# 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, 2020**

**or**

☐ **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 | Trading Symbol(s) | Name of each exchange on which registered |
|---|---|---|
| Common Stock | YTEN | The 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 ☐ 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 ☐ 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 ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files). Yes ☒ No ☐

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

| | |
|---|---|
| Large accelerated filer ☐ | Accelerated filer ☐ |
| Non-accelerated filer ☒ | Smaller reporting company ☒ |
| | Emerging growth company ☐ |

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. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ 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, 2020 was $9,581,299.

The number of shares outstanding of the registrant's common stock as of March 12, 2021 was 4,865,335.

**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 24, 2021, 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, 2020**
**INDEX**

***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 (the "Securities Act), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). 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; 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 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," "Yield10," "we," "our," "us," "our company" or "the company" refer to Yield10 Bioscience, Inc., a Delaware corporation and its subsidiaries.

## PART I

*(With the exception of stock prices and earnings per share disclosures, all dollar amounts throughout this report are shown in thousands unless otherwise indicated.)*

### ITEM 1. BUSINESS

#### Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company that is using its differentiated trait gene discovery platform, the "Trait Factory", to develop improved Camelina varieties to produce proprietary products, and to produce other high value traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. Our goals are to efficiently develop and commercialize a high value crop products business by developing superior varieties of Camelina for the production of feedstock oils, nutritional oils, and PHA bioplastics, and to license our yield traits to major seed companies for commercialization in major row crops, including corn, soybean and canola.

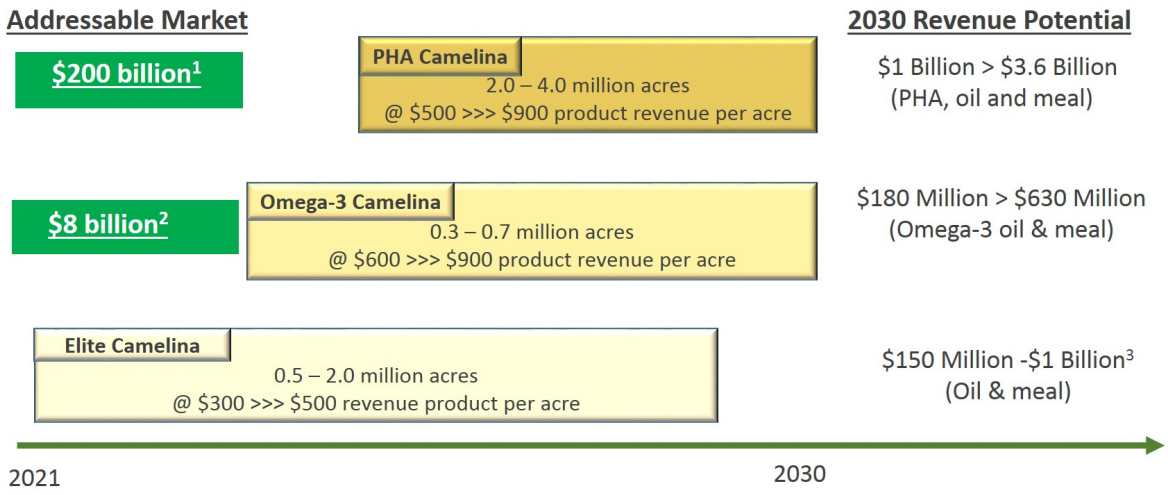
*Camelina sativa* (Camelina) is an annual oilseed plant in the mustard family that is native to Europe, and an essential component of our Trait Factory. It has several excellent agronomic traits, including low water and fertilizer input, drought resistance, and a short life cycle, making it suitable as a rotation crop in the U.S. Northwest, and as a relay or cover crop with corn and soybean in the U.S. Midwest. In addition, it produces a relatively abundant harvest of oil-containing protein rich seeds. For approximately ten years, Yield10 has been conducting research in Camelina, identifying and deploying its gene trait discoveries, evaluating the performance of these novel traits in field tests, developing PHA bioplastics in seed, and securing exclusive rights to omega-3 oils technology.

We are beginning to prepare for the commercial launch of our products business based on current Camelina varieties to supply oil and protein meal markets. We anticipate that this will be followed by the launch of two proprietary higher value products, omega-3 (DHA+EPA) oils, which we are developing pursuant to an agreement for technology in development with Rothamsted Research (“Rothamsted”), and PHA bioplastics. We expect the sequential launch of these products to allow us to

establish the operating foundation of the commercial products business and to grow revenues and margins based on sales of omega-3 oil products thereby generating sufficient cash flow to fund the commercialization of PHA bioplastics.

We are pursuing the development of elite Camelina germplasm exhibiting herbicide tolerance, disease resistance and other traits that will form a core Camelina germplasm foundation for deploying our product traits to reduce grower costs and increase value. Based on our research and development activities in Camelina, Yield10 has a pipeline of more than 10 novel yield traits currently in research and development. We have agreements in place for a number of our current yield trait gene candidates, including with the Bayer Crop Science division of Bayer AG ("Bayer"), GDM Seeds ("GDM"), Forage Genetics International, LLC, a division of Land O'Lakes, Inc. ("Forage Genetics") and JR Simplot Company ("Simplot"). These companies are currently progressing the development of Yield10 traits in soybean, forage sorghum, and potato. We expect to generate several proof points for our traits in various crops over the next two years and plan to find partners to license our traits for canola, corn and other crops as we generate additional data.

We believe the market opportunity for our Camelina varieties, proprietary products in development, and performance traits is significant. We are targeting uses for our Camelina products in applications such as: oils for animal and human nutrition; feedstock oils for renewable diesel, omega-3 oils for aquaculture, and PHA bioplastics in a range of applications. Leading seed companies are the potential clients for our performance trait innovations in major crops. We believe our value-added product strategy will provide strong differentiation for Yield10's Camelina crop varieties making them preferred by growers to address large product market opportunities as illustrated below:




Each of our product targets is well-aligned with trends in food security, social responsibility, and sustainability, including the need for:

- *Low-carbon index feedstocks for renewable diesel biofuel;*
- *New sources of oil and protein meal for animal feed;*
- *Nutritional oils for human consumption;*
- *Land-based omega-3 fatty acid oils to replace diminishing world supplies of fish oil for aquaculture;*
- *Biobased, biodegradable bioplastics for feed, water treatment and to reduce plastic waste;*
- *Increasing the organic carbon content of soil in farming; and*
- *Performance traits to increase yield per acre of major agricultural crops.*

We are building a portfolio of intellectual property around our crop yield technology and traits. As of December 31, 2020, we owned or held exclusive rights to 21 patent families, including nine issued patents and 42 pending patent applications, related to advanced technologies for increasing crop performance and composition traits in oils and PHA bioplastics, in the United States and throughout the world. As part of our agreement with Rothamsted, we have an exclusive option to license the original patent filing for the production of EPA/DHA oil in Camelina and two improvement patents filed after the agreement was signed.

**The Unmet Need: Global Food Supply, Reducing Carbon Emissions and Producing Sustainable Products**

According to a number of studies, including a recent report entitled "The Future of Food: Complexities and Compromises," published December 6, 2020 by Morgan Stanley, the agri-food system needs to transform to produce 50% more food, eliminate malnutrition and cut 13 gigatons of greenhouse gas emissions by 2050. Agriculture will also have to be a source of low carbon feedstocks for fuels, chemicals and plastics. This will result in increased demand for feed grains, edible oil and forage crops, demand that will need to be met with an increasing emphasis on sustainable growth metrics and climate change, as highlighted in the Morgan Stanley report. Yield10 is focused on addressing the yield gap for major crops by using our Trait Factory to optimize photosynthesis and carbon efficiency in crops to increase grain or biomass yield using our novel traits. We have been working in the area of increasing photosynthetic carbon capture and crop yield technologies since 2012, and we have identified several potentially promising genes for increasing yield or improving crop performance.

*Cover Crops:* To meet growing demand for oils and protein, and to mitigate the negative environmental impacts of current farming practices, particularly in the corn belt, the development of cash cover crops or relay crops is another means to increase land productivity and address growing demand. Cover or relay crops are planted between harvest and sowing of major commodities, such as soybean, in effect increasing the number of harvests per growing season. Yield10 believes that Camelina, with its short growing season, has considerable potential to be used as a cover crop to reduce soil erosion, improve soil quality, and control diseases and pests and nutrient run-off from land that is used for row crop production. Third party estimates indicate that Camelina has up to 30 million acres of potential as a cover crop in the mid-west of the United States, and we believe that the product value-add from Yield10's proprietary products will be a key differentiator for farmers making planting decisions.

*High Protein Meal:* There is a growing global demand for additional protein sources for feed and food applications. Camelina seed can be processed in existing oilseed processing facilities to extract the oil, and what remains is a protein. On a dry basis, the meal contains approximately 30-35% protein with a good amino acid profile for feed applications. Camelina meal has been approved for use in some animal feed applications, and we expect with additional accelerated breeding using genome editing, the meal quality can be further enhanced to further expand this application.

*Edible oils:* Edible oils or vegetable oils are derived from fruits and vegetables, such as palm, soybean, rapeseed (canola) and sunflower. These oils are used in frying, baking, other types of cooking and in food preparation and flavoring such as salad dressings and bread dips. Edible oils are of increasing importance among health-conscious consumers as key functional ingredients which may reduce the risk of cardiovascular disorders along with potentially lowering the possibility of certain kinds of breast cancer. Based on these drivers, the global edible oil market is anticipated to witness a substantial growth in demand for unrefined, unprocessed, healthy, and organic oil.

*Renewable diesel:* Renewable diesel is the second-largest consumer biofuel in the U.S. behind ethanol. Renewable diesel is chemically identical to diesel, so it can be used in the existing diesel infrastructure. Also, it is one of the most viable carbon reduction alternatives to other fuel sources. Vegetable oil can be used as a feedstock for renewable diesel, and a growth in the availability of oils suitable for this use could contribute to growth in this market. Publicly available data for 2019 indicates that total U.S. renewable diesel consumption was approximately 900 million gallons. At the federal level, biomass-based diesel qualifies as an advanced biofuel under the U.S. Environmental Protection Agency's Renewable Fuel Standard (RFS) program, which requires renewable fuels to be blended into the nation's fuel supply. Biomass-based diesel also generates credits under California's Low Carbon Fuel Standard (LCFS) and is increasingly used to meet the increasing fuel standards in the LCFS because of its favorable greenhouse gas reduction score.

*Omega-3 (DHA+EPA) Oils:* The aquaculture sector will play a major role in meeting the demand for fish, and sustainable land-based sources of key feed ingredients will need to be developed and adopted. This includes high value specialty ingredients, including in particular new sources of omega-3 oils to replace oil from harvested fish. The aquaculture sector is expected to grow at 5% CAGR over the next ten years, to reach revenues of over $300 billion. Fish oil supply from ocean harvested fish is particularly important for farmed salmon. At this time, the growth of the salmon farming sector along with additional demand from new nutraceutical markets for direct human consumption is expected to exceed sustainable supply. In 2019, 4.5 million tonnes of fish feed was used globally for salmon farming. Although it can vary by geographic location, fish oil represents 24% of the contents making up this fish feed. This equates to 2,380 million pounds of fish oil consumed in salmon feed production. The combined omega-3 market is expected to double in the next 5 years. The demand from salmon farming alone is expected to be approximately 7% per year going forward, according to the *2020 Salmon Handbook*.

*PHA Bioplastic; Feed Additives:* The first patent on the use of PHA in oilseed meal in animal feed was filed by our predecessor company Metabolix in the mid-1990s, and has since expired. However, chicken feeding studies described in that

application demonstrated that the PHA in the feed was bioavailable as an *energy source.* Since then, there have been several other reports on the use of PHA in both animal and aquaculture feed where the inclusion of microbially produced PHA at low levels has been demonstrated to have beneficial pre-biotic effects, providing some level of protection against pathogens, and in chicken feeding studies the low levels of PHA have been shown to improve the feed conversion efficiency. We believe this may be an interesting opportunity to progress two common goals:1) developing fundamental data for FDA and/or Canadian Food Inspection Agency (CFIA) regulatory approval of PHA in animal feed to assist in the approval of protein meal left over from PHA extraction in feed applications and 2) developing a potentially near-term market opportunity for the current Camelina lines, which we have shown to produce 4-6% PHA in seed in our recent small scale field trials.

*PHA Bioplastic, Water Treatment:* In water treatment, the PHA biomaterial acts as a growth substrate and energy source for denitrifying bacteria, which convert nitrate, a primary cause of water pollution and algal growth, to nitrogen gas which returns to the air. This application is technically straight-forward, requiring only the production and shipment of PHA biomaterials in pellet form. The model for this business is to supply the continuous replenishment of the PHA pellets. We believe that this application is not very demanding on the purity and quality of the PHA produced and represents a more favorable technical path to initial commercialization for PHA Camelina. This application may also serve as a market for PHA produced in the future for bioplastics applications which does not meet the product specifications or ultimately as a way to generate value by “upcycling” post-consumer PHA bioplastic. Yield10 is in the early stages of developing the business model for this opportunity.

