the actual sale price at which the sell order giving rise to such purchase obligation was executed (including any brokerage commissions) and (B) at the option of such Holder, either reissue (if surrendered) the shares of Preferred Stock equal to the number of shares of Preferred Stock submitted for conversion (in which case, such conversion shall be deemed rescinded) or deliver to such Holder the number of shares of Common Stock that would have been issued if the Corporation had timely complied with its delivery requirements under Section 6(c)(i). For example, if a Holder purchases shares of Common Stock having a total purchase price of $11,000 to cover a Buy-In with respect to an attempted conversion of shares of Preferred Stock with respect to which the actual sale price of the Conversion Shares (including any brokerage commissions) giving rise to such purchase obligation was a total of $10,000 under clause (A) of the immediately preceding sentence, the Corporation shall be required to pay such Holder $1,000. The Holder shall provide the Corporation written notice indicating the amounts payable to such Holder in respect of the Buy-In and, upon request of the Corporation, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Corporation's failure to timely deliver the Conversion Shares upon conversion of the shares of Preferred Stock as required pursuant to the terms hereof.

v. Reservation of Shares Issuable Upon Conversion. The Corporation covenants that it will at all times reserve and keep available out of its authorized and unissued shares of Common Stock for the sole purpose of issuance upon conversion of the Preferred Stock as herein provided, free from preemptive rights or any other actual contingent purchase rights of Persons other than the Holder (and the other holders of the Preferred Stock), not less than such aggregate number of shares of the Common Stock as shall be issuable (taking into account the adjustments and restrictions of Section 7) upon the conversion of the then outstanding shares of Preferred Stock. The Corporation covenants that all shares of Common Stock that

shall be so issuable shall, upon issue, be duly authorized, validly issued, fully paid and nonassessable.

vi. Fractional Shares. No fractional shares or scrip representing fractional shares shall be issued upon the conversion of the Preferred Stock. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such conversion, the Corporation shall round up to the next whole share.

vii. Transfer Taxes and Expenses. The issuance of Conversion Shares on conversion of this Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such Conversion Shares, provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such Conversion Shares upon conversion in a name other than that of the Holders of such shares of Preferred Stock and the Corporation shall not be required to issue or deliver such Conversion Shares unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid. The Corporation shall pay all Transfer Agent fees required for same-day processing of any Notice of Conversion and all fees to the Depository Trust Company (or another established clearing corporation performing similar functions) required for same-day electronic delivery of the Conversion Shares.

d) Beneficial Ownership Limitation. The Corporation shall not effect any conversion of the Preferred Stock, and a Holder shall not have the right to convert any portion of the Preferred Stock, to the extent that, after giving effect to the conversion set forth on the applicable Notice of Conversion, such Holder (together with such Holder's Affiliates, and any Persons acting as a group together with such Holder or any of such Holder's Affiliates (such Persons, "Attribution Parties")) would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by such Holder and its Affiliates and Attribution Parties shall include the number of shares of Common Stock issuable upon conversion of the Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (i) conversion of the remaining, unconverted Stated Value of Preferred Stock beneficially owned by such Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Corporation subject to a limitation on conversion or exercise analogous to the limitation contained herein (including, without limitation, the Preferred Stock) beneficially owned by such Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 6(d), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. Subject to a Holder's right to rely on the number of outstanding shares of Common Stock as set forth below, the Corporation makes no representation to the

Holder that its calculations are in compliance with Section 13(d) of the Exchange Act and that the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 6(d) applies, the determination of whether the Preferred Stock is convertible (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and of how many shares of Preferred Stock are convertible shall be in the sole discretion of such Holder, and the submission of a Notice of Conversion shall be deemed to be such Holder's determination of whether the shares of Preferred Stock may be converted (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and how many shares of the Preferred Stock are convertible, in each case subject to the Beneficial Ownership Limitation. To ensure compliance with this restriction, each Holder will be deemed to represent to the Corporation each time it delivers a Notice of Conversion that such Notice of Conversion has not violated the restrictions set forth in this paragraph and the Corporation shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 6(d), in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as stated in the most recent of the following: (i) the Corporation's most recent periodic or annual report filed with the Commission, as the case may be, (ii) a more recent public announcement by the Corporation or (iii) a more recent written notice by the Corporation or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written or oral request (which may be via email) of a Holder, the Corporation shall within one Trading Day confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Corporation, including the Preferred Stock, by such Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% (or, upon election by a Holder prior to the issuance of any shares of Preferred Stock, 9.99%) of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Preferred Stock held by the applicable Holder. A Holder, upon notice to the Corporation, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 6(d) applicable to its Preferred Stock provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon conversion of this Preferred Stock held by the Holder and the provisions of this Section 6(d) shall continue to apply. Any such increase in the Beneficial Ownership Limitation will not be effective until the 61st day after such notice is delivered to the Corporation and shall only apply to such Holder and no other Holder. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 6(d) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation contained herein or to make changes or supplements necessary or

desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of Preferred Stock.

e) Forced Conversion. Notwithstanding anything herein to the contrary, if after the Original Issue Date, the VWAP during any 30 consecutive Trading Day period, which thirty (30) consecutive Trading Day period shall have commenced only after the Original Issue Date (the "Threshold Period"), exceeds $6.75 (subject to adjustment for forward and reverse stock splits, recapitalizations, stock dividends and the like after the Original Issue Date) and (ii) the daily dollar trading volume for such Threshold Period exceeds $175,000 per Trading Day, the Corporation may, within one (1) Trading Day after the end of any such Threshold Period, deliver a written notice to all Holders (a "Forced Conversion Notice" and the date such notice is delivered to all Holders, the "Forced Conversion Notice Date") to cause each Holder to convert all or part of such Holder's Preferred Stock (as specified in such Forced Conversion Notice) pursuant to Section 6, it being agreed that the "Conversion Date" for purposes of Section 6 shall be deemed to occur on the third Trading Day following the Forced Conversion Notice Date (such third Trading Day, the "Forced Conversion Date"). The Corporation may not deliver a Forced Conversion Notice, and any Forced Conversion Notice delivered by the Corporation shall not be effective, unless all of the Equity Conditions have been met on each Trading Day during the applicable Threshold Period through and including the later of the Forced Conversion Date and the Trading Day after the date that the Conversion Shares issuable pursuant to such conversion are actually delivered to the Holders pursuant to the Forced Conversion Notice. Any Forced Conversion Notices shall be applied ratably to all of the Holders based on the then outstanding shares of Preferred Stock. For purposes of clarification, a Forced Conversion shall be subject to all of the provisions of Section 6, including, without limitation, the provisions requiring payment of liquidated damages and limitations on conversions.

Section 7. Certain Adjustments.

a) Stock Dividends and Stock Splits. If the Corporation, at any time while this Preferred Stock is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock on shares of Common Stock or any other Common Stock Equivalents (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Corporation upon conversion of, or payment of a dividend on, this Preferred Stock), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues, in the event of a reclassification of shares of the Common Stock, any shares of capital stock of the Corporation, then the Conversion Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding any treasury shares of the Corporation) outstanding immediately before such event, and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive

such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 7(a) above, if at any time the Corporation grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of such Holder's Preferred Stock (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, to the extent that the Holder's right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

c) Pro Rata Distributions. During such time as this Preferred Stock is outstanding, if the Corporation declares or makes any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a "Distribution"), at any time after the issuance of this Preferred Stock, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of this Preferred Stock (without regard to any limitations on conversion hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, to the extent that the Holder's right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Distribution to such extent (or in the beneficial ownership of any shares of Common Stock as a result of such Distribution to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

d) Fundamental Transaction. If, at any time while this Preferred Stock is outstanding, (i) the Corporation, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Corporation with or into another Person, (ii) the Corporation, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Corporation or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Corporation, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Corporation, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a "Fundamental Transaction"), then, upon any subsequent conversion of this Preferred Stock, the Holder shall have the right to receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock), the number of shares of Common Stock of the successor or acquiring corporation or of the Corporation, if it is the surviving corporation, and any additional consideration (the "Alternate Consideration") receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Preferred Stock is convertible immediately prior to such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock). For purposes of any such conversion, the determination of the Conversion Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Corporation shall apportion the Conversion Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any conversion of this Preferred Stock following such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the foregoing provisions and evidencing the Holders' right to convert such preferred stock into Alternate Consideration. The Corporation shall cause any successor entity in a Fundamental Transaction in which the Corporation is not the survivor (the "Successor Entity") to assume in writing all of the

obligations of the Corporation under this Certificate of Designation in accordance with the provisions of this Section 7(d) pursuant to written agreements in form and substance reasonably satisfactory to the Holder and approved by the Holder (without unreasonable delay) prior to such Fundamental Transaction and shall, at the option of the Holder, deliver to the Holder in exchange for this Preferred Stock a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Preferred Stock which is convertible for a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon conversion of this Preferred Stock (without regard to any limitations on the conversion of this Preferred Stock) prior to such Fundamental Transaction, and with a conversion price which applies the conversion price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such conversion price being for the purpose of protecting the economic value of this Preferred Stock immediately prior to the consummation of such Fundamental Transaction), and which is reasonably satisfactory in form and substance to the Holder. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Certificate of Designation referring to the "Corporation" shall refer instead to the Successor Entity), and may exercise every right and power of the Corporation and shall assume all of the obligations of the Corporation under this Certificate of Designation with the same effect as if such Successor Entity had been named as the Corporation herein.

e) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding any treasury shares of the Corporation) issued and outstanding.

f) Notice to the Holders.

i. Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each Holder by facsimile or email a notice setting forth the Conversion Price after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Conversion by Holder. If (A) the Corporation shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Corporation shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Corporation shall authorize the granting to all holders of the Common Stock of rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Corporation shall be required in connection with any

reclassification of the Common Stock, any consolidation or merger to which the Corporation is a party, any sale or transfer of all or substantially all of the assets of the Corporation, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property or (E) the Corporation shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Corporation, then, in each case, the Corporation shall cause to be filed at each office or agency maintained for the purpose of conversion of this Preferred Stock, and shall cause to be delivered by facsimile or email to each Holder at its last facsimile number or email address as it shall appear upon the stock books of the Corporation, at least twenty (20) calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange, provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Corporation or any of the Subsidiaries, the Corporation shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to convert the Conversion Amount of this Preferred Stock (or any part hereof) during the 20-day period commencing on the date of such notice through the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

Section 8. Miscellaneous.

a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder including, without limitation, any Notice of Conversion, shall be in writing and delivered personally, by facsimile or e-mail, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at 19 Presidential Way, Woburn, Massachusetts 01801, Attention: Chief Executive Officer, facsimile number 781-933-3279, e-mail address peoples@yield10bio.com, or such other facsimile number, e-mail address or address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section 8. Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile, or by e-mail, or sent by a nationally recognized overnight courier service addressed to each Holder at the facsimile number, e-mail address or address of such Holder appearing on the books of the Corporation. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest

of (i) the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number or e-mail at the e-mail address set forth in this Section 8 prior to 5:30 p.m. (New York City time) on any date, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number or e-mail at the e-mail address set forth in this Section on a day that is not a Trading Day or later than 5:30 p.m. (New York City time) on any Trading Day, (iii) the second Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

b) Absolute Obligation. Except as expressly provided herein, no provision of this Certificate of Designation shall alter or impair the obligation of the Corporation, which is absolute and unconditional, to pay liquidated damages, and accrued dividends, as applicable, on the shares of Preferred Stock at the time, place, and rate, and in the coin or currency, herein prescribed.

c) Lost or Mutilated Preferred Stock Certificate. If a Holder's Preferred Stock certificate shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership thereof reasonably satisfactory to the Corporation.

d) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Certificate of Designation shall be governed by and construed and enforced in accordance with the internal laws of the State of Delaware, without regard to the principles of conflict of laws thereof. All legal proceedings concerning the interpretation, enforcement and defense of the transactions contemplated by this Certificate of Designation (whether brought against a party hereto or its respective Affiliates, directors, officers, shareholders, employees or agents) shall be commenced in the state and federal courts sitting in the City of New York, Borough of Manhattan (the "New York Courts"). The Corporation and each Holder hereby irrevocably submit to the exclusive jurisdiction of the New York Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waive, and agree not to assert in any suit, action or proceeding, any claim that they are not personally subject to the jurisdiction of such New York Courts, or such New York Courts are improper or inconvenient venue for such proceeding. The Corporation and each Holder hereby irrevocably waive personal service of process and consent to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Certificate of Designation and agree that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by applicable law. The Corporation and each Holder hereto hereby irrevocably

waive, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Certificate of Designation or the transactions contemplated hereby. If the Corporation or any Holder shall commence an action or proceeding to enforce any provisions of this Certificate of Designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding.

e) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation on any other occasion. Any waiver by the Corporation or a Holder must be in writing.

f) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances. If it shall be found that any interest or other amount deemed interest due hereunder violates the applicable law governing usury, the applicable rate of interest due hereunder shall automatically be lowered to equal the maximum rate of interest permitted under applicable law.

g) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

h) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

i) Status of Converted or Redeemed Preferred Stock. If any shares of Preferred Stock shall be converted, redeemed or reacquired by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Series A Convertible Preferred Stock.

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RESOLVED, FURTHER, that the Chairman, the president or any vice-president, and the secretary or any assistant secretary, of the Corporation be and they hereby are authorized and directed to prepare and file this Certificate of Designation of Preferences, Rights and Limitations in accordance with the foregoing resolution and the provisions of Delaware law.

IN WITNESS WHEREOF, the undersigned have executed this Certificate this 19th day of December, 2017.

/s/ Oliver P. Peoples
Name: Oliver P. Peoples
Title: President and Chief Executive Officer

/s/ Charles B. Haaser
Name: Charles B. Haaser
Title: Vice President – Finance, Chief Accounting Officer, Treasurer and Assistant Secretary

ANNEX A

NOTICE OF CONVERSION

(TO BE EXECUTED BY THE REGISTERED HOLDER IN ORDER TO CONVERT SHARES OF PREFERRED STOCK)

The undersigned hereby elects to convert the number of shares of Series A Convertible Preferred Stock indicated below into shares of common stock, par value $0.01 per share (the "Common Stock"), of Yield10 Bioscience, Inc., a Delaware corporation (the "Corporation"), according to the conditions hereof, as of the date written below. If shares of Common Stock are to be issued in the name of a Person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto. No fee will be charged to the Holders for any conversion, except for any such transfer taxes.

Conversion calculations:

Date to Effect Conversion: _____

Number of shares of Preferred Stock owned prior to Conversion: _____

Number of shares of Preferred Stock to be Converted: _____

Stated Value of shares of Preferred Stock to be Converted: _____

Number of shares of Common Stock to be Issued: _____

Applicable Conversion Price:_____

Number of shares of Preferred Stock subsequent to Conversion: _____

Address for Delivery: _____
or
DWAC Instructions:
Broker no: _____
Account no: _____

[HOLDER

By:_____
Name:
Title:

CERTIFICATE OF AMENDMENT

OF

RESTATED CERTIFICATE OF INCORPORATION

OF

YIELD10 BIOSCIENCE, INC.

Pursuant to Section 242 of the

General Corporation Law of the State of Delaware

YIELD10 BIOSCIENCE, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

1. The name of the corporation (hereinafter called the **"Corporation")** is Yield10 Bioscience, Inc.

2. The Certificate of Incorporation of the Corporation was filed with the Secretary of State of the State of Delaware on September 1, 1998. A Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on November 15, 2006 and thereafter Certificates of Designation were filed on July 8, 2009 and August 22, 2014 with the Secretary of State of the State of Delaware and Certificates of Amendment were filed on October 30, 2014 and May 26, 2015 with the Secretary of State of the State of Delaware and a Certificate of Designation was filed on September 11, 2015 with the Secretary of State of the State of Delaware, and a Certificate of Amendment was filed on January 6, 2017 with the Secretary of State of the State of Delaware.

3. The first paragraph of Article IV of the Corporation's Restated Certificate of Incorporation, as amended, is hereby deleted and replaced in its entirety with:

> "The total number of shares of capital stock which the Corporation shall have authority to issue is two hundred fifty-five million (255,000,000) shares, of which (i) two hundred fifty million (250,000,000) shares shall be a class designated as common stock, par value $.01 per share (the "Common Stock"), and (ii) five million (5,000,000) shares shall be a class designated as undesignated preferred stock, par value $.01 per share (the "Undesignated Preferred Stock").

Upon the effectiveness of this Certificate of Amendment to the Restated Certificate of Incorporation, as amended, every ten (10) issued and outstanding shares of Common Stock of the Corporation shall be changed, combined and reclassified into one (1) whole share of Common Stock, which shares shall be fully paid and nonassessable shares of Common Stock of the Corporation; provided, however, that in lieu of issuing fractional interests in shares of Common Stock to which any stockholder would otherwise be entitled pursuant hereto (after aggregating all

fractions of a share to which such stockholder would otherwise be entitled), the Corporation shall take such actions as permitted by and in accordance with Section 155 of the DGCL.

4. The Board of Directors of the Corporation has duly adopted resolutions (i) authorizing the Corporation to execute and file with the Secretary of State of the State of Delaware this Certificate of Amendment to combine every ten (10) shares of the Corporation's Common Stock, issued and outstanding or held in the treasury of the Corporation into one (1) share of Common Stock, and (ii) declaring this Certificate of Amendment to be advisable and recommended for approval by the stockholders of the Corporation.

5. This Certificate of Amendment was duly adopted in accordance with the provisions of Section 242 of the DGCL by the Board of Directors and stockholders of the Corporation.

6. This Certificate of Amendment as filed under Section 242 of the General Corporation Law of the State of Delaware, has been duly authorized in accordance thereof.