*PHA Bioplastic; Alternatives to Plastic:* Global plastic waste is estimated at 380 million tonnes per year. The largest market for plastics today is for packaging materials, and it accounts for nearly half of all plastic waste generated globally, where most of it is never recycled or incinerated. We believe there may be significant market opportunity for producing PHA biomaterials in Camelina in the future. PHA biomaterials (PHAs) are natural microbial high molecular weight polymeric storage polymers. These polymers are natural polyesters and can be recovered from the microbes which produce them and processed using standard plastics processing equipment into a range of product forms. The commercialization of PHAs based on fermentation technologies continues to receive considerable media and investment interest, even though this approach has high capital and operating costs. In the longer term, the production of PHA bioplastics in Camelina would represent an entirely new market opportunity for farmers. This opportunity could provide economic returns for farmers to justify large acreage adoption of Camelina as a cover crop and enable the low-cost production of this product for new markets including water treatment and sustainable biodegradable plastics replacement applications.

*Trait Development and Licensing*: Using our Trait Factory, we have identified and are evaluating novel yield trait genes to improve the field performance of Camelina for our products business and to improve the yield and performance of major food and feed crops. Improvements in yield to the levels targeted by Yield10, for example 10-20 percent increases seed yield in Camelina, would significantly enhance the value of our Camelina products and would be expected to generate significant increases in yield in the major food and feed crops. For example, Yield10 is targeting an approximately 10-20 percent increase in canola and soybean yields, which, if successfully deployed across North American acreage, could result in annual incremental crop value of up to $10 billion. In the licensing model, Yield10 would expect to receive up-front payments on the execution of a commercial license, milestone payments and royalties based on seed sales. 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.

**Business Strategy**

We are using our proprietary Trait Factory trait gene discovery platform to develop the oilseed Camelina to produce proprietary products and high value seed traits for the agriculture and food industries. Our goal is to commercialize a series of higher value Camelina products and license our yield traits to major seed companies for major row crops including corn, soybean and canola. Although our Camelina products will address key sustainability drivers, we believe first and foremost that they should increase profitability across the value delivery chain. We believe that any sustainability benefits will provide a marketing advantage for our future customers and potential upside from any available government credits. We also plan to continue to seek non-dilutive financing opportunities from government grants and funded partnerships. Although our Trait Factory may enable multiple commercial opportunities going forward, we will retain our capital efficient approach, focusing internal resources on developing elite varieties of Camelina germplasm and PHA bioplastics. We plan to rely on Rothamsted for the development of the Camelina omega-3 oil trait and on major seed companies for the development of our traits in the major crops. Using this approach, we are developing the following three potential revenue streams:

- Camelina Products Business;
- Trait development and licensing; and

- R&D revenue from government grants and/or partners.

**Camelina Products Business**

Our long-term vision for Camelina is as a high value large acreage cover crop for the corn belt which reduces nutrient pollution from fertilizer use, increases soil carbon content, increases farm revenue and produces low carbon sustainable products. In the near term, we are using our current spring varieties of Camelina to establish our products operating business, with winter varieties, for larger scale adoption as cover crops, to follow. Our plan is to execute the sequential launch of our products from our Camelina oilseed platform as follows:

***Elite Camelina Varieties:*** In launching our Camelina products business, we plan to provide our seed to growers under contracts with Yield10, use existing oilseed processing assets through toll arrangements and arrange offtake agreements with end users for the oil and protein meal to address current markets, such as for animal feed. Our technology team will continue to develop improved varieties of elite Camelina germplasm with the herbicide tolerance, disease resistance, seed yield and oil content traits currently progressing in our trait pipeline. Elite Camelina varieties will be core to the current markets and the commercialization of our omega-3 and PHA bioplastic traits, which we will develop separately and introduce into the elite varieties by plant breeding. In order to position Yield10 to execute on this plan, we harvested our first 50 acres of Camelina seed grown under contract in Montana in 2020. We also began work to scale up new varieties, including both spring and winter Camelina.

***Omega-3 Trait –Products are fish oil and protein meal:*** Currently, we believe the first proprietary product we will launch commercially will be based on technology developed over the last 10 years by the Rothamsted in the UK. Yield10 signed an Exclusive Collaboration and Option Agreement for this technology with Rothamsted in November 2020. Rothamsted has progressed the omega-3 trait far beyond proof of concept stage with the completion of multiple field trials, oil production, aquaculture and human nutrition studies. Under its agreement with us, Rothamsted is responsible for making improvement and further optimization of this exciting trait at their facilities in the UK. We believe that the current omega-3 trait is already at a sufficient technology readiness level to begin commercialization activities. Due to intellectual property considerations, Yield10 will continue its focus on developing elite varieties of Camelina with herbicide tolerance, disease resistance, higher yield and oil content, with the intention to breed the Rothamsted omega-3 trait into this germplasm in the future. In the near term Yield10 is developing a business strategy for this technology in South America to serve the market in Chile, which currently represents around 30% of the global fish oil market for the salmon feed market. Over the past nine years, the global market for fish oils has experienced a CAGR of 7%. Our strategy is to form relationships with service providers in South America and to increase business development activities with the companies in the aquafeed sector. The major feed suppliers in Chile are also the leading feed suppliers for North America and Norway. We believe that producing omega-3 product in South America to obtain regulatory approval in salmon feed and validation of the value of this use will pave the way for future production in North America, which we currently anticipate would begin in the 2025 spring planting season in Canada.

***PHA trait – PHA, oil and meal:*** The second proprietary product we are developing is based on new technology for the large scale, low-cost sustainable production of natural biodegradable PHA biomaterial as a third Camelina seed component. By reprogramming Camelina to produce PHA in the seed, the harvested seed can then be processed to produce three products: oil, protein meal for animal feed, and PHA biomaterial. The typical costs for producing edible oils are a useful benchmark for the potential long-term cost structure for crop based PHAs. In this scenario, crop based PHAs could have a cost advantage over petroleum-based plastics. We successfully field-tested prototype PHA bioplastic trait Camelina lines in field tests during the 2020 growing season. Although we plan to field test the two best-performing PHA Camelina lines at larger scale during the 2021 growing season, we recognize that our PHA trait is at an earlier technology readiness level. We believe that by producing PHA bioplastic in Camelina seed as a third seed product along with processing the seed to produce oil and protein meal, we can achieve a cost structure with the benefits of integrated economics. This is essentially an integrated feed (protein meal), low carbon fuel (oil) and bioplastics platform which may facilitate optimization of revenue as each market fluctuates according to demand.

**Trait Development and Licensing:** Our approach to capturing value for our traits in major food and feed crops is by licensing our traits to major seed players to maximize the numbers of acres on which they are adopted. Yield10’s capital efficient approach for trait development in major food and feed crops is to utilize field results obtained from our work with traits in Camelina to create interest from major seed companies. We then execute non-exclusive research licenses for traits of interest, enabling these companies to progress our traits within the crop(s) of interest. These agreements have a limited term and contain clauses requiring data sharing with Yield10 and provide the seed companies with the right to negotiate a commercial agreement. In December 2017 we signed our first agreement with the Crop Science division of Bayer AG ("Bayer") (formerly Monsanto Company), to test C3003 and the first version of C3004 in soybean. In 2019, the license was

expanded to cover a new discovery and intellectual property related to a new version of C3004. Similarly, in 2018 we signed a non-exclusive research license with Forage Genetics, to test a series of traits in forage sorghum. In 2019 we signed a non-exclusive research license with Simplot for the evaluation of our traits in potato. In 2020, we signed a non-exclusive research license with GDM for the evaluation of three traits in soybean. We plan to look for partners for our traits in canola and corn during 2021.

***Traits Being Developed by Licensees***[1]

| Crop/Trait | Company | Agreement | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| Soybean/C3003<br>Soybean/C3004 | Bayer CropScience | Research License<br>Collaboration | | | | | |
| Soybean<br>Multiple traits | GDM | Research License<br>Collaboration | | | | | |
| Sorghum<br>Multiple traits | Forage Genetics International | Research License<br>Collaboration | | | | | |
| Potato<br>Multiple Traits | Simplot | Research License<br>Collaboration | | | | | |

[1] The time line shown in the chart reflects the duration of each partner's research license agreements.

**R&D revenue from government grants and/or partners:** Yield10 has historically sought and participated in government grants in collaboration with leading academic institutions to develop early crop innovations and to secure rights to intellectual property. We are a participant in a grant from the Department of Energy with Michigan State University, which is a current primary source of grant revenue. It is our intention to continue this practice where the grant opportunities are consistent with progressing our commercial goals. Other potential sources of non-product revenue include funded partnerships or collaborations with companies interested in the use of our GRAIN platform to identify gene targets for traits in crops of commercial interest and potential partners or customers in the Camelina products value chain.

***Our History***

***We have a significant track record and expertise in the metabolic engineering (synthetic biology) of plants.***

Our predecessor company Metabolix, co-founded by our CEO, was a pioneer in the development of advanced PHA bioplastics production and applications technology using engineered microbes and fermentation, and as a result developed deep experience across the PHA bioplastics value chain. In addition, Metabolix supported a crop science research program to produce PHA biomaterials in crops as a potential low-cost production system and it was this crop science activity that became the foundation of Yield10. Historically, these efforts were focused on producing the simplest member of the PHA family, known as PHB, which is a microbial carbon storage biopolymer, in high concentration in the seeds of oilseed crops or in the leaves of biomass crops such as switchgrass. The PHB biomaterial is useful as a natural water treatment product and as a replacement for petroleum-based plastics.

***Our Approach***

***Our GRAIN platform provides us with a unique approach for discovering novel yield trait genes and producing higher value sustainable products in Camelina.***

We have integrated advanced metabolic flux modeling capabilities with transcriptome network analysis to form the foundation of our GRAIN (Gene Ranking Artificial Intelligence Network) big data mining gene discovery platform. This discovery platform is the core of our Trait Factory. In the case of crops, the levers to increase seed yield are the metabolic infrastructure through which carbon flows from photosynthesis to seed production and the gene regulators or transcription factors which control various pathways of plant metabolism. Over the last 20 years, the agricultural sector has generated vast numbers of data points. During this same period, there have been very few new crop traits produced. GRAIN efficiently

mines big data sets and prioritizes actionable gene targets to improve crop productivity. We have employed this approach to discover a range of potential yield trait genes.

***We developed a "Fast Field Test" model system to characterize, evaluate and de-risk novel trait genes in Camelina and simultaneously develop improved varieties for the production of proprietary products.***

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. Translating success with non-plant genes in major crops has been successful for traits such as insect resistance and herbicide tolerance, and the current biotechnology seed sector, which accounted for 467 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. Camelina is well-suited to field trials based on its short growing time to maturity, and we believe it holds potential as a new crop for farmers. It is also very fast to modify, develop genetically stable seed and scale up seed for field planting. Ideally, we hope to be able to progress from trait identification to field planting in about 12 months. Results from our field studies in Camelina have enabled us to generate partner interest in progressing our traits in corn, soybean, canola and other crops through research license agreements.

***We believe Camelina has high potential to become a large acreage commercial crop for producing renewable diesel feedstocks, nutritional oils including omega-3 (DHA+EPA) oils and PHA bioplastics in North and South America.***

Camelina is currently in limited cultivation in North America and Europe. Camelina oil has historically been used in food, and production is increasing because of its natural omega-3 (ALA) fatty acid content. Results from a randomized controlled study published in 2018 in the journal *Molecular Nutrition and Food Research* have shown that Camelina sativa oil, but not fatty fish or lean fish, improved the serum lipid profile in subjects with impaired glucose metabolism. Camelina protein meal left over following oil extraction by cold crushing has been approved by regulatory authorities for use in animal feed applications in the U.S. and Canada. In the cold crushing process to extract oil, some of the omega-3 (ALA) oil remains in the meal, making it attractive for use as chicken feed because it increases the omega-3 content of eggs. Camelina also has the potential to be a low carbon index source of feedstocks for renewable diesel and as a platform crop for the production of proprietary crop products.

In November 2020, Yield10 signed an exclusive collaboration and option agreement with Rothamsted for technology related to producing omega-3 (DHA+EPA) in Camelina.

We believe that our Camelina development capabilities, together with our yield and oil content trait improvements, will enable an attractive Camelina products business focused on nutritional oils in the near-term. In the longer term, the potential for production of PHA biomaterials in Camelina could provide economic returns for farmers to justify very large acreage adoption and enable the low-cost production of this product. PHA biomaterials with the right cost structure have applications in very large markets not currently served by agriculture, including water treatment and biodegradable bioplastic applications. We believe crop-based production will enable broad-based global adoption of these materials.

***We have assembled a pipeline of crop yield traits for development that are applicable to both Camelina and major commercial crops and established agreements with major seed companies.***

Our unique approach to crop yield trait discovery utilizing our GRAIN platform, which integrates advanced metabolic engineering concepts to address critical bottlenecks in carbon metabolism, has enabled us to discover a series of yield genes with potential use for producing step-change improvements in crop yield. Through our research and early development efforts we have identified and begun characterizing our C3000 and C4000 series of traits. To initially characterize the potential yield trait genes, we test our yield trait candidates using our Camelina platform. As a yield trait innovator, our objective is to identify novel yield traits that act at a fundamental level in crop metabolism to provide the potential for broad deployment of our traits across multiple crop types. Following our work with these trait genes in Camelina, our approach is to enter into license agreements or form collaborations with major agricultural companies so they can incorporate our novel yield traits into their seed products.

***We believe our business model will allow us to develop our Camelina products business and capture value for important new yield traits for major crops.***

We are working to advance our own developments as well as form business alliances to progress our traits through development, launch and commercialization. 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 value realization strategies. We are focused on identifying and signing additional research and development collaborations to accelerate commercial development of our promising yield traits. Based on this strategy, Yield10 intends to focus internal resources on trait gene discovery and developing an independent Camelina based products business.

***We have signed non-exclusive research licenses for our novel yield traits with agriculture industry leaders.***

In 2017 we granted a non-exclusive global research license to Bayer to evaluate our novel yield traits C3003 and C3004 in soybean. The license was expanded in 2019 to include a new discovery and intellectual property for C3004. Bayer is a leader in the development and commercialization of biotech-derived soybean seed. In 2018, we granted a research license with a similar structure to Forage Genetics, a leader in forage crops used for animal feed, to evaluate five traits in forage sorghum. In 2019 we granted a research license with a similar structure to Simplot, a leader in potato development and product food sales. In 2020, we signed a non-exclusive research license with GDM for the evaluation of three traits in elite soybean germplasm.

These licenses are intended to provide market leaders in their respective crops with an attractive opportunity to test our traits and develop data at their own expense. At any time during the term of the license, 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 these traits. This structure allows us the flexibility to expand the testing of our traits with investment by other companies and to potentially enter negotiations for development and commercial licenses when the value of our traits is better understood. In 2021, we plan to continue to explore additional opportunities to expand the testing of current and future trait discoveries through similar arrangements with other companies, and as part of our evolving strategy, we now plan to look for partners to progress our yield traits in canola and corn.

***Our Oilseed Operation based in Canada provides us with unique capabilities in the development of Camelina 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 a network of commercial science advisors and collaborators to provide us with insight and opportunities to advance our industry alliances, crop research and development, and 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 (a division of the U.S. Department of Energy ("DOE")) 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. In 2018 and 2019, Yield10 announced signing global license agreements with the University of Missouri for advanced technology to boost oil content in oilseed crops, including C3007, C3010, and C3012, which are based on the discovery of a key regulatory mechanism controlling oil production in oilseed crops which can be used to increase oil content. Jay J. Thelen, Ph.D., Professor of Biochemistry at the University of Missouri, who discovered this mechanism, joined our Scientific Advisory Board in 2018. In conjunction with the Rothamsted collaboration agreement signed in 2020, Prof. Johnathan Napier, a world leading scientist in the development of sustainable plant omega-3 (DHA+EPA) oil traits, also joined our advisory team.

***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 also have the potential to be developed and deployed in other oilseed crops. For example, in 2017, we were selected as a sub-awardee on a new DOE grant led by Michigan State University to conduct research aimed at boosting oilseed yield in Camelina. During 2020, we received two small Canadian government

research grants awarded through the Industrial Research Assistance Program administered by National Research Council Canada. We plan to continue to pursue government grants to defray research costs associated with our research and development activities.

***We are operating with a lean organizational footprint which is evaluating our novel yield traits in greenhouse and field tests while maintaining efficient use of cash resources.***

As of December 31, 2020, we had 25 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 is allowing 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.

**Target Crop: The Oilseed Camelina sativa**

Camelina (*Camelina sativa*) was grown extensively in Europe, Russia and Central Asia since medieval times for oil and protein but was replaced by cultivation of rapeseed during the 1940s. Camelina has the potential to replicate the development of modern canola from rapeseed on an accelerated timeline based on modern technologies including genomics, the Trait Factory and genome editing. Starting in the 1960s, the breeding of canola from rapeseed to the first generations of canola was not completed until 1982 based on improving the oil for human consumption (low euricic acid in the oil) and improving the protein meal (low glucosinolates) for use in animal feed. This was followed by incorporating herbicide tolerance and hybrid technologies in the 1990s. Today, canola is grown on 20 million acres in Canada and is estimated to generate around $25 billion for the Canadian economy, according to the Canola Council of Canada.

Camelina has not been subject to intensive plant breeding efforts or crop production improvements, so the full potential of this crop has not yet been achieved. Initial interest in using Camelina oil in biofuels resulted in additional investment in the development of the crop in North America beginning in the mid-2000s. This work demonstrated that Camelina has several beneficial attributes. Camelina is amenable to production practices used for canola, grows on marginal lands, has enhanced drought and cold tolerance, displays early maturation and requires fewer inputs than other oilseed crops. Camelina is also naturally resistant to diseases that impact canola, and its fast growth cycle makes this crop suitable for spring planting in the Northwest U.S. and into Canada. In addition, the short growing season makes it a cash relay or cover crop candidate suitable for the upper mid-west corn belt.

Our vision is to use our proprietary gene traits to improve Camelina seed oil content and yield and combine those with herbicide and disease resistant traits currently in development to produce oil and protein meal for current markets. This will be followed by the development of the high value omega-3 Camelina regulated trait based on our November 2020 agreement with Rothamsted. This is at a high technology readiness level and we believe suitable to begin commercialization activities. In the longer term, we believe optimizing the production of the PHA bioplastics in Camelina will enable large acre production, initially in spring varieties, and over time, in winter varieties for use as a cash cover crop. Some estimates from USDA indicate a potential of up to 30 million acres in the upper corn belt of the U.S., which would potentially make PHA Camelina the third largest crop in the U.S.

Camelina is an attractive choice of crop for the following reasons:

- Camelina, as an underdeveloped crop, has high technology upside potential to improve agronomics (including herbicide tolerance), seed yield and seed value.
- There is a growing demand for crops that diversify the crop landscape, have lower environmental footprints and have the potential to produce high value secondary products, opening new opportunities for farmers.
- Camelina oil is rich in an omega-3 fatty acid (ALA) which is currently creating demand for the oil as a substitute for fish oil in aquaculture, a near term market.
- Camelina is readily segregated from the major row crops and readily engineered using genetic engineering tools, making it an ideal platform for producing novel seed products.
- Camelina has been engineered to produce high levels of omega-3 (DHA+EPA) fatty acids as a drop-in replacement oil for fish oil in aquafeed markets, this will replace the use of generic Camelina oil in this market,

- We have demonstrated the successful deployment of novel traits to increase seed yield and seed oil content of Camelina.
- We have recently demonstrated proof of concept for PHA bioplastics in Camelina in our 2020 field tests providing us with the potential to link a new high value Camelina crop with very large non-traditional markets in water treatment and plastics. Our internal analysis indicates this could drive very large acreage adoption. The higher per acre value enabled by Yield10's agronomic and product traits could make Yield10 the preferred production contractor for growers,
- Production of Camelina seed in double cropping situations results in a favorable carbon intensity index for the oil, making it an attractive feedstock for renewable diesel in geographies such as California where there are low carbon fuel standards in place and the economic value of carbon savings can be substantial. Low carbon fuel standards are being established in other regions of the U.S., Canada and the EU, which is increasing demand for renewable diesel feedstocks.

**Our "GRAIN" Technology Platform**

In the last two decades 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. As a result, the seed sector has tested thousands of single genes and generated billion if not trillions of data points, yet step change improvements in crop yield have remained elusive. Yield10 is bringing new approaches and innovation based on over 30 years of experience in advanced synthetic biology and metabolic systems modeling to improve inherent yield of major food and feed crops.

At a fundamental level, 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. 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.

Plant growth is based on a series of chemical reactions and these can be modeled to determine the best ways to optimize the yield of the targeted product. We have integrated advanced metabolic flux modeling capabilities with transcriptome network analysis to form the foundation of the GRAIN gene discovery platform. GRAIN is a powerful data mining tool which the company has protected as a trade secret. Yield10 has used GRAIN to identify a pipeline of traits it is developing in Camelina to determine performance and then through a series of license arrangements with major seed companies in other crops. We also believe our integrated GRAIN platform can be used to successfully identify new targets for improving crop yield and are working to leverage the platform in the near-term to secure research and development funding from industry partners.

**Traits in Development**

Yield10 has established a strong pipeline of performance and product traits in development and has recently added programs for herbicide tolerance and disease resistance traits for Camelina into our pipeline.

**Novel Yield Trait Gene C3003**

C3003 is an algal gene, in-licensed from the University of Massachusetts. We believe based on GRAIN modeling that C3003 reduces the well-understood yield losses that occur through photorespiration, a side reaction of photosynthesis in C3 crops based on early positive results. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, including canola, soybean, rice, wheat and potato. Yield10 is progressing the introduction of the C3003 trait gene as well as improvements to the C3003 trait in Camelina, canola, and corn. Yield10 has elected to defer further work with canola and corn and seek partners for C3003 and other traits in these crops. Bayer and JR Simplot are working with C3003 in their soybean and potato programs, respectively.

**Novel Yield Trait Gene C3004**

We began our investigation of C3004 by preparing genetic constructs to increase the expression of the C3004 gene in Camelina. Stable C3004 Camelina lines were developed and we performed yield studies in a greenhouse and a controlled environment growth chamber. In these studies, increased expression of C3004 in Camelina resulted in a significant increase

in plant growth and vigor, increased branching and seed yield, and in some cases increased individual seed weight. In 2019 we continued the development of additional C3004 Camelina lines, conducted greenhouse studies and our first field tests.

Our 2019 greenhouse studies included additional C3004 Camelina lines with different Camelina genetic backgrounds. We again observed increased vigor, branching and increases in seed yield consistent with our 2018 observations. In our 2019 field tests, photosynthetic measurements were taken during the growing season on C3004 Camelina lines at similar developmental stages. Five lines tested showed statistically significant increases in several important photosynthetic parameters for plants, including $CO_2$ fixation, electron transport rate, and the conversion of light energy to chemical energy (effective quantum yield). In 2020, Yield10 conducted field testing C3004 Camelina lines at an expanded number of sites to collect agronomic and seed yield data. We currently have research license agreements in place with seed companies to evaluate the Camelina C3004 gene in soybean and potato,

**Oil Enhancing Traits: C3007, C3008, C3009, C3010 and C3012**

Yield10 is progressing a series of traits targeted at increasing the oil content in Camelina where the oil is the main value driver. Based on the results we obtain with Camelina, we may be able to license these traits to seed companies for use in other oilseed crops, including canola and soybean. Yield10 is building significant capabilities and intellectual property around key oil biosynthesis pathways in plants based on technologies for increasing oil content in seeds. In cases where the oil is the primary economic value driver for the crop, increasing oil content is a valuable trait. Improving the oil content and yield of Camelina seed would increase the value per acre for this crop for the production of both generic and omega-3 (DHA+EPA) oils. We began the technical work in Camelina in 2016 with our C3008a, C3008b and C3009 traits which regulate the production and degradation of oils in oilseed crops. In 2017 and 2018, we received confirmation from USDA-APHIS's Biotechnology Regulatory Services (BRS) that two types of our genome-edited Camelina plant lines developed using CRISPR/Cas-9 genome editing technology for increased oil content were not considered to be regulated under 7 CFR part 340, clearing the way for field testing in the U.S. The first type is based on the inactivation of an enzyme expected to decrease turnover of oil in mature seeds and reduce free fatty acids in oil, a trait we have designated as C3008a. The other type is based on the inactivation of three enzymes to both enhance the production of oil and decrease turnover of oil in mature seeds and is designated as our triple edit, or C3008a, C3008b and C3009 trait containing line. We completed our first field trial with these edited Camelina lines in the U.S. during the 2019 growing season. Some of the Camelina lines with edits to the three genes produced an increase in oil content in individual seeds as well as an increase in seed oil content as a percentage of seed weight as compared to control plants. The best performing line produced an average 11.8 percent increase in oil per individual seed, an 8.7 percent increase in individual seed weight, and a 4.7 percent increase in seed oil content as a percentage of overall seed weight. No significant change in oil composition was observed. Yield10 conducted additional field tests with the best Camelina line (E3902) in the 2020 growing season and is scaling-up pure seed production in anticipation of potential commercial use.

In 2018, we signed an exclusive global license agreement with the University of Missouri for advanced oilseed technology including the C3007 and C3010 gene traits, promising targets focused on the central role of Acetyl-CoA Carboxylase ("ACCase") a key metabolic control point for oil production. In 2019, we signed an additional exclusive global license with University of Missouri for another ACCase related gene target we named C3012. We have produced genome edited versions of C3007 in Camelina and canola. Camelina contains three copies of three different BADC genes, BADC-1, BADC-2 and BADC-3. We successfully edited combinations of two of the three BADC genes and obtained confirmation through the "Am I Regulated?" process that USDA-APHIS BRS does not consider these Camelina lines to be regulated under 7 CFR part 340. These lines were grown in our 2020 field tests. We later succeeded in editing the three copies of the remaining BADC gene and data for a portion of these lines, with only one of the three copies edited, has been submitted to the USDA-APHIS BRS Confirmation of Exemption Process, under the new SECURE Rule that took effect in May 2020. This submission is currently under regulatory review. We expect to provide additional submissions to USDA-APHIS BRS containing edited versions of all three copies of this last BADC gene either under rule §340.1 (b) (4), or the Regulatory Status Review (RSR) process, which is expected to become available for Camelina in fourth quarter 2021. We also constructed edited versions of C3007 in the canola genome and obtained confirmation in 2020 through the "Am I Regulated?" process that USDA-APHIS BRS does not consider these canola lines to be regulated under 7 CFR part 340, thereby enabling future field testing of the lines.

**Omega-3 (DHA+EPA) oil trait**

The omega-3 (DHA+EPA) oil trait for which Yield10 has secured rights is being developed by the research team at Rothamsted as part of their program to develop a sustainable drop-in replacement for fish oil used in the production of

aquaculture feed. Yield10 is providing financial support to the ongoing Rothamsted program and has secured an exclusive option to commercialize the technology and improvements made during the term of the agreement.