7. This Certificate of Amendment shall take effect on May 26, 2017.

[Remainder of this page intentionally left blank.]

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to Certificate of Incorporation to be signed by its duly authorized President and Chief Executive Officer this 25th day of May, 2017.

YIELD10 BIOSCIENCE, INC.

By: /s/ OLIVER P. PEOPLES

Name: Oliver P. Peoples, Ph,D.

Title: President and Chief Executive Officer

CERTIFICATE OF AMENDMENT

OF

RESTATED CERTIFICATE OF INCORPORATION

OF

METABOLIX, INC.

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

METABOLIX, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the *"**Corporation**")*, does hereby certify as follows:

1. The name of the corporation (hereinafter called the "Corporation") is Metabolix, Inc.

2. The Certificate of Incorporation of the Corporation was filed with the Secretary of State of the State of Delaware on September 1, 1998. A Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on November 15, 2006 and thereafter Certificates of Designation were filed on July 8, 2009 and August 22, 2014 with the Secretary of State of the State of Delaware and Certificates of Amendment were filed on October 30, 2014 and May 26, 2015 with the Secretary of State of the State of Delaware and a Certificate of Designation was filed on September 11, 2015 with the Secretary of State of the State of Delaware.

3. The Restated Certificate of Incorporation, filed on November 15, 2006, as amended, is hereby further amended to change the name of the Corporation to Yield10 Bioscience, Inc., by striking out Article I thereof and by substituting in lieu of said Article the following new Article I:

The name of the corporation (hereinafter called the "Corporation") is

YIELD10 BIOSCIENCE, INC.

4. The amendment of the Restated Certificate of Incorporation, as amended, herein certified has been duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

[*Signature Page Follows*]

Signed this 6th day of January, 2017.

METABOLIX, INC.

By: /s/ OLIVER P. PEOPLES

Name: Oliver P. Peoples, Ph,D.

Title: President and Chief Executive Officer

CERTIFICATE OF ELIMINATION OF THE

SERIES B PREFERRED STOCK OF

METABOLIX, INC.

Pursuant to Section 151(g)

of the General Corporation Law

of the State of Delaware

Metabolix, Inc., a Delaware corporation (the "**Corporation**"), in accordance with the provisions of Section 151(g) of the General Corporation Law of the State of Delaware, hereby certifies as follows:

1. That, pursuant to Section 151 of the General Corporation Law of the State of Delaware and authority granted in the Amended and Restated Certificate of Incorporation of the Corporation, as theretofore amended (the "**Certificate of Incorporation**"), the Board of Directors of the Corporation, by resolution duly adopted, authorized the issuance of a series of 50,000 shares of Series B Preferred Stock, par value $.01 per share, of the Corporation (the "**Series B Preferred Stock**"), and established the voting powers, designations, preferences and relative, participating, optional or other rights, if any, or the qualifications, limitations or restrictions thereof, and, on August 22, 2014, filed a Certificate of Designation (the "**Certificate of Designation**") with respect to such Series B Preferred Stock in the office of the Secretary of State of the State of Delaware (the "**Secretary of State**").

2. That no shares of said Series B Preferred Stock are outstanding and no shares thereof will be issued subject to said Certificate of Designation.

3. That the Board of Directors of the Corporation has adopted the following resolutions:

RESOLVED: That no shares of the Corporation's authorized Series B Preferred Stock, par value $0.01 per share (the "**Series B Preferred Stoc**k") are outstanding and that no shares of the Series B Preferred Stock will be issued subject to the certificate of designation previously filed on August 22, 2014 with respect to the Series B Preferred Stock.

RESOLVED: That the proper officers of the Corporation (the "**Authorized Officers**") be and hereby are authorized and directed to file a certificate setting forth this resolution with the Secretary of State of the State of Delaware pursuant to the provisions of Section 151(g) of the General Corporation Law of the State of Delaware for the purpose of eliminating from the Corporation's certificate of incorporation all matters set forth in the Certificate of Designation with respect to the Series B Preferred Stock; and further that upon such filing all authorized shares of Series B Preferred Stock shall be eliminated and restored to the status of authorized but unissued shares of undesignated preferred stock under the Corporation's certificate of incorporation.

4. That, accordingly, all matters set forth in the Certificate of Designation with respect to the Series B Preferred Stock be, and hereby are, eliminated from the Certificate of Incorporation, as heretofore amended, of the Corporation.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the undersigned authorized officer of the Corporation, has executed this Certificate of Elimination as of September 11, 2015.

METABOLIX, INC.

By: /s/ Joseph Shaulson

Name: Joseph Shaulson

Title: President & CEO

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED CERTIFICATE OF INCORPORATION
OF
METABOLIX, INC.

Metabolix, Inc. (the **"Corporation"),** a corporation organized under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the **"General Corporation Law"),**

DOES HEREBY CERTIFY:

1. Pursuant to Section 242 of the General Corporation Law, this Certificate of Amendment to Amended and Restated Certificate of Incorporation (this "**Amendment")** amends the provisions of the Amended and Restated Certificate of Incorporation of the Corporation (the "**Certificate**").

2. This Amendment has been approved and duly adopted by the Corporation's Board of Directors and its stockholders in accordance with the provisions of Section 242 of the General Corporation Law, and the provisions of the Certificate.

3. The following language is hereby added to the end of the first paragraph of ARTICLE IV of the Certificate:

"Effective at 5:00 p.m. EDT, on May 26, 2015, every six outstanding shares of Common Stock will be combined into and automatically become one share of outstanding Common Stock of the Corporation. The Corporation will not issue fractional shares on account of the foregoing reverse stock split; all shares that are held by a stockholder as of the effective date hereof shall be aggregated and each fractional share resulting from the reverse stock split after giving effect to such aggregation shall be cancelled.

In lieu of any interest in a fractional share to which a stockholder would otherwise be entitled as a result of such reverse stock split, such stockholder will be paid a cash amount for such fractional shares equal to the product obtained by multiplying (a) the closing price of the shares of Common Stock on the first trading day immediately preceding the effective date of the reverse split, as reported on The NASDAQ Capital Market by (b) the number of shares of Common Stock held by such stockholder that would otherwise have been exchanged for such fractional share interest. The par value of the Common Stock and the total number of authorized shares of Common Stock will not change as a result of such reverse stock split."

[End of Text]

IN WITNESS WHEREOF, the undersigned authorized officer of the Corporation, has executed this Certificate of Amendment to Amended and Restated Certificate of Incorporation as of May 26, 2015.

METABOLIX, INC.

By: /s/ Joseph Shaulson

Name: Joseph Shaulson

Title: President & CEO

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED CERTIFICATE OF INCORPORATION
OF
METABOLIX, INC.

Metabolix, Inc. (the **"Corporation"),** a corporation organized under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the **"General Corporation Law"),**

DOES HEREBY CERTIFY:

1. Pursuant to Section 242 of the General Corporation Law, this Certificate of Amendment to Amended and Restated Certificate of Incorporation (this **"Amendment")** amends the provisions of the Amended and Restated Certificate of Incorporation of the Corporation (the **"Certificate").**

2. This Amendment has been approved and duly adopted by the Corporation's Board of Directors and its stockholders in accordance with the provisions of Section 242 of the General Corporation Law, and the provisions of the Certificate.

3. The first paragraph of ARTICLE IV of the Certificate is hereby amended and restated in its entirety to read as set forth below:

"The total number of shares of capital stock which the Corporation shall have authority to issue is Two Hundred Fifty Five Million (255,000,000) shares, of which (i) Two Hundred Fifty Million (250,000,000) shares shall be a class designated as common stock, par value $.01 per share (the **"Common Stock"),** (ii) Four Million Nine Hundred Fifty Thousand (4,950,000) shares shall be a class designated as undesignated preferred stock, par value $.01 per share (the **"Undesignated Preferred Stock")** and (iii) Fifty Thousand (50,000) shares shall be a class designated as Series B Convertible Preferred Stock, par value $.O1 per share (the **"Series B Preferred Stock")."**

[End of Text]

IN WITNESS WHEREOF, the undersigned authorized officer of the Corporation, has executed this Certificate of Amendment to Amended and Restated Certificate of Incorporation as of October 30, 2014.

METABOLIX, INC.

By: /s/ Joseph Shaulson

Name: Joseph Shaulson

Title: President & CEO

METABOLIX, INC.

**CERTIFICATE OF DESIGNATION OF PREFERENCES,
RIGHTS AND LIMITATIONS
OF
SERIES B CONVERTIBLE PREFERRED STOCK**

PURSUANT TO SECTION 151 OF THE
DELAWARE GENERAL CORPORATION LAW

The undersigned, Joseph Shaulson and Sarah P. Cecil, do hereby certify that:

1. They are the President and Secretary, respectively, of Metabolix, Inc., a Delaware corporation (the "Corporation").

2. The Corporation is authorized to issue Five Million shares of preferred stock, $0.01 par value, none of which have been issued.