The most important omega-3 fatty acids for human health are ALA, DHA and EPA and the primary source of these is fish in the diet. These omega-3 fatty acids are produced by algae where they are thought to protect the cell membranes in cold water. The algal omega- 3's then progress up the food chain and accumulate in fish and into the human diet. Northern hemisphere fish oil contains around 10% DHA and 10% EPA. Camelina oil already contains the omega-3 fatty acid ALA and the Rothamsted Institute has developed engineered Camelina lines which produce approximately 20% of EPA +DHA fatty acids, similar to the composition of Northern Hemisphere fish oil. A number of these Camelina lines have been successfully field tested for the last four years at different locations in the UK, Canada and the U.S. and oil samples produced for salmon and human feeding studies. Rothamsted is continuing its research program to further improve the oil composition of Camelina oil with the goal of developing a land based production system for a Camelina oil composition as a drop in replacement for Southern Hemisphere fish oils, which has an EPA+DHA fatty acid content in the oil of approximately 30 percent. We believe there may be intellectual property challenges relating to the production of omega-3 oils in crops in North America until certain existing patents expire in Canada in 2025. In the interim, Yield10 will focus its R&D efforts on developing advanced Camelina germplasm with the intention to introduce the omega-3 trait in the future, and is developing a business plan to determine the feasibility of South American production to serve the aquafeed market in Chile, which represents approximately 30 percent of the world market share of farmed salmon.

**PHA Traits: C3014 and C3015**

Yield10 filed a U.S. patent application in 2019 for new technology potentially enabling low-cost production of PHA biomaterials in the seeds of Camelina. The Yield10 patent application describes a discovery around maintaining the viability and vigor of Camelina seed programmed to produce high levels of the PHA biomaterial PHB. By introducing the three genes encoding the pathway for producing PHA from the plant metabolite acetyl-CoA, we have demonstrated the production of up to 10 percent PHB in seeds of Camelina with good seedling viability in growth chambers. We currently have two new PHA biomaterial traits, C3014 and C3015, in our development pipeline and we carried out our successful first field tests in 2020. We are now progressing to scale up the two best lines, which showed PHA levels of up to 6% seed weight, to begin early product prototyping and market development studies for feed and water treatment applications. In parallel we plan to start the development of commercial quality lines based on insights from the field tests and our GRAIN platform with a goal to initiate commercial launch in the timeframe of 2024-2026.

We believe crop-based production will enable an advantaged cost structure thereby eliminating a barrier to entry for broad adoption of these materials for use potentially in animal feed, water treatment, and as a biobased, biodegradable plastics replacement. Seeds are natural, stable storage sites for large amounts of oil and proteins deposited by plants to nourish seedlings following seed germination in the field. The stability of seeds at ambient temperatures allows them to be readily harvested, transported and stored prior to processing and makes them the ideal site in a plant for producing PHA biomaterials.

The key concept was to introduce PHA as a new component of the seed composition and by processing the PHA producing seed, to produce oil, polymer, and protein rich seed meal. The combination of all three products improves the overall value proposition and we believe that in time this will result in PHA bioplastics costs in line with canola and soybean oils. Yield10 plans to develop and commercialize Camelina seed based PHA biomaterials for water treatment applications and look for commercial partnering opportunities for plastics replacements markets.

**C4000 Series Traits**

We used our GRAIN platform to study global transcription factors and identify novel yield traits in the C4000 series. 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, above ground biomass, and below ground biomass production in our switchgrass plants engineered to overexpress the transcription factors. We reported these results for our novel C4001 and C4003 traits in 2018 in the journal *Plant Science*. Switchgrass plants expressing C4001 resulted in a total increase in biomass of 75-100 percent in leaves and stems as compared to controls. Expression of C4003 in switchgrass resulted in a total increase in biomass of 100-160 percent in leaves and stems as compared to control plants. Increasing biomass yield is important for forage crops such as sorghum, silage corn, and alfalfa.

We are progressing the development of certain of our C4000 series of traits in Camelina and corn. Depending on the field performance of the C4000 series Camelina lines, Yield10 plans to integrate them into a commercial Camelina seed business. Recognizing our limited internal capabilities and resources in corn, the Company plans to seek partners interested in progressing these traits in corn under a license agreement like the one in place with Bayer for soybean. Forage Genetics began work with certain of our C4000 series traits through a research license signed in 2018 to assess the potential of our traits to increase biomass in forage sorghum. Simplot is testing the C4001 trait in potato.

We expect evaluation of C4000 series traits in these target crops will continue to advance in 2021. Traits in this series and the proof points we expect to generate may provide us with an opportunity to selectively partner with others for the development of these traits in major commercial food, feed, and forage crops.

**Target Crops for Trait Licensing**

Our research and early development work with our C3000 and C4000 series traits in Camelina and other crops 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, thereby creating significant economic value.

The crops we are targeting for development are described below.

**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 94.4 million acres of soybean were planted in the U.S. and Canada in the 2018/2019 growing season. According to the USDA, the U.S., Brazil and Argentina together currently represent approximately 80 percent of global soybean production. Yield10 is targeting a 20 percent or greater increase in soybean seed yield. Yield 10 has executed research license agreements with Bayer and GDM to enable evaluation of certain traits in soybean.

**Potato** is the most important non-cereal staple food crop for humans after wheat and rice. In the U.S. and Canada, the 2019 potato harvest acreage was approximately 1.3 million acres, the harvest value however was approximately $4.3 billion, and the frozen french fry sector had a value of around $20 billion. Yield10 has no in-house R&D activities specific to potato but has executed a research license agreement with Simplot to enable the evaluation of three of our traits in potato.

**Forage Sorghum.** 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. Yield10 has no in-house R&D activities specific to forage sorghum but has executed a research license agreement with Forage Genetics to enable them to evaluate five of our traits in this crop.

**Canola (*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, now Bayer) and Liberty-Link (Bayer) varieties of canola are grown and were introduced to the market in the 1990s. Approximately 24.7 million acres were planted in Canada and the U.S. in the 2018 growing season. The Canola Council of Canada has set yield goals of 52 bushels/acre for 26 million metric tons of production to meet global market demand for canola by 2025. Yield10 is targeting a 10-20 percent or greater increase in canola seed yield. As one of Canada's major field crops, canola is subject to variety registration, which is a regulatory requirement of the Seeds Act and is also administered by the CFIA. Any future sales of our seed traits or products in Canada would be done by a third-party collaborator or other partner, and that third party would be responsible for complying with registration requirements for the canola varieties, if applicable. Yield10 has field tested traits C3003 and C3004 in canola, and is seeking a collaboration or license to develop and commercialize our traits in corn.

**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 83 million acres of corn were planted in North America in the 2018 growing season. The traits commonly used in today's corn cultivars provide insect resistance and herbicide tolerance. In many GM seeds sold today, these traits are stacked ("stacked" refers to the practice of adding multiple traits to an elite plant line). Corn has the more efficient C4 photosynthesis system and Yield10 is targeting a 10 percent yield increase in corn. We have conducted early development of our traits in corn, and are seeking a collaboration or license to develop and commercialize our traits in corn.

**Regulatory Requirements**

Since the first successful commercialization of a biotechnology-derived agricultural crop in the 1990s, many new crop varieties have been developed and made available to farmers in the U.S. and worldwide. U.S. farmers have rapidly adopted many of these new biotechnology-derived varieties. 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 traditional forms of genetic engineering. A significant percentage of the production of other crops planted and harvested in the U.S., such as alfalfa, papaya and sugar beet, are also biotechnology-derived.

Biotechnology-derived or genetically engineered crops are subject to a significant amount of regulation in the U.S. and around the world. Field tests and field trials of such crops need to ensure that traits in development do not escape or mix with native plants, and crops that may be used as human food or animal feed must meet certain safety standards, but government regulations, regulatory systems and the politics that influence them vary significantly among jurisdictions.

For purposes of this discussion, the term "GE" includes both biotechnology-derived or genetically engineered plants that are modified by the insertion of recombinant DNA ("Traditional Genome Modification") and biotechnology-derived or genetically engineered plants that are modified through the application of more modern techniques of genome editing. We have seed traits that fall within each of these two generalized categories of GE plants, as summarized above under the subheading "Traits in Development."

*United States Regulation*

The U.S. government agencies primarily responsible for overseeing the products of modern agricultural biotechnology are the USDA, the FDA and the EPA. 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, as updated. 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 and its potential applications or intended uses. EPA's principal oversight role is for biotechnology-derived products that are intended for use as pesticides or herbicides, under the authorities granted to the agency under the Federal Insecticide, Fungicide, and Rodenticide Act and the Toxic Substances Control Act. Our business strategy for major grain crops is to develop yield and performance traits for licensing to the major seed companies. We have no current plans for the development of pesticide or herbicide GE traits that would be subject to the procedures and requirements of the EPA under these statutes.

Our seed traits and any future products that are successfully developed containing our seed traits, however, are or will be subject to USDA and FDA regulatory requirements. Those requirements will vary depending on the particular seed trait and the type and intended use of any product that will be commercialized. Future products that we plan to produce and sell, for example for use in water treatment may potentially have EPA regulatory requirements, and the regulations relating to manufacturing and consumer protection will need to be addressed.

Within USDA, APHIS is responsible for protecting agricultural plants from pests, diseases and noxious weeds. Under the Plant Protection Act ("PPA"), USDA-APHIS has regulatory oversight over products of modern biotechnology that could pose such a risk to domestic agriculture and native plants. Accordingly, USDA-APHIS regulates organisms and products that are known or are suspected to be plant pests or to pose a plant pest risk, including those that have been altered or produced through various genetic engineering techniques. These GE plants are called "regulated articles" in the relevant USDA-APHIS regulations, which are codified at 7 CFR part 340. The PPA and the implementing regulations in 7 CFR part 340 empower USDA-APHIS to regulate the import, handling, interstate movement and release into the environment of regulated articles, including certain GE 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 by ensuring appropriate handling, confinement and disposal.

Seed traits developed using Traditional Genome Modification, such as our C3003 yield trait that leverages the biological functions of an algal gene, are regulated under 7 CFR part 340. Regulated articles are subject to extensive USDA-APHIS oversight, including but not limited to permitting requirements for import, handling, interstate movement and release into the environment.

If, however, USDA-APHIS determines that a GE plant is unlikely to present a greater plant pest risk than its unmodified counterpart, the newly developed crop will no longer be subject to the permitting and other regulatory processes that are overseen by the agency (i.e., it will no longer be treated as a potential plant pest). Such a determination by the USDA-APHIS is called "not regulated" under the 7 CFR part 340 regulatory framework. The regulations establish detailed procedures for how a developer of a new GE plant may petition USDA-APHIS to determine if modified plant lines are not regulated under the 7 CFR part 340 framework, which is an official agency finding that the particular article is unlikely to pose a plant pest risk and therefore no longer needs to be regulated under 7 CFR part 340 and the PPA.

USDA-APHIS conducts a comprehensive science-based review of the petition to assess, among other things, plant pest risk, environmental considerations pursuant to the National Environmental Policy Act, and any potential impacts on endangered species. The duration of the petition process varies based on a number of factors, including the agency's familiarity with similar GE products, the type and scope of the environmental review conducted, and the number and types of public comments received. If, upon the completion of the review, USDA-APHIS approves the petition and the product is no longer deemed a "regulated article," the developer may commercialize the product, subject to any conditions set forth in the USDA-APHIS written decision issued in response to the petition for determination of non-regulated status.

As previously described, our seed traits developed using Traditional Genome Modification are regulated under 7 CFR part 340 and are subject to USDA-APHIS permitting requirements. In recent years, however, we and others have submitted various petitions to USDA-APHIS to determine whether particular GE plants developed through the use of different genome editing techniques meet the not regulated status under the 7 CFR part 340 framework administered by the agency. In general, lines developed using genome editing approaches have been deemed not to be regulated by USDA-APHIS under 7 CFR part 340. The USDA also announced in March 2018 that it would not require an assessment on products that use modern forms of mutagenesis if it is clear these outcomes could occur in nature. The USDA stated at that time that it did not "have any plans to regulate plants that could otherwise have been developed through traditional breeding techniques as long as they are developed without the use of a plant pest as the donor or vector and they are not themselves plant pests." This USDA policy statement applies to genetic deletions of any size, which would include genome editing through CRISPR-Cas9 and other emerging technologies, although it remains to be seen how this policy announcement will be implemented by USDA-APHIS and what practical effect that may have on seed trait developers like us and our competitors.

Historically, changes to the U.S. regulatory paradigm for agricultural biotechnology have been infrequent, are typically preceded by notice, and are most often subject to public comment, but there can be no guarantee that the USDA-APHIS governing regulations and policies will not change.

We have submitted two petitions under 7 CFR part 340 for a determination of the regulatory status (also known as the "Am I Regulated?" letter) to USDA-APHIS's Biotechnology Regulatory Services in order to confirm that the following two traits designed to increase oil content are not going to be regulated by the agency: (i) the single trait C3008 Camelina plant line, developed using CRISPR genome editing technology for increased oil content; and (ii) the triple-edited Camelina line that combines three gene traits, C3008a, C3008b and C3009, to increase oil production. In both cases, USDA-APHIS's Biotechnology Regulatory Services approved our petitions and confirmed that each of these novel plant lines would not be treated as a regulated article.

To our knowledge, our triple-edited Camelina line which was determined to not be regulated under 7 CFR part 340 in September 2018, is the first CRISPR-edited triple-trait plant determined by the agency to be not to be regulated. Given our business strategy to develop certain multi-trait genome edited plant lines, this achievement should facilitate our ability to put more of our novel yield traits through the petitioning process and the agency's scientifically driven decision-making process, with the expected end result of having lines containing more of our traits treated as not to be regulated under 7 CFR part 340 (as compared to our seed traits developed using Traditional Genome Modification, which are regulated articles). We expect to continue to make appropriate use of the "Am I Regulated" letter procedures to clarify the regulatory status of our new GE seed traits as they are developed.

Also, we tested the C3008 single-trait Camelina line in a 2018 field evaluation that took place in the United States following a notification in 2017 that the line would not be regulated under 7 CFR part 340.

Separate from the plant breeding and planting issues and USDA-APHIS regulation under 7 CFR part 340, a GE plant also will be regulated by the FDA if it is intended to be used as human food or animal feed. The FDA regulates the safety of food for humans and animals, and foods derived from GE plants must meet the same food safety requirements as foods derived from traditionally bred plants (also called conventional foods).

Since 1992, the FDA has had in place a voluntary consultation process for developers of bioengineered food (“Biotechnology Consultations”). Final agency decisions and other information from these Biotechnology Consultations are made publicly available by the FDA. Biotechnology Consultations are data-intensive and examine the new food product’s safety and nutritional profile, among other issues. Generally, the 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. The FDA primarily derives its regulatory power from the Federal Food, Drug, and Cosmetic Act, which has been amended over time by several subsequent laws. Among other oversight and inspection responsibilities, the FDA regulates ingredients, packaging, and labeling of foods, including nutrition and health claims and the nutrition facts panel. Foods are typically not subject to premarket review and approval requirements, with limited exceptions.

As part of a broader effort to modernize its regulatory approach to all biotechnology-derived products, the FDA is currently re-evaluating its regulatory approach in light of the increasing prevalence of certain genome edited plants. In January 2017, the FDA asked for public input to help inform its thinking about human and animal foods derived from new plant varieties produced using genome editing techniques. Among other things, the FDA’s request for comments asked for data and information in response to questions about the safety of foods from genome edited plants, such as whether certain categories of genome edited plants present food safety risks different from other plants produced through traditional plant breeding.

In October 2018, FDA leadership issued a document entitled the “Plant and Animal Biotechnology Innovation Action Plan” (the “Action Plan”) that identified three key priorities for the agency in this area: 1) advancing human and animal health by promoting product innovation and applying modern, efficient and risk-based regulatory pathways; 2) strengthening public outreach and communication regarding the FDA’s approach to innovative plant and animal biotechnology; and 3) increasing engagement with domestic and international partners on biotechnology issues. The Action Plan also stated that the FDA has reviewed the comments and other information it received in response to the January 2017 request for comments, and that it intends to develop guidance for the industry explaining how the FDA’s existing regulatory policy for foods derived from new plant varieties applies to foods produced using genome editing. The FDA also stated in the Action Plan that it intends to begin updating the existing procedures for voluntary Biotechnology Consultations to reflect the agency’s 25 years of experience with foods derived from biotechnology plants and to incorporate any additional issues related to genome editing of food crops. Such procedural updates are expected to be developed and implemented over the next two years.

*Canadian Regulation*

In Canada, GE crops and the food products into which they are incorporated 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 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 Plant Biosafety Office ("PBO") is responsible for conducting environmental assessments of biotechnology-derived plants, referred to as "plants with novel traits" ("PNT"). Authority for the PBO includes both approving confined field trials with the PNT through permits and authorizing their “unconfined release” as a first step towards commercialization. PNTs are defined in the Canadian Seeds Regulations as (i) plants into which a trait or traits have been intentionally introduced, and (ii) where the trait is new in Canada and has the potential to impact the environment. The CFIA also has in place a remutation policy, whereby plants containing the same mutation as a previously authorized plant of the same species are included in the authorization of the original PNT and are therefore subject to the same conditions.

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 that includes any PNT or other biotechnology-derived foods. The safety assessment should provide assurances that the novel food is safe when prepared or consumed according to its intended use before it enters the Canadian market and food system. 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 is safe and nutritious before it can be sold in Canada, as well as 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 in the United States, approval of a PNT or a novel food product does not take into account the method with which such product was produced. Rather, Health Canada employs a product-based (as opposed to a process-based) approach to its regulatory oversight of such emerging foods and food ingredients.

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 GE food ingredients.

Environment Canada is also 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 GE crops. With laboratories and greenhouses in both the U.S. and Canada, we are also subject to regulations governing the shipment of seeds and other plant material (including GE seeds and GE plant material) between our facilities in the U.S. and Canada, including USDA-APHIS and CFIA permits for the import and phytosanitary certificates for the export of plant materials that could pose a risk to domestic agriculture.

Having deployed our own research and development operations in Saskatoon, Canada in 2010, we have been conducting field studies of various yield traits in that country since 2016 under PNT permits issued by Canadian regulators. During 2020, we conducted field studies of multiple traits including our PHA bioplastic trait in Canada.

Finally, as one of Canada's major field crops, canola in particular is subject to variety registration, which is a regulatory requirement of the Seeds Act and is also administered by the CFIA. Any future sales of our seed traits or products in Canada would be done by a third-party collaborator or other partner, and that third party would be responsible for complying with registration requirements for the canola varieties, if applicable.

*Regulation in Other Jurisdictions*

Other jurisdictions and governmental authorities, including in South America and Asia, are increasingly taking an interest in regulating agricultural products of biotechnology. Regulatory approaches vary by jurisdiction, the existing public health framework and phytosanitary laws in the country, and other less tangible factors such as cultural and religious norms that may have an impact on individual country risk assessments and decision-making. We cannot predict future changes in the global regulatory landscape regarding GE plants subjected to Traditional Genome Modification or GE plants subjected to genome editing.

Further, although U.S. and Canadian regulatory authorities have taken similar approaches to overseeing both traditional biotechnology-derived plants and genome edited plants under their national plant health and biosafety laws, regulation of all GE plants in the EU is significantly more stringent than in North America. U.S. and Canadian regulators have also determined that genome edited GE plants pose fewer risks that those subjected to Traditional Genome Modification, while a recent EU legal ruling indicates that the existing European regulations for GE plants modified by the insertion of recombinant DNA should be strictly applied to genome edited plants as well. There is thus a sharp distinction between how European and North American regulatory agencies oversee novel seed traits, including those that are generated using the more modern techniques of genome editing. It is possible that emerging oversight regimes for GE products in other jurisdictions could follow the EU approach and impose similar strict requirements for the release of such products into the environment and their incorporation into human food or other consumer products.

Regulation of biotechnology-derived products in the EU is primarily based on Directive 2001/18/EC (the "2001 EC Directive"). The 2001 EC Directive defines "genetically modified organisms" ("GMOs") broadly as "organism[s], with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination." In July 2018, the Court of Justice of the European Union (CJEU) issued an important ruling

clarifying that the 2001 EC Directive and its pre-market authorization and associated risk assessment requirements required for such “GMOs” should also apply in full to organisms developed using more modern “directed” mutagenesis techniques.

The July 2018 CJEU decision is being interpreted to cover all modern genome editing tools such as CRISPR-Cas9, TALEN and oligonucleotide-directed mutagenesis. This recent clarification by the CJEU regarding the scope of EU regulations suggests that novel seed trait developers who are seeking to bring genome edited seed traits to commercial markets in the EU will face hurdles comparable to what has historically been required in Europe for introducing and commercializing Traditional Genome Modification traits.

Although we are not currently targeting European markets for the development or commercialization of our products, the EU approach to regulating GE plants without regard to the scientific distinctions between Traditional Genome Modification and directed genome editing could be adopted by emerging oversight regimes for GE products in other jurisdictions. There is no guarantee that countries for which we may have or may develop future marketing plans would not take a stricter legal and regulatory approach to controlling GE plants similar to that of the EU.

**In-License Agreements**

*Exclusive Collaboration Agreement with Rothamsted Research*

On November 12, 2020, Yield10 signed an exclusive collaboration agreement with UK-based Rothamsted Research to support Rothamsted’s Flagship Program to develop omega-3 oils in *Camelina sativa*. The technology developed by Rothamsted could enable the sustainable, plant-based production of omega-3 (DHA+EPA) nutritional oils that closely mimic the composition of Southern Hemisphere fish oil, an important ingredient in aquaculture feed. Omega-3 oils are also essential for human nutrition and have demonstrated benefits in heart health. Rothamsted Research is a world-leading nonprofit research center based in Harpenden, UK, that focuses on strategic agricultural science to the benefit of farmers and society worldwide. Over the last decade, the team led by Professor Johnathan Napier, Ph.D., Science Director, has demonstrated the production of DHA+EPA oils in Camelina seed. In addition, Prof. Napier’s team has carried out multi-year field trials and multiple feeding studies using the DHA+EPA Camelina oil in different fish species including salmon with research partners including at least one major aquafeed company. Under the agreement, Yield10 is providing financial support for Prof. Napier’s ongoing research including further DHA+EPA trait improvement, field testing and nutritional studies. As part of the agreement, Yield10 has an exclusive two-year option to sign a global, exclusive or non-exclusive license agreement to the technology. Under this collaboration Yield10 will monitor ongoing progress by Rothamsted while developing the business plan for the initial commercial launch, probably in South America, to serve the salmon feed market in Chile.

*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, including issued patents covering our yield trait gene C3003, relating to the manufacture of plants with enhanced photosynthesis. The agreement provides an exclusive, worldwide license to make, have made, use, offer for sale, sell, have sold and import any transgenic plant seed or plant grown therefrom 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.

Pursuant to the UMASS license agreement, 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 give UMASS the right to terminate the agreement, following a notice period, unless we are able to reach agreement with UMASS as to a potential adjustment to the applicable milestone.

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.

*License Agreement with the University of Missouri*

Pursuant to a license agreement with the University of Missouri ("UM") dated as of May 17, 2018, we have an exclusive, worldwide license to two novel gene technologies to boost oil content in crops. Both technologies are based on significant new discoveries around the function and regulation of ACCase, a key rate-limiting enzyme involved in oil production. The first technology, named C3007, is a gene for a negative controller that inhibits the enzyme activity of ACCase. The second technology, named C3010, is a gene which, if over-expressed, results in increased activity of ACCase. The UM license was expanded during May 2019 to include an exclusive worldwide license to a third gene in the ACCase complex, that we have designated C3012, that may complement the activity of C3007 to boost oil content in crops.

Pursuant to the UM license agreement, we are required to use diligent efforts to develop licensed products throughout the licensed field and to introduce licensed products into the commercial market. In that regard, we are obligated to fulfill certain research, development and regulatory milestones relating to C3007, C3010 and C3012, including completion of multi-site field demonstrations of a crop species in which C3007, C3010 and C3012 have been introduced, and filing for regulatory approval of a crop species in which C3007, C3010 and C3012 have been introduced within a specified period. Our failure to achieve any milestone provided for under the license agreement would give UM the right to terminate the license agreement or render it nonexclusive, unless we are able to reach agreement with UM as to the potential adjustment of the applicable milestone.

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

We may terminate the license agreement at any time upon 90 days' prior written notice to UM. Either party may terminate the license agreement upon written notice for a breach that is not cured within 30 days after receiving written notice of the breach. In addition, UM may terminate the license agreement with respect to certain patent rights immediately upon written notice in the event we contest the validity or enforceability of such patent rights.

**Competitive Landscape for our Business**

- Camelina Oilseed and Alternative Cover Crops
- Omega-3 Oil
- PHA Biomaterials
- Trait Licensing: Agricultural Industry Landscape

***Camelina Oilseed and Alternative Cover Crops****:* Camelina has been of interest for large scale production in North America to produce feedstocks for biodiesel since the biofuels boom in the early 2000's because it is not a major food crop. This interest changed over the ensuing years as more information was developed about its potential for food oils and as a supplement for fish oil in the production of aquafeed due to its natural content of the omega-3 fatty acid ALA. We anticipate that the growing interest in sourcing non-food, low carbon index feedstocks for renewable diesel will create renewed interest and potentially competition in Camelina. This may be particularly true of its use as a winter cover crop, enabling a second oil harvest for each acre. The general interest in cover crops has been steadily increasing over the last several years and this has resulted in at least one venture funded company actively developing alternatives to Camelina. The St. Louis, Missouri company CoverCress Inc., has been active for several years developing the oilseed pennycress as a cover crop for the mid-west corn and soybean belt.

***Omega-3 Oil:*** The growing demand for alternative sustainable sources of fish oil for human nutrition, pharmaceutical, and aquafeed applications has made this an attractive area for investment by several companies. Alternative sources include microbial fermentation processes commercialized by Veramaris (the joint venture between Evonic and DSM, with a production facility in Blair, Nebraska) and Archer Daniels Midland Co. (with a production facility in Clinton, Iowa). On the crop-based production side, two different genetically engineered varieties of the oilseed canola have been developed and approved by USDA-APHIS to address this growing demand. BASF Plant Sciences has developed a canola variety that produces low amounts of the omega-3 fatty acid EPA and the Australian company Nuseed has developed a canola variety that produces the omega-3 fatty acid DHA in the oil. BASF currently has patents on genes for the production of omega-3 oils

in canola dating back to applications made on or before 2005. NuSeed exclusively licensed patents on the production of omega-3 oils in canola from Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO). We believe the Rothamsted technology which enables production of omega-3 DHA+EPA oil has higher potential as a drop-in replacement for fish oil in aquafeed.