3. The following resolutions were duly adopted by the board of directors of the Corporation (the "Board of Directors"):

WHEREAS, the certificate of incorporation of the Corporation provides for a class of its authorized stock known as preferred stock, consisting of Five Million shares, $0.01 par value per share, issuable from time to time in one or more series;

WHEREAS, the Board of Directors is authorized to fix the dividend rights, dividend rate, voting rights, conversion rights, rights and terms of redemption and liquidation preferences of any wholly unissued series of preferred stock and the number of shares constituting any series and the designation thereof, of any of them; and

WHEREAS, it is the desire of the Board of Directors, pursuant to its authority as aforesaid, to fix the rights, preferences, restrictions and other matters relating to a series of the preferred stock, which shall consist of up to 50,000 shares of the preferred stock which the Corporation has the authority to issue, as follows:

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors does hereby provide for the issuance of a series of preferred stock for cash or exchange of other securities, rights or property and does hereby fix and determine the rights, preferences, restrictions and other matters relating to such series of preferred stock as follows:

TERMS OF PREFERRED STOCK

Section 1. Definitions. For the purposes hereof, the following terms shall have the following meanings:

"Affiliate" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 of the Securities Act.

"Alternate Consideration" shall have the meaning set forth in Section 7(d).

"Business Day" means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

"Charter Amendment" means the amendment of the Corporation's Amended and Restated Certificate of Incorporation, as amended, to increase the authorized number of shares of Common Stock to not less than 150,000,000.

"Commission" means the United States Securities and Exchange Commission.

"Common Stock" means the Corporation's common stock, par value $0.01 per share, and stock of any other class of securities into which such securities may hereafter be reclassified or changed.

"Common Stock Equivalents" means any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

"Conversion Price" shall have the meaning set forth in Section 6(b).

"Conversion Shares" means, collectively, the shares of Common Stock issuable upon conversion of the shares of Series B Preferred Stock in accordance with the terms hereof.

"Conversion Shares Registration Statement" means a registration statement that registers the resale of all Conversion Shares of the Holders, who shall be named as "selling stockholders" therein and meets the requirements of Section 9 of the Purchase Agreement.

"Delaware Courts" shall have the meaning set forth in Section 8(c).

"Fundamental Transaction" shall have the meaning set forth in Section 7(d).

"Holder" shall have the meaning given such term in Section 2.

"Issue Date Price" shall have the meaning set forth in Section 7(t).

"Liquidation" shall have the meaning set forth in Section 5.

"Person" means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

"Purchase Agreement" means the Securities Purchase Agreement, dated as of August 4, 2014, among the Corporation and the original Holders, as amended, modified or supplemented from time to time in accordance with its terms.

"Purchase Rights" shall have the meaning set forth in Section 7(b).

"Securities" means the Series B Preferred Stock and the Underlying Shares.

"Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

"Series B Preferred Stock" shall have the meaning set forth in Section 2.

"Stated Value" shall have the meaning set forth in Section 2, as the same may be increased pursuant to Section 3.

"Stockholder Approval" means the approval of the Charter Amendment by the requisite stockholders of the Corporation.

"Successor Entity" shall have the meaning set forth in Section 7(d).

"Trading Day" means a day on which the principal Trading Market is open for business.

"Trading Market" means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE MKT, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market, or the New York Stock Exchange (or any successors to any of the foregoing).

"Transaction Documents" means this Certificate of Designation, the Purchase Agreement, and all exhibits and schedules hereto and thereto.

"Transfer Agent" means American Stock Transfer and Trust Company, the current transfer agent of the Corporation, and any successor transfer agent of the Corporation.

"Underlying Shares" means the shares of Common Stock issued and issuable upon conversion of the Series B Preferred Stock.

Section 2. Designation, Amount and Par Value. The series of preferred stock shall be designated as its Series B Convertible Preferred Stock (the "Series 13 Preferred Stock") and the number of shares so designated shall be up to 50,000 (which shall not be subject to increase without the written consent of all of the holders of the Series B Preferred Stock (each, a "Holder" and collectively, the "Holders")). Each share of Series B Preferred Stock shall have a par value of $.01 per share and a stated value equal to $1,000 (the "Stated Value").

Section 3. Dividends. Except for stock dividends or distributions for which adjustments are to be made pursuant to Section 7, Holders shall be entitled to receive, and the Corporation shall pay, dividends or distributions on shares of Series B Preferred Stock equal (on an as-if-converted-to-Common Stock basis) to and in the same form as dividends or distributions actually paid on shares of the Common Stock when, as and if such dividends or distributions are paid on shares of the Common Stock. No other dividends or distributions shall be paid on shares of Series B Preferred Stock.

Section 4. Voting Rights. Except as otherwise provided herein or as otherwise required by law, the Series B Preferred Stock shall have no voting rights. However, as long as any shares of Series B Preferred Stock are outstanding, the Corporation shall not, without the affirmative vote of the Holders of a majority of the then outstanding shares of the Series B Preferred Stock, alter or change adversely the powers, preferences or rights given to the Series B Preferred Stock or alter or amend this Certificate of Designation in a manner that adversely affects the powers, preferences or rights given to the Series B Preferred Stock.

Section 5. Liquidation. Upon any liquidation, dissolution or winding-up of the Corporation, whether voluntary or involuntary (a "Liquidation"), the Holders shall be entitled to receive out of the assets, whether capital or surplus, of the Corporation an amount equal (on an as-if-converted-to-Common Stock basis) to and in the same form as amounts actually paid on shares of the Common Stock. The Corporation shall mail written notice of any such Liquidation, not less than 45 days prior to the payment date stated therein, to each Holder.

Section 6. Conversion.

a) Mandatory, Automatic Conversion. Upon the filing and acceptance of the Charter Amendment with the Secretary of State of the State of Delaware, each share of Series B Preferred Stock shall automatically convert into that number of shares of Common Stock determined by dividing the Stated Value of such share of Series B Preferred Stock by the Conversion Price. Any conversion pursuant to this Section 6(a) shall occur automatically and without any further action by the Holders and whether or not the certificates representing such shares of Series 13 Preferred Stock are surrendered to the Corporation or its Transfer Agent. Upon the occurrence of such automatic conversion, the Corporation shall provide written notice to the Holders, and the Holders shall, a reasonable time thereafter, surrender the certificates representing such shares at the office

of the Corporation or any Transfer Agent for the Series B Preferred Stock. Thereupon, there shall be issued and delivered to such Holder promptly at such office and in its name as shown on the Corporation's stock records, a certificate or certificates for the number of shares of Common Stock into which the shares of Series B Preferred Stock surrendered were convertible on the date on which such automatic conversion occurred. All Shares of Series B Preferred Stock converted into Common Stock in accordance with the terms hereof shall be deemed to have been retired and canceled and shall not be reissued.

b) Conversion Price. The conversion price for the Series B Preferred Stock (the "Conversion Price") shall equal $1.00, subject to adjustment as provided in Section 7.

c) Fractional Shares. No fractional shares or scrip representing fractional shares shall be issued upon the conversion of the Series B Preferred Stock. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such conversion, the Corporation shall, at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Conversion Price or round up to the next whole share.

d) Transfer Taxes and Expenses. The issuance of certificates for shares of the Common Stock on conversion of Series B Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such certificates; provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such certificate upon conversion in a name other than that of the Holders of such shares of Series B Preferred Stock and the Corporation shall not be required to issue or deliver such certificates unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid.

e) Issuance Limitations. Notwithstanding anything herein to the contrary, the Series B Preferred Stock may not be converted into any shares of Common Stock unless the Corporation has obtained Stockholder Approval.

Section 7. Certain Adjustments.

a) Stock Dividends and Stock Splits. If the Corporation, at any time while

the Series B Preferred Stock is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock on shares of Common Stock or any other Common Stock Equivalents (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Corporation upon conversion of, or payment of a dividend on, Series B Preferred Stock), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues, in the event of a reclassification of shares of the Common Stock, any shares of

capital stock of the Corporation, then the Conversion Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock outstanding immediately before such event, and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 7(a), if, at any time while the Series B Preferred Stock is outstanding, the Corporation grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then each Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which such Holder could have acquired if such Holder had held the number of shares of Common Stock acquirable upon complete conversion of such Holder's Series B Preferred Stock immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights.

c) Pro Rata Distributions. During such time as Series B Preferred Stock is outstanding, if the Corporation declares or makes any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a "Distribution"), at any time after the issuance of the Series B Preferred Stock, then, in each such case, Holders shall be entitled to participate in such Distribution to the same extent that such Holders would have participated therein if such Holders had held the number of shares of Common Stock acquirable upon complete conversion of Series B Preferred Stock immediately before the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution.

d) Fundamental Transaction. If, at any time while Series B Preferred Stock is outstanding, (i) the Corporation, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Corporation with or into another Person, (ii) the Corporation, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Corporation or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Corporation, directly or indirectly, in one or more related

transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Corporation, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or Affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a "Fundamental Transaction"), then, upon any subsequent conversion of Series B Preferred Stock, Holders shall have the right to receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 6(e) on the conversion of Series B Preferred Stock), the number of shares of Common Stock of the successor or acquiring corporation or of the Corporation, if it is the surviving corporation, and any additional consideration (the "Alternate Consideration") receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which Series B Preferred Stock is convertible immediately prior to such Fundamental Transaction (without regard to any limitation in Section 6(e) on the conversion of Series B Preferred Stock). For purposes of any such conversion, the determination of the Conversion Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Corporation shall apportion the Conversion Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, the Holders shall be given the same choice as to the Alternate Consideration as to the securities, cash or property to be received upon any conversion of Series B Preferred Stock following such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the foregoing provisions and evidencing the Holders' right to convert such preferred stock into Alternate Consideration. The Corporation shall cause any successor entity in a Fundamental Transaction in which the Corporation is not the survivor (the "Successor Entity") to assume in writing all of the obligations of the Corporation under this Certificate of Designation and the Purchase Agreement in accordance with the provisions of this Section 7(d) pursuant to written agreements and shall, at the option of a Holders, deliver to the Holders in exchange for Series B Preferred Stock a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to Series B Preferred Stock which is convertible into a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon conversion of Series B Preferred Stock (without regard to any limitations on the conversion of Series B Preferred Stock) prior to such Fundamental Transaction, and

with a conversion price which applies the Conversion Price to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such conversion price being for the purpose of protecting the economic value of Series B Preferred Stock immediately prior to the consummation of such Fundamental Transaction), and which is reasonably satisfactory in form and substance to the Holders. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Certificate of Designation and the other Transaction Documents referring to the "Corporation" shall refer instead to the Successor Entity), and may exercise every right and power of the Corporation and shall assume all of the obligations of the Corporation under this Certificate of Designation and the other Transaction Documents with the same effect as if such Successor Entity had been named as the Corporation herein.

e) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 11100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the number of shares of Common Stock (excluding any treasury shares of the Corporation) issued and outstanding.

f) Notice to the Holders of Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each Holder a notice setting forth the Conversion Price after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

Section 8. Miscellaneous.

a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder shall be in writing and delivered personally, by facsimile, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at the address set forth above Attention: Secretary, or such other address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section 8(a). Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile, or sent by a nationally recognized overnight courier service addressed to each Holder at the facsimile number or address of such Holder appearing on the books of the Corporation, or if no such facsimile number or address appears on the books of the Corporation, at the facsimile number or address of such Holder, as set forth in Schedule I to the Purchase Agreement. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number set forth in this Section 8(a) prior to 5:30 p.m. (New York City time) on any date, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number set forth in this Section 8(a) on a day that is not a Trading Day or later

than 5:30 p.m. (New York City time) on any Trading Day, (iii) the second Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

b) Lost or Mutilated Series B Preferred Stock Certificate. If a Holder's Series B Preferred Stock certificate shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Series B Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership hereof reasonably satisfactory to the Corporation and, if requested by the Corporation, in its reasonable discretion, the receipt of a bond in a customary amount.

c) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Certificate of Designation shall be governed by and construed and enforced in accordance with the internal laws of the State of Delaware, without regard to the principles of conflict of laws thereof. Each party agrees that ail legal proceedings concerning the interpretation, enforcement and defense of the transactions contemplated by any of the Transaction Documents (whether brought against a party hereto or its respective Affiliates, directors, officers, shareholders, employees or agents) shall be commenced in the state and federal courts of the State of Delaware (the "Delaware Courts"). Each party hereto hereby irrevocably submits to the exclusive jurisdiction of the Delaware Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein (including with respect to the enforcement of any of the Transaction Documents), and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of such Delaware Courts, or such Delaware Courts are improper or inconvenient venue for such proceeding. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Certificate of Designation and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by applicable law. Each party hereto hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Certificate of Designation or the transactions contemplated hereby. If any party shall commence an action or proceeding to enforce any provisions of this Certificate of Designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding.

d) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a

waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation on any other occasion. Any waiver by the Corporation or a Holder must be in writing.

e) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances.

f) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

g) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

h) Status of Converted or Redeemed Series B Preferred Stock. Shares of Series B Preferred Stock may only be issued pursuant to the Purchase Agreement. If any shares of Series B Preferred Stock shall be converted, redeemed or reacquired by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Series B Convertible Preferred Stock.

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RESOLVED, FURTHER, that the Chairman, the president or any vice-president, and the secretary or any assistant secretary, of the Corporation be, and they hereby are, authorized and directed to prepare and file this Certificate of Designation of Preferences, Rights and Limitations in accordance with the foregoing resolution and the provisions of Delaware law.

IN WITNESS WHEREOF, the undersigned have executed this Certificate this 22nd day of August 2014.

/s/ Joseph Shaulson	/s/ Sarah P. Cecil
Joseph Shaulson	Sarah P. Cecil
President	Secretary

CERTIFICATE OF DESIGNATIONS
OF
SERIES A JUNIOR PARTICIPATING CUMULATIVE
PREFERRED STOCK
OF
METABOLIX, INC.

METABOLIX, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), in accordance with the provisions of Section 103 thereof,

DOES HEREBY CERTIFY:

Pursuant to the authority conferred upon the Board of Directors by the Amended and Restated Certificate of Incorporation (the "Certificate of Incorporation"), and Section 151(g) of the General Corporation Law of the State of Delaware, on July 7, 2009, the Board of Directors adopted the following resolution determining it desirable and in the best interests of the Corporation and its stockholders for the Corporation to create a series of 45,000 shares of preferred stock designated as "Series A Junior Participating Cumulative Preferred Stock":

RESOLVED, that pursuant to the authority vested in the Board of Directors of this Corporation, in accordance with the provisions of the Certificate of Incorporation, a series of preferred stock, par value $0.01 per share, of the Corporation be and hereby is created, and that the designation and number of shares thereof and the voting and other powers, preferences and relative, participating, optional or other rights of the shares of such series and the qualifications, limitations and restrictions thereof are as follows:

Series A Junior Participating Cumulative Preferred Stock

Section 1. Designation and Amount. There shall be a series of preferred stock that shall be designated as "Series A Junior Participating Cumulative Preferred Stock" (the "Series A Preferred Stock"), and the number of shares initially constituting such series shall be 45,000; provided, however, that if more than a total of 45,000 shares of Series A Preferred Stock shall be issuable upon the exercise of Rights (the "Rights") issued pursuant to the Shareholder Rights Agreement dated as of July 7, 2009, between the Corporation and American Stock Transfer & Trust Company, LLC, as Rights Agent (the "Rights Agreement"), the Board of Directors of the Corporation, pursuant to Section 151(g) of the General Corporation Law of the State of Delaware, may direct by resolution or resolutions that a certificate be properly executed, acknowledged, filed and recorded, in accordance with the provisions of Section 103 thereof, providing for the total number of shares of Series A Preferred Stock authorized to be issued to be increased (to the extent that the Certificate of Incorporation then permits) to the largest number of whole shares (rounded up to the nearest whole number) issuable upon exercise of such Rights.

Section 2. Dividends and Distributions.

(A) (i) Subject to the rights of the holders of any shares of any class or series of preferred stock (or any similar stock) ranking prior and superior to the Series A Preferred Stock with respect to dividends, the holders of shares of Series A Preferred Stock, in preference to the holders of shares of common stock and of any other class or series of stock ranking junior to the Series A Preferred Stock, shall be entitled to receive, when, as and if declared by the Board of Directors out of funds legally available for the purpose, quarterly dividends payable in cash on the first day of March, June, September and December in each year (each such date being referred to herein as a "Quarterly Dividend Payment Date"), commencing on the first Quarterly Dividend Payment Date after the first issuance of a share or fraction of a share of Series A Preferred Stock, in an amount per share (rounded to the nearest cent) equal to the greater of (a) $1.00 or (b) subject to the provisions for adjustment hereinafter set forth, 10,000 times the aggregate per share amount of all cash dividends, and 10,000 times the aggregate per share amount (payable in kind) of all non-cash dividends or other distributions other than a dividend payable in shares of common stock or a subdivision of the outstanding shares of common stock (by reclassification or otherwise), declared on the common stock since the immediately preceding Quarterly Dividend Payment Date, or, with respect to the first Quarterly Dividend Payment Date, since the first issuance of any share or fraction of a share of Series A Preferred Stock. The multiple of cash and non-cash dividends declared on the common stock to which holders of the Series A Preferred Stock are entitled, which shall be 10,000 initially but which shall be adjusted from time to time as hereinafter provided, is hereinafter referred to as the "Dividend Multiple." In the event the Corporation shall at any time after July 7, 2009 (the "Rights Declaration Date") (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the Dividend Multiple thereafter applicable to the determination of the amount of dividends which holders of shares of Series A Preferred Stock shall be entitled to receive shall be the Dividend Multiple applicable immediately prior to such event multiplied by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

(ii) Notwithstanding anything else contained in this paragraph (A), the Corporation shall, out of funds legally available for that purpose, declare a dividend or distribution on the Series A Preferred Stock as provided in this paragraph (A) immediately after it declares a dividend or distribution on the common stock (other than a dividend payable in shares of common stock); provided that, in the event no dividend or distribution shall have been declared on the common stock during the period between any Quarterly Dividend Payment Date and the next subsequent Quarterly Dividend Payment Date, a dividend of $1.00 per share on the Series A Preferred Stock shall nevertheless be payable on such subsequent Quarterly Dividend Payment Date.