***PHA Biomaterials:*** Third party PHA producers are pursuing fermentation-based production systems to produce PHA bioplastics for the biodegradables market. These include Cheil Jedang, or CJ, of South Korea (which acquired the fermentation and polymer processing technology from Yield10 in 2016 when we were still named Metabolix Inc.), Kaneka of Japan, and Danimer Scientific of Atlanta, Georgia (which acquired the PHA assets of P&G in 2007). Danimer has a revenue generating bioplastics compounding business, produced PHAs using fermentation of seed oils and has relationships in place with a number of brand owners and consumer products companies. In 2020, Danimer (NYSE: DNMR) went public through a SPAC transaction on the NYSE. There are also a number of much smaller pre-commercial PHA bioplastic companies, all of which, to our knowledge, are based on fermentation platforms in North America and in China. Although these companies use genetically engineered microbes and feedstocks from GMO crops for their fermentation processes, some brand owners may prefer to accept the higher cost structure for their PHA bioplastic as compared to PHA Camelina because they are not made in a GMO crop.

***Trait Licensing: Agricultural Industry Landscape***: Following advances in biotechnology in the 1970s through the early 1990s, the first genetically modified ("GM") 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 (also referred to as GMO or Agbiotech) 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 for which data is available. The planting of GM crops is centered in the Americas with North America at approximately 45 percent of the acres and South 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 the EU 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 EU has been resistant to the adoption of 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 $68 billion in 2017 and is projected to grow to more than $100 billion by 2022. According to an ISAAA report, the global GM seed business represented a $17 billion market in 2017 and biotech crops were grown on approximately 469 million acres that year. 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 Corporation, Bayer, DuPont de Nemours, Inc., Syngenta AG and AgReliant Genetics, LLC. 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 were recently involved in consolidation of the sector with the merger of DuPont de Nemours, Inc. and Dow Chemical Company, the acquisition of Syngenta AG by the China National Chemical Corporation, and the acquisition of The Monsanto Company by Bayer 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 LLC, Arcadia Biosciences, Inc., Benson Hill Biosystems, Inc., BioCeres S.A., Calyxt, Inc., Cibus Ltd., Evogene Ltd., Inari Agriculture, Inc., Indigo Agriculture, Inc., Kaiima Bio-Agritech Ltd., Marrone Bio Innovation, Inc., and Pairwise Plants LLC, many of which have greater resources and experience than we have. Both Calyxt (Nasdaq: CLXT) and the private company Cibus recently changed their business models to focus on trait discovery and development.

**Intellectual Property**

Our continued success depends in large part on our proprietary technology. As of December 31, 2020, we owned or held exclusive rights to 21 patent families, including nine issued patents and 42 pending patent applications, related to advanced technologies for increasing yield in crops, in the United States and throughout the world. As part of the agreement with Rothamsted Research, we have an exclusive option on three patent families. Our portfolio of patent applications includes plant science technologies we have in-licensed globally and exclusively from the University of Massachusetts 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. Our portfolio of patent applications also includes advanced technologies for oilseed crops that we in licensed globally and exclusively from the University of Missouri in 2018 and 2019 related to the yield trait genes C3007, C3010 and C3012.

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

**Human Capital Resources**

As of December 31, 2020, we had 25 full-time employees. Of those employees, 21 were in research and development. Among our staff, 11 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.

*Talent Acquisition and Retention*

We recognize that our employees largely contribute to our success. To this end, we support business growth by seeking to attract and retain best-in-class talent. We use internal and external resources to recruit highly skilled candidates for open positions. We believe that we are able to attract and retain superior talent as measured by our minimal turnover rate and high employee service tenure.

*Total Rewards*

Our total rewards philosophy has been to create investment in our workforce by offering a competitive compensation and benefits package for the two geographies in which we have offices. We provide employees with compensation packages that include base salary, annual incentive bonuses, and long-term equity incentive awards. We also offer comprehensive employee benefits, such as life, disability, and health insurance as well as flexible spending accounts, paid time off, and a 401(k) plan. It is our expressed intent to be an employer of choice in our industry by providing a market-competitive compensation and benefits package.

*Health, Safety, and Wellness*

The health, safety, and wellness of our employees is a priority in which we have always invested and will continue to do so. We provide our employees with access to a variety of innovative, flexible, and convenient health and wellness

programs. Program benefits are intended to provide protection and security, so employees can have peace of mind concerning events that may require time away from work or that may impact their financial well-being.

These investments and the prioritization of employee health, safety, and wellness took on particular significance in 2020 in light of COVID-19. To protect and support our team members, we have implemented health and safety measures that included maximizing personal workspaces, altering work schedules, and providing personal protective equipment. To aid in containing the spread of COVID-19, we have also implemented remote-work options and have limited employee travel. We continue to monitor this rapidly evolving situation and will continue to seek programs to educate and assist employees whenever possible.

*Diversity, Equity, and Inclusion*

We believe a diverse workforce is critical to our success. Our mission is to value differences in races, ethnicities, religions, nationalities, genders, ages, and sexual orientations, as well as education, skill sets and experience. We are focused on inclusive hiring practices, fair and equitable treatment, organizational flexibility, and training and resources.

**Corporate History and Investor Information**

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

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 Exchange Act as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the Securities and Exchange Commission (the "SEC"). In addition, the SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our filings with the SEC may be accessed through the SEC's website at http://www.sec.gov.

## ITEM 1A. RISK FACTORS

**Risk Factor Summary**

Our business is subject to numerous risks. We encourage you to carefully review the full risk factors contained in this Annual Report on Form 10-K. Some of the principal risk factors are summarized below:

- We have a history of net losses and our future profitability is uncertain.
- 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.
- We have 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.
- There can be no assurance that we will be able to comply with the continued listing standards of The Nasdaq Capital Market.
- Currently, our primary source of our revenue is government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.
- Our government grants may subject us to government audits, which could expose us to penalties if we have failed to comply with the terms of the grants.
- Our financial condition and results of operations could be adversely affected by public health epidemics, including the ongoing coronavirus outbreak.

- The crop science product development cycle is lengthy and uncertain, and our progress will depend heavily on our ability to attract third-party investment in research under license agreements and on our ability to establish future collaborative partnerships to develop and commercialize our innovations.
- Any potential collaborative partnerships that we may enter into in the future may not be successful, which could adversely affect our ability to develop and commercialize our innovations.
- Our crop science program may not be successful in developing commercial products.
- Even if we or our future collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.
- Our estimates of market opportunity and forecasts of market growth may prove to be inaccurate, and even if the markets in which we may compete in the future achieve growth, our business could fail to achieve the same growth rates as others in the industry.
- If ongoing or future field trials conducted by us or our future collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.
- Competition in the market for traits and seeds is intense and requires continuous technological development, and, if we are unable to compete effectively, our financial results will suffer.
- Our business is subject to various government regulations in the United States and Canada, the regulatory requirements for our future products in development are evolving and are subject to change, and if there are adverse changes to the current regulatory framework, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.
- If we or our future collaborators are unable to comply with and timely complete the regulatory process in the United States and Canada for our future products in development, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.
- The regulatory environment for genetically engineered crops in jurisdictions outside the United States and Canada varies greatly, and some jurisdictions have more restrictive regulations that could delay, prevent or limit our or our future collaborators' ability to market our traits.
- Consumer resistance to genetically engineered crops may negatively affect the ability to commercialize future crops containing our traits, as well as our public image, and may reduce any future sales of seeds containing our yield traits.
- Government policies and regulations, particularly those affecting the agricultural sector and related industries, could adversely affect our operations and our ability to generate future revenues and to achieve profitability.
- The products of third parties, or the environment itself, may be negatively affected by the unintended appearance of our trait genes, novel seed compositions and novel seed products.
- Loss of or damage to our elite novel trait events and plant lines would significantly slow our product development efforts.
- Our insurance coverage may be inadequate to cover all the liabilities we may incur.
- 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 future collaborators' ability to complete the regulatory process for or commercialize such products.
- 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.

- Our business and operations would suffer in the event of system failures.
- Patent protection for our technologies is both important and uncertain.
- Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.
- Portions of our crop science technology are owned by or subject to retained rights of third parties.
- We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.
- Our license agreements include royalty payments that we are required to make to third parties.
- 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.
- 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.
- Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.
- 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.
- 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.
- Concentration of ownership among our officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.
- Our financial condition, research and development efforts, and results of operations could be further adversely affected by the ongoing coronavirus outbreak.

*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 contained 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.*

**Risks Relating to our Financial Position**

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

We have recorded losses every year since our inception, with the exception of 2012. As of December 31, 2020, our accumulated deficit was $375,100. 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, or any, product 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.***

During the year ended December 31, 2020, we were successful in raising adequate capital to fund our operations, ending the year with unrestricted cash, cash equivalents and short-term investments of $9,702. Subsequent to year-end, on February 3, 2021, we raised a further $11,996, net of estimated offering costs of $744, through the sale of 1,040,000 shares of common stock at an issuance price of $12.25. These shares of common stock were offered pursuant to a registration statement on Form S-3 (File No. 333-237539), as initially filed with the SEC on April 1, 2020 and declared effective on April 10, 2020. Also subsequent to year-end through March 15, 2021, 481,973 warrants issued in our November 2019 securities offering were exercised by warrant holders providing us with additional cash of $3,856. We estimate that our cash resources, including cash provided subsequent to our December 31, 2020 balance sheet date, will be sufficient to fund operations and meet our obligations into the first quarter of 2023.

We follow the guidance of ASC Topic 205-40, *Presentation of Financial Statements-Going Concern*, in order to determine whether there is substantial doubt about our ability to continue as a going concern for one year after the date our financial statements are issued. Based on our current cash forecast, we expect that our present capital resources will be sufficient to fund our planned operations for at least that period of time. This forecast of cash resources is forward-looking information that involves risks and uncertainties, and the actual amount of expenses could vary materially and adversely as a result of a number of factors. Our ability to continue operations after our current cash resources are exhausted will depend upon our ability to obtain additional financing through, among other sources, public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, warrant holders' ability and willingness to exercise the Company's outstanding warrants, additional government research grants or collaborative arrangements with third parties, as to which no assurances can be given. We do not know whether additional financing will be available on terms favorable or acceptable to us when needed, if at all. If adequate additional funds are not available when required, we may be forced to curtail our research efforts, explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

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 and licenses related to our 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.

We will require additional capital resources to support the implementation of our business 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 will 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.

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, as amended (the "Code"), 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 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.

The crop science 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"). Nasdaq listing rules require us to maintain certain closing bid price, stockholders' equity and other financial metric criteria in order for our common stock to continue trading on Nasdaq. For example, Nasdaq Listing Rule 5550(a)(4) requires companies to maintain a minimum of 500,000 publicly held shares. Nasdaq Listing Rule 5550(a)(2) requires listed securities to maintain a minimum bid price of $1.00 per share, and Listing Rule 5810(c)(3)(A) provides that a failure to meet the minimum bid price requirement exists if the deficiency continues for a period of 30 consecutive business days.

On June 25, 2019, we received a deficiency letter from Nasdaq which provided us a grace period of 180 calendar days, or until December 23, 2019, to regain compliance with the minimum bid price requirement. We subsequently received an additional 180 days (until June 22, 2020) to regain compliance with the requirement. On January 9, 2020, 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-40 ratio for the reverse stock split was subsequently approved by our Board of Directors, and the reverse stock split took effect on January 15, 2020. As a result of the reverse stock split, every forty 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 January 30, 2020, we had regained compliance with the minimum bid price requirement.

***Currently, our primary source of our revenue is 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, the expenses that we incur 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 if we have failed to comply with the terms of the grants.***

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.

***Our financial condition and results of operations could be adversely affected by public health epidemics, including the ongoing coronavirus outbreak.***

A novel strain of coronavirus was reported to have originated in Wuhan, Hubei Province, China in December 2019, and has been rapidly spreading across the globe, including in the United States and Canada. Any outbreak of contagious disease such as the coronavirus or other adverse public health developments could have a material and adverse effect on our business operations. Such adverse effects could include quarantines, disruptions of or restrictions on our ability and/or the ability of our collaborators' personnel to travel or conduct normal business activities, as well as closures of our facilities or the facilities of our collaborators for an indefinite period of time (including shutdowns that may be requested or mandated by governmental authorities). Any temporary closures of facilities would likely affect our development efforts and operating results, and any disruption to the operations of our collaborators would likely impact our development efforts and operating results. The extent to which the coronavirus may impact our results will depend on future developments, which are highly uncertain and cannot be predicted, and on new information that may emerge concerning the severity of the coronavirus. However, current predictions suggest that the impact of sustained business closures and quarantines resulting from the coronavirus on the global economy will be severe, and this may have a material adverse effect on our business.