(B) Dividends shall begin to accrue and be cumulative on outstanding shares of Series A Preferred Stock from the Quarterly Dividend Payment Date next preceding the date of issue of such shares of Series A Preferred Stock, unless the date of issue of such shares is prior to the record date for the first Quarterly Dividend Payment Date, in which case dividends on such shares shall begin to accrue from the date of issue of such shares, or unless the date of issue is a Quarterly Dividend Payment Date or is a date after the record date for the determination of holders of shares of Series A Preferred Stock entitled to receive a quarterly dividend and before such Quarterly Dividend Payment Date, in either of which events such dividends shall begin to accrue and be cumulative from such Quarterly Dividend Payment Date. Accrued but unpaid dividends shall not bear interest. Dividends paid on the shares of Series A Preferred Stock in an amount less than the total amount of such dividends at the time accrued and payable on such shares shall be allocated pro rata on a share-by-share basis among all such shares at the time outstanding. The Board of Directors may fix in accordance with applicable law a record date for the determination of holders of shares of Series A Preferred Stock entitled to receive payment of a dividend or distribution declared thereon, which record date shall be not more than such number of days prior to the date fixed for the payment thereof as may be allowed by applicable law.

Section 3. Voting Rights. In addition to any other voting rights required by law, the holders of shares of Series A Preferred Stock shall have the following voting rights:

(A) Subject to the provision for adjustment hereinafter set forth, each share of Series A Preferred Stock shall entitle the holder thereof to 10,000 votes on all matters submitted to a vote of the stockholders of the Corporation. The number of votes which a holder of a share of Series A Preferred Stock is entitled to cast, which shall initially be 10,000 but which may be adjusted from time to time as hereinafter provided, is hereinafter referred to as the "Vote Multiple." In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the Vote Multiple thereafter applicable to the determination of the number of votes per share to which holders of shares of Series A Preferred Stock shall be entitled shall be the Vote Multiple immediately prior to such event multiplied by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

(B) Except as otherwise provided herein or by law, the holders of shares of Series A Preferred Stock and the holders of shares of common stock and the holders of shares of any other capital stock of this Corporation having general voting rights, shall vote together as one class on all matters submitted to a vote of stockholders of the Corporation.

(C) (i) Whenever, at any time or times, dividends payable on any shares of Series A Preferred Stock shall be in arrears in an amount equal to at least six full quarter dividends (whether or not declared and whether or not consecutive), the holders of record of the

outstanding shares of Series A Preferred Stock shall have the exclusive right, voting separately as a single class, to elect two directors of the Corporation at a special meeting of stockholders of the Corporation or at the Corporation's next annual meeting of stockholders, and at each subsequent annual meeting of stockholders, as provided below.

(ii) Upon the vesting of such right of the holders of shares of Series A Preferred Stock, the maximum authorized number of members of the Board of Directors shall automatically be increased by two and the two vacancies so created shall be filled by vote of the holders of the outstanding shares of Series A Preferred Stock as hereinafter set forth. A special meeting of the stockholders of the Corporation then entitled to vote shall be called by the Chairman and Chief Executive Officer or the Secretary of the Corporation, if requested in writing by the holders of record of not less than 5% of the shares of Series A Preferred Stock then outstanding. At such special meeting, or, if no such special meeting shall have been called, then at the next annual meeting of stockholders of the Corporation, the holders of the shares of Series A Preferred Stock shall elect, voting as above provided, two directors of the Corporation to fill the aforesaid vacancies created by the automatic increase in the number of members of the Board of Directors. At any and all such meetings for such election, the holders of a majority of the outstanding shares of Series A Preferred Stock shall be necessary to constitute a quorum for such election, whether present in person or proxy, and such two directors shall be elected by the vote of at least a majority of the shares of Series A Preferred Stock held by such stockholders present or represented at the meeting, the holders of Series A Preferred Stock being entitled to cast a number of votes per share of Series A Preferred Stock as is specified in paragraph (A) of this Section 3. Each such additional director shall not be a member of Class I, Class II or Class III of the Board of Directors of the Corporation, but shall serve until the next annual meeting of stockholders for the election of directors, or until his successor shall be elected and shall qualify, or until his right to hold such office terminates pursuant to the provisions of this Section 3(C). Any director elected by holders of shares of Series A Preferred Stock pursuant to this Section 3(C) may be removed at any annual or special meeting, by vote of a majority of the stockholders voting as a class who elected such director, with or without cause. In case any vacancy shall occur among the directors elected by the holders of shares of Series A Preferred Stock pursuant to this Section 3(C), such vacancy may be filled by the remaining director so elected, or his successor then in office, and the director so elected to fill such vacancy shall serve until the next meeting of stockholders for the election of directors.

(iii) The right of the holders of shares of Series A Preferred Stock, voting separately as a class, to elect two members of the Board of Directors of the Corporation as aforesaid shall continue until, and only until, such time as all arrears in dividends (whether or not declared) on the Series A Preferred Stock shall have been paid or declared and set apart for payment, at which time such right shall terminate, except as herein or by law expressly provided subject to revesting in the event of each and every subsequent default of the character above-mentioned. Upon any termination of the right of the holders of the Series A Preferred Stock as a class to vote for directors as herein provided, the term of office of all directors then in office elected by the holders of shares of Series A Preferred Stock pursuant to this Section 3(C) shall terminate immediately. Whenever the term of office of the directors elected by the holders of shares of Series A Preferred Stock pursuant to this Section 3(C) shall terminate and the special

voting powers vested in the holders of the Series A Preferred Stock pursuant to this Section 3(C) shall have expired, the maximum number of members of this Board of Directors of the

Corporation shall be such number as may be provided for in the By- laws of the Corporation,

irrespective of any increase made pursuant to the provisions of this Section 3(C). The voting rights granted by this Section 3(C) shall be in addition to any other voting rights granted to the holders of the Series A Preferred Stock in this Section 3.

(D) Except as otherwise required by applicable law or as set forth herein, holders of Series A Preferred Stock shall have no special voting rights and their consent shall not be required (except to the extent they are entitled to vote with holders of common stock as set forth herein) for taking any corporate action.

Section 4. Certain Restrictions.

(A) Whenever dividends or distributions payable on the Series A Preferred Stock as provided in Section 2 are in arrears, thereafter and until all accrued and unpaid dividends and distributions, whether or not declared, on shares of Series A Preferred Stock outstanding shall have been paid in full, the Corporation shall not:

(i) declare or pay dividends on, make any other distributions on, or redeem or purchase or otherwise acquire for consideration any shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series A Preferred Stock;

(ii) declare or pay dividends on or make any other distributions on any shares of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series A Preferred Stock, except dividends paid ratably on the Series A Preferred Stock and all such parity stock on which dividends are payable or in arrears in proportion to the total amounts to which the holders of all such shares are then entitled;

(iii) except as permitted in subsection 4(A)(iv) below, redeem, purchase or otherwise acquire for consideration shares of any stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series A Preferred Stock, provided that the Corporation may at any time redeem, purchase or otherwise acquire shares of any such parity stock in exchange for shares of any stock of the Corporation ranking junior (either as to dividends or upon dissolution, liquidation or winding up) to the Series A Preferred Stock; or

(iv) purchase or otherwise acquire for consideration any shares of Series A Preferred Stock, or any shares of any stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series A Preferred Stock, except in accordance with a purchase offer made in writing or by publication (as determined by the Board of Directors) to all holders of such shares upon such terms as the Board of Directors, after consideration of the respective annual dividend rates and other relative rights and preferences of the respective series and classes, shall determine in good faith will result in fair and equitable treatment among the respective series or classes.

(B) The Corporation shall not permit any subsidiary of the Corporation to purchase or

otherwise acquire for consideration any shares of stock of the Corporation unless the Corporation could, under subsection (A) of this Section 4, purchase or otherwise acquire such shares at such time and in such manner.

Section 5. Reacquired Shares. Any shares of Series A Preferred Stock purchased or otherwise acquired by the Corporation in any manner whatsoever shall be retired promptly after the acquisition thereof. All such shares shall upon their retirement become authorized but unissued shares of preferred stock and may be reissued as part of a new series of preferred stock to be created by resolution or resolutions of the Board of Directors, subject to the conditions and restrictions on issuance set forth herein.