**Risks Relating to our Yield10 Bioscience Crop Science Program**

***The crop science product development cycle is lengthy and uncertain, and our progress will depend heavily on our ability to attract third-party investment in research under license agreements and on our ability to establish future collaborative partnerships to develop and commercialize our innovations.***

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 development work with respect to our products 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. Our initial development strategy is to make it attractive for established agricultural industry companies to invest financial and technical resources to introduce our traits into their elite germplasm for event selection and evaluation under research licenses. For example, in 2017 we entered into a non-exclusive research license with Monsanto, which was subsequently acquired by Bayer AG ("Bayer"), pursuant to which we granted Monsanto a non-exclusive research license to evaluate our novel C3003 and C3004 yield traits in soybean. We expanded the agreement with Bayer in 2019 to cover a new discovery and intellectual property related to C3004. In 2018, we granted a non-exclusive research license to Forage Genetics, a subsidiary of Land O'Lakes, Inc., to evaluate five of our novel yield traits in forage sorghum. The traits included in the research license include C3003 as well as four traits from our GRAIN platform, C4001, C4002, C4003 and C4029. In 2019, we granted a non-exclusive research license to J.R. Simplot Company to evaluate C3003, C3004 and C4001 in potato. In 2020, we signed a non-exclusive research license with GDM for evaluation of seed yield traits in soybean, which will provide opportunities to explore additional Yield10 commercial crop performance traits with a leading seed market participant and potentially provide access to South American acreage in Argentina and Brazil. We may not be successful in establishing or maintaining suitable relationships with established agricultural industry companies for research licenses in the future, and there can be no assurance that any such relationships will result in future collaboration agreements to develop and commercialize our innovations, with terms that are 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.

***Any potential collaborative partnerships that we may enter into in the future may not be successful, which could adversely affect our ability to develop and commercialize our innovations.***

We expect that collaborations with established agricultural industry companies will be required for us to successfully develop and commercialize our innovations. The agriculture industry is highly concentrated and dominated by a small number of large companies, which could impact efforts to form the collaborations that we will need in order to complete the development of our products. To the extent that we pursue such arrangements, we will face significant competition in seeking appropriate partners. Moreover, such arrangements are complex and time-consuming to negotiate, document, implement and maintain. We may not be successful in establishing or implementing such arrangements. The terms of any partnerships, joint ventures or other collaborative arrangements that we may establish may not be favorable to us.

The success of any future collaborative partnerships is uncertain and will depend heavily on the efforts and activities of our potential partners. Such arrangements are subject to numerous risks, including the risks that:

- our partners may have significant discretion in determining the efforts and resources that they will apply to the arrangement;
- our partners may not pursue the development and commercialization of our product candidates based on trial results, changes in their strategic focus, competing priorities, availability of funding, or other external factors;
- our partners may delay or abandon field trials, fail to conduct field trials that produce sufficient conclusory data, provide insufficient funding for field trials, or repeat or conduct new field trials;
- partners who have marketing, manufacturing and distribution rights with respect to a product may not commit sufficient resources to, or otherwise not perform satisfactorily in carrying out, these activities;
- to the extent that such arrangements provide for exclusive rights, we may be precluded from collaborating with others;
- our partners may not properly maintain or defend our intellectual property rights, or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability;
- disputes may arise between us and a partner that causes the delay or termination of the research, development or commercialization of our current or future products, or that results in costly litigation or arbitration that diverts management attention and resources;
- such arrangements may be terminated, and, if terminated, may result in a need for additional capital for our independent pursuit of matters previously covered by such arrangement;
- our partners may own or co-own intellectual property that results from our arrangement; and
- a partner’s sales and marketing activities or other operations may not be in compliance with applicable laws resulting in civil or criminal proceedings.

***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 effects 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, to the extent regulatory approvals are required;
- 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;
- we may be unable to patent our traits in the necessary jurisdictions; and
- our efforts to develop niche crop products based on our Camelina platform, including specialty oils and PHB biomaterials are in the early stages and may not be successful.

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 any requisite regulatory approvals that may be 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 future 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 future collaborators' ability to incorporate our traits into a wide range of crops in significant markets and geographies. Even if we or our future collaborators 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, or competitors of our collaborators, 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;
- we may not be able to produce high-quality seeds in sufficient amounts to meet demand; and
- we may not be able to secure the financial or other resources needed to achieve commercial success.

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

***Our estimates of market opportunity and forecasts of market growth may prove to be inaccurate, and even if the markets in which we may compete in the future achieve growth, our business could fail to achieve the same growth rates as others in the industry.***

Market opportunity estimates and market growth forecasts are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. Our estimates and forecasts relating to the size and expected

growth of the global seed industry and the biotechnology seeds market, and the market size for any products that we may develop in our Camelina products business, such as PHA biomaterials, and the estimated ranges of incremental value increase that a novel, newly developed crop trait may produce, may prove to be inaccurate. Even if the markets in which we may compete in the future achieve these opportunity estimates and market growth forecasts, our business could fail to grow at similar rates, if at all.

***If ongoing or future field trials conducted by us or our future 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 future 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, we or our research licensees 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 were a 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, which we have experienced from time to time in our field trials, can also reduce both acreages 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 the market for 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 any products that we or our future collaborators commercialize 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 potential future 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 in the United States and Canada, the regulatory requirements for our future products in development are evolving and are subject to change, and if there are adverse changes to the current regulatory framework, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.***

In the United States and Canada, where our seed traits and biotechnology-derived plant lines are developed and field tested, changes in regulatory requirements applicable to our seed traits or future products in development containing our traits could result in a substantial increase in the time and costs associated with developing and commercializing future products containing our traits, and could materially affect our ability to meet our desired development timelines or to develop and commercialize a future product containing our traits at all.

In the United States, our seed traits and any future products that are successfully developed containing our seed traits are or will be subject to USDA and FDA regulatory requirements. The USDA and FDA requirements will vary depending on the particular seed trait and the intended use of any product that will be commercialized. Our business strategy is focused on crop yield traits and we have no current plans for the development of pesticide or herbicide traits, which would be subject to regulation by the EPA.

Within USDA, the APHIS is responsible for protecting agricultural plants under the Plant Protection Act. USDA-APHIS regulates organisms and products that are known or are suspected to be plant pests or to pose a plant pest risk, including those that have been altered or produced through various genetic engineering techniques. These genetically engineered plants are called "regulated articles" in the relevant USDA-APHIS regulations, which control the import, handling, interstate movement and release into the environment of regulated articles, including certain genetically engineered organisms undergoing confined experimental use or field trials. Seed traits developed using the insertion of recombinant DNA, such as our C3003 yield trait that leverages the biological functions of an algal gene, are regulated articles and are therefore subject to extensive USDA-APHIS oversight, including but not limited to, permitting requirements for import, handling, interstate movement and release into the environment.

In recent years, we and others have submitted various petitions to USDA-APHIS to determine whether particular biotechnology-derived plants developed through the use of different genome editing techniques may be considered to be not regulated under the framework administered by the agency. In general, genome editing approaches to novel plant trait development have been considered not regulated by USDA-APHIS. In particular, we have submitted two petitions (also known as the "Am I Regulated?" letter) to USDA-APHIS's Biotechnology Regulatory Services in order to confirm that the following two oil content traits are not going to be regulated by the agency under 7 CFR part 340: (i) the single trait C3008 Camelina plant line, developed using CRISPR genome editing technology for increased oil content; and (ii) the triple-edited Camelina line that combines three gene traits, C3008a, C3008b and C3009, to increase oil production. In both cases, USDA-APHIS approved our petitions and confirmed in writing that each of these novel plant lines would not be treated as a regulated article.

The USDA also announced in March 2018 that it would not require an assessment on products that used modern forms of mutagenesis if it was clear these outcomes could occur in nature. The USDA stated at that time that it did not "have any plans to regulate plants that could otherwise have been developed through traditional breeding techniques as long as they are developed without the use of a plant pest as the donor or vector and they are not themselves plant pests." This USDA policy statement applies to genetic deletions of any size, which would include genome editing through CRISPR-Cas9 and other emerging technologies, although it remains to be seen how this policy announcement will be implemented by USDA-APHIS and what practical effect that may have on seed trait developers like us and our competitors.

There can be no guarantee that the USDA-APHIS governing regulations and policies will not change. We cannot predict whether advocacy groups will challenge existing regulations and USDA determinations, whether the USDA will alter its interpretations of existing regulations, modify existing regulations or promulgate new regulations, or whether additional laws will come into effect. If these or other developments resulted in adverse changes to the current regulatory framework, our seed traits or future products in development containing our traits could be subjected to more burdensome regulatory standards, thereby substantially increasing the time and costs associated with developing and commercializing any future products. Moreover, we cannot assure you that USDA-APHIS will analyze any of our future yield traits or products in development containing our traits in a manner consistent with its analysis of our genome edited yield traits to date. Complying with the USDA's plant pest regulations for traits that are classified as "regulated articles," including the permitting requirements for field testing and environmental release, is a costly, time-consuming process and could substantially delay or prevent the commercialization of any future products containing traits that we expected to be deemed non-regulated by USDA-APHIS under 7 CFR part 340.

In addition to USDA-APHIS regulation of plant breeding and planting, a biotechnology-derived plant also will be regulated by the FDA if it is intended to be used as human food or animal feed. The FDA regulates the safety of food for humans and animals, and foods derived from novel plant varieties must meet the same food safety requirements as foods derived from traditionally bred plants (also called conventional foods). Since 1992, the FDA has had in place a voluntary consultation process for developers of bioengineered food (“Biotechnology Consultations”).

Biotechnology Consultations are data-intensive and examine the new food product’s safety and nutritional profile, among other issues. Generally, the 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 genetically engineered and conventional versions. When such a determination cannot be made, the novel plant variety may become subject to FDA premarket review and approval as a food additive.

As part of a broader effort to modernize its regulatory approach to all biotechnology-derived products, the FDA is currently re-evaluating its regulatory approach in light of the increasing prevalence of certain genome edited plants. In January 2017, the FDA asked for public input to help inform its thinking about human and animal foods derived from new plant varieties produced using genome editing techniques. Among other things, the FDA’s request for comments asked for data and information in response to questions about the safety of foods from genome edited plants, such as whether certain categories of genome edited plants present food safety risks different from other plants produced through traditional plant breeding. Subsequently, in October 2018, FDA leadership issued a document entitled the “Plant and Animal Biotechnology Innovation Action Plan” (“Action Plan”) that identified three key priorities for the agency in this area and stated that the FDA has reviewed the comments and other information it received in response to the January 2017 request for comments. The FDA also stated that it intended to develop guidance for industry explaining how the FDA’s existing regulatory policy for foods derived from new plant varieties applies to foods produced using genome editing. Although the expected draft guidance has not yet been released for public comment, on March 4, 2020 FDA, USDA, and EPA launched a new initiative to help consumers better understand foods created through genetic engineering, called “Feed Your Mind,” which aims to answer the most common questions that consumers have about such crops. The FDA also stated in the 2018 Action Plan that it intended to begin updating the existing procedures for voluntary Biotechnology Consultations to reflect the agency’s 25 years of experience with foods derived from biotechnology plants and to incorporate any additional issues related to genome editing of food crops. Subsequently, in February 2019, FDA completed its first consultation on a genome edited plant variety (a soybean variety modified to have increased levels of oleic acid).

We have not participated in any Biotechnology Consultations or engaged in any informal discussions with the FDA about our novel yield traits, whether those traits have been developed using genome editing or traditional genome modification using the insertion of recombinant DNA. Any delay in the regulatory consultation process, or a determination by the FDA that future product candidates containing our traits raise different safety issues than the relevant conventional crop and therefore must be approved by the agency as a new food additive through an intensive premarket safety review process, could increase the costs associated with or delay or prevent the commercialization of the future product candidate. Such delays may lead to reduced acceptance by farmers, food manufacturers or the public and an increase in competitor products that may directly compete with ours. Further, if the FDA enacts new regulations or policies with respect to genome edited plants in particular, such policies could result in additional compliance costs or delay or prevent the commercialization of any potential commercial products containing our seed traits, which could adversely affect our ability to generate revenues and to achieve profitability.

In Canada, genetically engineered crops and the food products into which they are incorporated 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, referred to as “plants with novel traits” ("PNT"). Authority for the PBO includes both approving confined field trials with the PNT 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 that includes any PNT or other biotechnology-derived foods. Health Canada will evaluate the data and information about the novel food and make a determination regarding whether it is safe and nutritious before it can be sold in Canada, as well as whether any restrictions are warranted under applicable law or the product’s safety profile. Any commercialization of our yield crops in Canada is expected to be done by a third-party collaborator or other partner and complying with Health Canada’s pre-market notification requirement and safety assessment for novel foods would be the obligation of that third-party collaborator.

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 genetically engineered crops. With laboratories and greenhouses in both the U.S. and Canada, we are also subject to regulations governing the shipment of seeds and other 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. We also have been conducting field studies of various yield traits in Canada since 2016 under PNT permits issued by Canadian regulators.

Complying with the Canadian regulations is a costly, time-consuming process and could substantially delay or prevent the commercialization of our products. In addition, we cannot assure you that CFIA and Health Canada regulations or the agencies' implementation of those regulations will not change or that the legislative framework in Canada for biotechnology-derived crops, whether for genome edited plants or plants modified using the insertion of recombinant DNA, will not be amended or otherwise changed in a manner that could result in additional compliance costs or delay or prevent the commercialization of any potential commercial products containing our seed traits, which could adversely affect our ability to generate revenues and to achieve profitability.

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.

***If we or our future collaborators are unable to comply with and timely complete the regulatory process in the United States and Canada for our future products in development, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.***

We apply for and maintain the regulatory permits in the United States and Canada necessary for our operations, particularly those covering our field trials. We anticipate that we or our future collaborators will apply for and maintain regulatory approvals, if any, necessary for the commercialization of any future 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.

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 future product containing our traits. These limitations could adversely affect our potential revenues.