Section 6. Liquidation, Dissolution or Winding Up. Upon any liquidation, dissolution or winding up of the Corporation (voluntary or otherwise), no distribution shall be made (x) to the holders of shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series A Preferred Stock unless, prior thereto, the holders of shares of Series A Preferred Stock shall have received an amount (the "Series A Liquidation Preference") equal to accrued and unpaid dividends and distributions thereon, whether or not declared, to the date of such payment, plus an amount equal to the greater of (1) $10,000.00 per share or (2) an aggregate amount per share, subject to the provision for adjustment hereinafter set forth, equal to 10,000 times the aggregate amount of all cash or other property to be distributed per share to holders of common stock upon such liquidation, dissolution or winding up of the Corporation, or (y) to the holders of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series A Preferred Stock, except distributions made ratably on the Series A Preferred Stock and all other such parity stock in proportion to the total amounts to which the holders of all such shares are entitled upon such liquidation, dissolution or winding up. In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the aggregate amount per share to which holders of shares of Series A Preferred Stock were entitled immediately prior to such event under clause (x) of the preceding sentence shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

In the event, however, that there are not sufficient assets available to permit payment in full of the Series A Liquidation Preference and the liquidation preferences of all other classes and series of stock of the Corporation, if any, that rank on a parity with the Series A Preferred Stock in respect thereof, then the assets available for such distribution shall be distributed ratably to the holders of the Series A Preferred Stock and the holders of such parity shares in proportion to their respective liquidation preferences.

Neither the consolidation of nor merging of the Corporation with or into any other corporation or corporations, nor the sale or other transfer of all or substantially all of the assets of the Corporation, shall be deemed to be a liquidation, dissolution or winding up of the
Corporation within the meaning of this Section 6.

Section 7. Consolidation, Merger, etc. In case the Corporation shall enter into any consolidation, merger, combination or other transaction in which the outstanding shares of common stock are exchanged for or changed into other stock or securities, cash and/or any other property, then in any such case each share of Series A Preferred Stock shall at the same time be similarly exchanged or changed in an amount per share (subject to the provision for adjustment hereinafter set forth) equal to 10,000 times the aggregate amount of stock, securities, cash and/or any other property (payable in kind), as the case may be, into which or for which each share of common stock is changed or exchanged, plus accrued and unpaid dividends, if any, payable with respect to the Series A Preferred Stock. In the event the Corporation shall at any time after the Rights Declaration Date (i) declare or pay any dividend on common stock payable in shares of common stock, or (ii) effect a subdivision or combination or consolidation of the outstanding shares of common stock (by reclassification or otherwise than by payment of a dividend in shares of common stock) into a greater or lesser number of shares of common stock, then in each such case the amount set forth in the preceding sentence with respect to the exchange or change of shares of Series A Preferred Stock shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of common stock outstanding immediately after such event and the denominator of which is the number of shares of common stock that were outstanding immediately prior to such event.

Section 8. Redemption. The shares of Series A Preferred Stock shall not be redeemable; provided, however, that the foregoing shall not limit the ability of the Corporation to purchase or otherwise deal in such shares to the extent otherwise permitted hereby and by law.

Section 9. Ranking. Unless otherwise expressly provided in the Certificate of Incorporation or a Certificate of Designations relating to any other series of preferred stock of the Corporation, the Series A Preferred Stock shall rank junior to every other series of the Corporation's preferred stock previously or hereafter authorized, as to the payment of dividends and the distribution of assets on liquidation, dissolution or winding up and shall rank senior to the common stock.

Section 10. Fractional Shares. Series A Preferred Stock may be issued in whole shares or in any fraction of a share that is one ten-thousandth (1/10,000th) of a share or any integral multiple of such fraction, which shall entitle the holder, in proportion to such holder's fractional shares, to exercise voting rights, receive dividends, participate in distributions and to have the benefit of all other rights of holders of Series A Preferred Stock. In lieu of fractional shares, the Corporation may elect to make a cash payment as provided in the Rights Agreement for fractions of a share other than one ten-thousandth (1/10,000th) of a share or any integral multiple thereof.

Section 11. Amendment. At any time any shares of Series A Preferred Stock are outstanding, the Certificate of Incorporation and the foregoing Sections 1 through 10, inclusive,

and this Section 11 of the Certificate of Designations shall not be amended in any manner, including by merger, consolidation or otherwise, which would materially alter or change the powers, preferences or special rights of the Series A Preferred Stock so as to affect them adversely without the affirmative vote of the holders of two-thirds or more of the outstanding shares of Series A Preferred Stock, voting separately as a class.

IN WITNESS WHEREOF, the Corporation has caused this Certificate to be signed this 8th day of July, 2009.

METABOLIX, INC.

By: /s/ Richard P. Eno
Name: Richard P. Eno
Title: President and CEO

[Signature Page to Certificate of Designations of
Series A Junior Participating Cumulative Preferred Stock]

AMENDED AND RESTATED

CERTIFICATE OF INCORPORATION

OF

METABOLIX, INC.

Metabolix, Inc., a corporation organized and existing under the laws of the State of Delaware (the "Corporation"), hereby certifies as follows:

1. The name of the Corporation is Metabolix, Inc. The original certificate of incorporation of Metabolix, Inc. was filed with the Secretary of State of the State of Delaware on September 1, 1998.

2. This Amended and Restated Certificate of Incorporation was duly adopted in accordance with the provisions of Sections 242 and 245 of the Delaware General Corporation Law (the "DGCL").

3. The text of the Certificate of Incorporation of this corporation be hereby amended and restated in its entirety to provide as herein set forth in full.

ARTICLE I

The name of the Corporation is Metabolix, Inc.

ARTICLE II

The address of the Corporation's registered office in the State of Delaware is do The Corporation Trust Company, 1209 Orange Street in the City of Wilmington, County of New Castle. The name of its registered agent at such address is The Corporation Trust Company.

ARTICLE III

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the DGCL.

ARTICLE IV

CAPITAL STOCK

The total number of shares of capital stock which the Corporation shall have authority to issue is One Hundred Five Million (105,000,000) shares, of which (i) One Hundred Million (100,000,00) shares shall be a class designated as common stock, par value $.01 per share (the "Common Stock"), and (ii) Five Million (5,000,000) shares shall be a class designated as undesignated preferred stock, par value $.01 per share (the "Undesignated Preferred Stock").

The number of authorized shares of the class of Undesignated Preferred Stock may from time to time be increased or decreased (but not below the number of shares outstanding) by the affirmative vote of the holders of a majority of the outstanding shares of Common Stock entitled to vote, without a vote of the holders of the Undesignated Preferred Stock (except as otherwise provided in any certificate of designations of any series of Undesignated Preferred Stock).

The powers, preferences and rights of, and the qualifications, limitations and restrictions upon, each class or series of stock shall be determined in accordance with, or as set forth below in, this Article IV.

A. COMMON STOCK

Subject to all the rights, powers and preferences of the Undesignated Preferred Stock and except as provided by law or in this Article IV (or in any certificate of designations of any series of Undesignated Preferred Stock):

(a) the holders of the Common Stock shall have the exclusive right to vote for the election of directors of the Corporation (the "Directors") and on all other matters requiring stockholder action, each outstanding share entitling the holder thereof to one vote on each matter properly submitted to the stockholders of the Corporation for their vote; provided, however, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Certificate (or on any amendment to a certificate of designations of any series of Undesignated Preferred Stock) that alters or changes the powers, preferences, rights or other terms of one or more outstanding series of Undesignated Preferred Stock if the holders of such affected series are entitled to vote, either separately or together with the holders of one or more other such series, on such amendment pursuant to this Certificate (or pursuant to a certificate of designations of any series of Undesignated Preferred Stock) or pursuant to the DGCL;

(b) dividends may be declared and paid or set apart for payment upon the Common Stock out of any assets or funds of the Corporation legally available for the payment of dividends, but only when and as declared by the Board or any authorized committee thereof; and

(c) upon the voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the net assets of the Corporation shall be distributed pro rata to the holders of the Common Stock.

B. UNDESIGNATED PREFERRED STOCK

The Board of Directors or any authorized committee thereof is expressly authorized, to the fullest extent permitted by law, to provide for the issuance of the shares of Undesignated Preferred Stock in one or more series of such stock, and by filing a certificate pursuant to applicable law of the State of Delaware, to establish or change from time to time the number of shares of each such series, and to fix the designations, powers, including voting

powers, full or limited, or no voting powers, preferences and the relative, participating, optional or other special rights of the shares of each series and any qualifications, limitations and restrictions thereof

ARTICLE V

STOCKHOLDER ACTION

1. Action without Meeting. Except as otherwise provided herein, any action required or permitted to be taken by the stockholders of the Corporation at any annual or special meeting of stockholders of the Corporation must be effected at a duly called annual or special meeting of stockholders and may not be taken or effected by a written consent of stockholders in lieu thereof.

2. Special Meetings. Except as otherwise required by statute and subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock, special meetings of the stockholders of the Corporation may be called only by the Board of Directors acting pursuant to a resolution approved by the affirmative vote of a majority of the Directors then in office. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders of the Corporation.

ARTICLE VI
DIRECTORS

1. General. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors except as otherwise provided herein or required by law.

2. Election of Directors. Election of Directors need not be by written ballot unless the By-laws of the Corporation (the “By-laws”) shall so provide.

3. Number of Directors; Term of Office. The number of Directors of the Corporation shall be fixed solely and exclusively by resolution duly adopted from time to time by the Board of Directors. The Directors, other than those who may be elected by the holders of any series of Undesignated Preferred Stock, shall be classified, with respect to the term for which they severally hold office, into three classes, as nearly equal in number as reasonably possible. The initial Class 1 Directors of the Corporation shall be Edward M. Muller, Matthew Strobeck, Ph.D., and Robert L. Van Nostrand; the initial Class II Directors of the Corporation shall be Jack W. Lasersohn, Jay Kouba, Ph.D., and Oliver P. Peoples, Ph.D.; and the initial Class Ill Directors of the Corporation shall be Edward M. Giles, Anthony J. Sinskey, Sc.D., and James J. Barber, Ph.D. The initial Class I Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2007, the initial Class II Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2008, and the initial Class III Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2009. At each annual meeting of stockholders, Directors elected to succeed those Directors whose terms expire shall be elected for a term of office to expire at the third succeeding annual

meeting of stockholders after their election. Notwithstanding the foregoing, the Directors elected to each class shall hold office until their successors are duly elected and qualified or until their earlier resignation or removal.

Notwithstanding the foregoing, whenever, pursuant to the provisions of Article IV of this Certificate, the holders of any one or more series of Undesignated Preferred Stock shall have the right, voting separately as a series or together with holders of other such series, to elect Directors at an annual or special meeting of stockholders, the election, term of office, filling of vacancies and other features of such directorships shall be governed by the terms of this Certificate and any certificate of designations applicable thereto.

4. Vacancies. Subject to the rights, if any, of the holders of any series of

Undesignated Preferred Stock to elect Directors and to fill vacancies in the Board of Directors relating thereto, any and all vacancies in the Board of Directors, however occurring, including, without limitation, by reason of an increase in size of the Board of Directors, or the death, resignation, disqualification or removal of a Director, shall be filled solely and exclusively by the affirmative vote of a majority of the remaining Directors then in office, even if less than a quorum of the Board of Directors, and not by the stockholders. Any Director appointed in accordance with the preceding sentence shall hold office for the remainder of the full term of the class of Directors in which the new directorship was created or the vacancy occurred and until such Director's successor shall have been duly elected and qualified or until his or her earlier resignation or removal. Subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock to elect Directors, when the number of Directors is increased or decreased, the Board of Directors shall, subject to Article VI.3 hereof, determine the class or classes to which the increased or decreased number of Directors shall be apportioned; provided, however, that no decrease in the number of Directors shall shorten the term of any incumbent Director. In the event of a vacancy in the Board of Directors, the remaining Directors, except as otherwise provided by law, shall exercise the powers of the full Board of Directors until the vacancy is filled.

5. Removal. Subject to the rights, if any, of any series of Undesignated Preferred

Stock to elect Directors and to remove any Director whom the holders of any such stock have the right to elect, any Director (including persons elected by Directors to fill vacancies in the Board of Directors) may be removed from office (i) only with cause and (ii) only by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of Directors. At least forty-five (45) days prior to any meeting of stockholders at which it is proposed that any Director be removed from office, written notice of such proposed removal and the alleged grounds thereof shall be sent to the Director whose removal will be considered at the meeting.

ARTICLE VII

LIMITATION OF LIABILITY

A Director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a Director, except for liability (a) for any breach of the Director's duty of loyalty to the Corporation or its stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) under Section 174 of the DGCL or (d) for any transaction from which the Director derived an improper personal benefit. If the DGCL is amended after the effective date of this Certificate to authorize corporate action further eliminating or limiting the personal liability of Directors, then the liability of a Director of the Corporation shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended.

Any repeal or modification of this Article VII by either of (i) the stockholders of the Corporation or (ii) an amendment to the DGCL, shall not adversely affect any right or protection existing at the time of such repeal or modification with respect to any acts or omissions occurring before such repeal or modification of a person serving as a Director at the time of such repeal or modification.

ARTICLE VIII

AMENDMENT OF BY-LAWS

1. Amendment by Directors. Except as otherwise provided by law, the By-laws of the Corporation may be amended or repealed by the Board of Directors by the affirmative vote of a majority of the Directors then in office.

2. Amendment by Stockholders. The By-laws of the Corporation may be amended or repealed at any annual meeting of stockholders, or special meeting of stockholders called for such purpose as provided in the By-laws, by the affirmative vote of at least 75% of the outstanding shares entitled to vote on such amendment or repeal, voting together as a single class; provided, however, that if the Board of Directors recommends that stockholders approve such amendment or repeal at such meeting of stockholders, such amendment or repeal shall only require the affirmative vote of the majority of the outstanding shares entitled to vote on such amendment or repeal, voting together as a single class.

ARTICLE IX

AMENDMENT OF CERTIFICATE OF INCORPORATION

The Corporation reserves the right to amend or repeal this Certificate in the manner now or hereafter prescribed by statute and this Certificate, and all rights conferred upon stockholders herein are granted subject to this reservation. Whenever any vote of the holders of voting stock is required to amend or repeal any provision of this Certificate, and in addition to any other vote of holders of voting stock that is required by this Certificate or by law, such amendment or repeal shall require the affirmative vote of the majority of the outstanding shares entitled to vote on such amendment or repeal, and the affirmative vote of the majority of the outstanding shares of each class entitled to vote thereon as a class, at a duly constituted meeting of stockholders called expressly for such purpose; provided, however, that the affirmative vote of not less than 75% of

the outstanding shares entitled to vote on such amendment or repeal, and the affirmative vote of not less than 75% of the outstanding shares of each class entitled to vote thereon as a class, shall be required to amend or repeal any provision of Article V, Article VI, Article VII, Article VIII or Article IX of this Certificate.

[End of Text]

THIS AMENDED AND RESTATED CERTIFICATE OF INCORPORATION is executed as of this 15th day of November, 2006.

METABOLIX, INC.

By: /s/ James Barber

Name: James Barber

Title: Chief Executive Officer and President

Subsidiary Name	**Jurisdiction of Organization**
Yield10 Bioscience Securities Corp.	MA
Metabolix Oilseeds, Inc.	Canada
Metabolix GmbH	Germany

Exhibit 23.2

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-1 (No. 333-220040), Form S-3 (No. 3333-217051) and Form S-8 (Nos.333-138631, 333-145232, 333-155115, 333-157869, 333-165405, 333-172724, 333-181268, 333-187589, 333-194858, 333-194859, 333-202983, and 333-217052) of Yield10 Bioscience, Inc. of our report dated March 12, 2018, relating to our audit of the consolidated financial statements for the year ending December 31, 2017 of Yield10 Bioscience, Inc. and its subsidiaries which appears in this Annual Report on Form 10-K of Yield10 Bioscience, Inc., for the year ending December 31, 2017.

/s/RSM US LLP

Boston, Massachusetts
March 12, 2018

EXHIBIT 31.1

CERTIFICATIONS

I, Oliver P. Peoples certify that:

1. I have reviewed this annual report on Form 10-K of Yield10 Bioscience, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2018

/s/ OLIVER P. PEOPLES

Name: Oliver P. Peoples

Title: *President and Chief Executive Officer (Principal Executive Officer)*

EXHIBIT 31.2

CERTIFICATIONS

I, Charles B. Haaser, certify that:

1. I have reviewed this annual report on Form 10-K of Yield10 Bioscience, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2018

/s/ CHARLES B. HAASER

Name: Charles B. Haaser

Title: *Chief Accounting Officer*
(Principal Financial and Accounting Officer)

EXHIBIT 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the annual report on Form 10-K of Yield10 Bioscience, Inc. (the "Company") for the year ended December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), we, Oliver P. Peoples, President, Chief Executive Officer and Principal Executive Officer of the Company and Charles B. Haaser, Chief Accounting Officer and Principal Financial and Accounting Officer of the Company, certify, pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, to my knowledge that:

1. the Report fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended, and

2. the information in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

This certification is being provided pursuant to 18 U.S.C. 1350 and is not to be deemed a part of the Report, nor is it to be deemed to be "filed" for any purpose whatsoever.

YIELD10 BIOSCIENCE, INC.

Date: March 12, 2018 By: /s/ OLIVER P. PEOPLES

Oliver P. Peoples
President and Chief Executive Officer (Principal Executive Officer)

Date: March 12, 2018 By: /s/ CHARLES B. HAASER

Charles B. Haaser
Chief Accounting Officer (Principal Financial and Accounting Officer)