***The regulatory environment for genetically engineered crops in jurisdictions outside the United States and Canada varies greatly, and some jurisdictions have more restrictive regulations that could delay, prevent or limit our or our future collaborators' ability to market our traits.***

Other jurisdictions and governmental authorities, including in South America and Asia, are increasingly taking an interest in regulating agricultural products of biotechnology. Regulatory approaches vary by jurisdiction as a result of the existing public health frameworks and phytosanitary laws, as well as other less tangible factors such as cultural and religious norms that may have an impact on individual country risk assessments and decision-making. Each jurisdiction may have its own regulatory framework, which may include restrictions and regulations on planting and growing genetically engineered plants, import of grain and other plant products, and in the consumption and labeling of feed and foods derived from such novel plants, and which may apply to future products containing our traits. We cannot predict future changes in the global regulatory landscape regarding genetically engineered plants or commercial products incorporating such novel plant varieties. The regulatory environment for such plants is greatly uncertain outside of the U.S. and Canada, and some jurisdictions have more restrictive regulations that could delay, prevent or limit our or our future collaborators' ability to market our traits.

For example, regulation of all genetically engineered plants in the European Union ("EU") is far more stringent than in the U.S. and Canada. U.S. and Canadian regulators have determined that genome edited plants pose fewer risks than traditional biotechnology-derived plants subjected to modification through the insertion of recombinant DNA. In contrast, a recent EU legal ruling indicated that the existing EU regulations for genetically engineered plants modified by the insertion of recombinant DNA, which were already more stringent than corresponding U.S. and Canadian regulations, should be strictly applied to genome edited plants as well. As a result, there is a sharp distinction between how EU and U.S. and Canadian regulatory agencies oversee novel seed traits, and in particular those that are generated using the more modern techniques of genome editing.

Although we are not currently targeting EU markets for the development or commercialization of future products containing our traits, emerging oversight regimes for genetically engineered products in other jurisdictions may follow the EU approach and impose similarly strict requirements for the release of such products into the environment and their incorporation into human food or other consumer products. Such jurisdictions may also elect to regulate genetically engineered plants without distinguishing between traditional biotechnology-derived plants modified with recombinant DNA and genome edited plants. There is no guarantee that countries for which we may have or may develop future marketing plans would not take a stricter legal and regulatory approach to controlling genetically engineered plants similar to that of the EU, which could increase regulatory costs and delay, prevent or limit our or our future collaborators' ability to market our traits in such jurisdictions.

***Consumer resistance to genetically engineered crops may negatively affect the ability to commercialize future crops containing our traits, as well as our public image, and may reduce any future sales of seeds containing our yield traits.***

Food and feed made from genetically engineered seeds and plants are not accepted by some consumers, and in certain countries production of certain genetically engineered crops is effectively prohibited, including throughout the EU, due to concerns over such products' effects on food safety and the environment. Advocacy groups have engaged in publicity campaigns and filed lawsuits in various countries against companies and regulatory authorities, seeking to halt regulatory approval activities or influence public opinion against genetically engineered and/or genome edited products. Actions by consumer groups and others also may disrupt research and development or production of genetically engineered plants, seeds or food products that incorporate such novel plant varieties. The high public profile of the biotechnology industry in food and feed production, and a lack of consumer acceptance of the types of products to which we have devoted substantial development resources, could have a negative impact on the commercial success of any of products incorporating our traits that may successfully complete the development process, as to which no assurance can be given, and could materially and adversely affect our ability to obtain future 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.

***Government policies and regulations, particularly those affecting the agricultural sector and related industries, could adversely affect our operations and our ability to generate future revenues and to achieve profitability.***

Agricultural production and trade flows are subject to government policies and regulations. Governmental policies and approvals of technologies affecting the agricultural industry, such as taxes, tariffs, duties, subsidies, incentives and import and export restrictions on agricultural commodities and commodity products can influence the planting of certain crops, the location and size of crop production, and the volume and types of imports and exports. Future government policies in the United States, Canada or in other countries could discourage farmers from using any of our products that may successfully complete the development process, as to which no assurance can be given. Similarly, these policies could discourage food processors from purchasing harvested crops containing our traits or could encourage the use of our competitors' products, which would put us at a commercial disadvantage and could negatively impact our ability to generate any revenues and to achieve profitability.

***The products of third parties, or the environment itself, may be negatively affected by the unintended appearance of our trait genes, novel seed compositions and novel seed products.***

The potential for unintended but unavoidable trace amounts, sometimes called "adventitious presence," of trait genes, novel seed compositions and novel seed products 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.

***Loss of or damage to our elite novel trait events and plant lines would significantly slow our product development efforts.***

We have a collection of elite novel trait events and plant lines in which we are developing traits for incorporation into elite germplasm and potential seed products. Our elite novel trait events and plant lines are a key strategic asset since they form the basis for the introgression of our traits into plant breeding programs. If we suffer loss or damage to our elite novel trait events and plant lines, our research and development activities could be negatively impacted.

***Our insurance coverage may be inadequate to cover all the liabilities we may incur.***

We face the risk of exposure to liability claims if any products that are successfully developed containing our seed traits, as to which no assurance can be given, are defective and if any product that we develop or any product that uses our technologies or incorporates any of our traits causes injury. Although we carry insurance at levels customary for companies in our industry, such coverage may become unavailable or be inadequate to cover all liabilities we may incur. There can be no assurance that we will be able to continue to maintain such insurance, or obtain comparable insurance at a reasonable cost, if at all. If we are unable to obtain sufficient insurance coverage at an acceptable cost or otherwise, or if the amount of any claim against us exceeds the coverage under our policies, we may face significant expenses.

***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 future 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. We could be subject to penalties, fines and liabilities if our third-party contractors fail to perform as required.

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 changes in the 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.

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

We utilize information technology 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.

**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 include four recent patents on our C3003 gene in-licensed from the University of Massachusetts, three recent patents on C4001 and other novel yield traits, and two patents relating to our historical business. Our currently issued patents have expiration dates ranging from 2021 through 2034. New pending patent applications owned by or licensed to us relating to crop yield improvements have earliest effective filing dates ranging from 2014 through 2020 and include a new patent application on a breakthrough technology for producing PHA biomaterials in crops. This patent application would have an expiration date in 2040 if granted, however, we may not be able to obtain sufficiently broad claims to cover the new invention.

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.

***Our license agreements include royalty payments that we are required to make to third parties.***

We are party to license agreements that require us to remit royalty payments and other payments related to our licensed intellectual property. Under our in-license agreements, we may pay upfront fees and milestone payments and be subject to future royalties. We cannot precisely predict the amount, if any, or timing of royalties we may owe in the future.

Furthermore, we may enter into additional license agreements in the future, which may also include royalty, milestone and other payments.

***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. In 2018, we entered into a non-exclusive research license agreement jointly with the Broad Institute of MIT and Harvard and Pioneer, part of Corteva Agriscience™, Agriculture Division of DowDuPont Inc., for the use of CRISPR-Cas9 genome-editing technology for crops in order to demonstrate the utility of our yield trait genes in this field. The joint license covers intellectual property consisting of approximately 48 patents and patent applications on CRISPR-Cas9 technology controlled by the Broad Institute and Corteva Agriscience. Under the agreement, we have the option to renew the license on an annual basis and the right, subject to specified conditions, to convert the research license to a commercial license in the future, although there can be no assurance that we will be able to secure such commercial license on acceptable terms. CRISPR technology is uniquely suited to agricultural applications as it enables precise changes to plant DNA without the use of foreign DNA to incorporate new traits. Plants developed using CRISPR genome-editing technology have the potential to be considered not regulated by USDA-APHIS under 7 CFR part 340 for development and commercialization in the U.S., which could result in shorter developmental timelines and lower costs associated with commercialization of new traits in the U.S. as compared to regulated crops. 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 it is later determined that the patent rights using the CRISPR technology that we obtained under license 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 as is the case for our GRAIN trait gene discovery platform. 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.***

Execution of our business plan requires additional financing. 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, regulatory developments, 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 stockholders 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 ("DGCL") 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 15, 2021, our officers, directors and stockholders who hold at least 5% of our stock beneficially own a combined total of approximately 38.5 percent of our outstanding common stock, including shares of common stock subject to stock options and warrants that are currently exercisable or are exercisable within 60 days after March 15, 2021. 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 15, 2021, Jack W. Schuler (and his related entities) beneficially owned approximately 30.4 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 price for their shares of common stock. The concentration of ownership also may contribute to the low trading volume and volatility of our common stock.

**Risks Relating to COVID-19**

***Our financial condition, research and development efforts, and results of operations could be further adversely affected by the ongoing coronavirus outbreak.***

Any outbreak of contagious diseases, such as COVID-19, or other adverse public health developments, could have a material and adverse effect on our business operations. In response to the ongoing coronavirus pandemic, we have modified our business practices, including in response to legislation, executive orders and guidance from government entities and healthcare authorities. These directives include the temporary closing of businesses deemed “non-essential,” travel bans and restrictions, social distancing and quarantines. Since March 2020, we have limited employee, researcher and supplier access to the research facility we share with the National Research Council of Canada and our other leased facilities located in Saskatchewan, Canada. Our Canadian operations have not yet been significantly impacted by the coronavirus pandemic. Our research and development facility in Woburn was closed from March through late May 2020, and to date, we have operated our laboratories on a staggered schedule in order to help prevent the spread of the disease. To date, we have also been able to move forward with planning and operational steps required to implement our field trials in Canada and the United States. It is possible, however, that current and potential future closures of our research facilities, if they continue for an extended time period, could adversely impact our anticipated time frames for completing field trials and other work we plan to accomplish during 2021.

Additional adverse effects of the coronavirus pandemic could include quarantines, disruptions of or restrictions on our ability and/or the ability of our collaborators’ personnel to travel or conduct normal business activities, as well as additional closures of our facilities or the facilities of our collaborators for an indefinite period of time.

As COVID-19 continues to affect individuals and businesses around the globe, we will likely experience disruptions that could severely impact our business, research and field testing trials, including:

- interruption of field testing activities due to quarantines or other limitations on travel imposed or recommended by federal or state governments, employers and others;
- limitations on employee resources that would otherwise be focused on the conduct of our research and field testing, including because of sickness of employees or their families or requirements imposed on employees to avoid contact with large groups of people;
- delays in receiving approval from regulatory authorities related to our seed traits;
- delays in field testing sites receiving the supplies and materials needed to conduct our trials;
- interruption in global shipping that may affect the transport of materials needed for our research; and

- limitations on government and academic grants that support our research programs.

Additionally, our results of operations could be adversely affected to the extent that COVID-19, or any other epidemic, harms our business or the economy in general either domestically or in any other region in which we do business. The extent to which COVID-19 affects our operations will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the outbreak, new information that may emerge concerning the severity of COVID-19 and the actions to contain COVID-19 or treat its impact, among others, which could have an adverse effect on our business and financial condition. Current predictions suggest that the impact of sustained business closures and quarantines resulting from the coronavirus on the global economy will be severe, and this may have a material adverse effect on our business and our ability to secure funding. As we continue to actively monitor the situation, we may take further actions that affect our operations.

## 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 previously leased approximately 30,000 square feet of office and research and development space located at 19 Presidential Way, Woburn, Massachusetts. This lease began on June 1, 2016 and will end on November 30, 2026 and does not include any options for the early termination or the extension of the lease. In November 2019, we entered into a modification of the Woburn lease in which we permanently returned 7,409 square feet of underutilized space to the landlord for the remaining term of the lease. We will have no further financial obligations for the vacated space and lease rental charges, including utility, maintenance and real estate tax charges, have been proportionally reduced. The security deposit was also proportionally reduced to $229. All other significant terms of the lease remained unchanged.

We have a sublease agreement with a subsidiary of CJ CheilJedang Corporation ("CJ") for CJ's sublease of 9,874 square feet of our Woburn facility. The subleased space was determined to be in excess of our needs as a result of our strategic shift and the related restructuring of our operations during 2016. The sublease is coterminous with our master lease. CJ pays rent and operating expenses equal to its pro-rata share of the amounts payable to the landlord by us, as adjusted from time-to-time in accordance with the terms of the master lease. CJ has provided us with a security deposit of $103 in the form of an irrevocable letter of credit. The CJ sublease is unaffected by our recent lease modification.

Through May 2020, we leased approximately 13,702 square feet of unused office and laboratory space in Lowell, Massachusetts. In May 2020, the lease terminated in accordance with the terms of the lease agreement and the facility has been returned to the landlord. No further expenses are anticipated under this lease.

Our wholly-owned subsidiary, Metabolix Oilseeds, Inc. ("MOI"), located in Saskatoon, Saskatchewan, Canada, leases approximately 7,000 square feet of office, laboratory and greenhouse space located within Innovation Place at 410 Downey Road and within the research facility of National Research Council Canada located at 110 Gymnasium Place. These leases do not contain renewal or early termination options. MOI's leases for these facilities generally have terms of one year, and are extended annually through amendment. Most of these leases will expire on May 31, 2021, unless further amended, and others will expire on various dates through September 30, 2021.

## 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."

### Stockholders

As of March 12, 2021, there were 4,865,335 shares of our common stock outstanding held by 38 stockholders of record.

### Unregistered Sales of Securities

On January 4, 2021, we issued 3,759 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.

### Issuer Purchases of Equity Securities

During the quarter ended December 31, 2020, there were no repurchases made by us or on our behalf, or by any "affiliated purchasers," of shares of our common stock.

### ITEM 6.

[Reserved.].

## 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. On January 15, 2020, the Company effected a 1-for-40 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 to reflect this reverse stock split.*

### Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company that is using its differentiated trait gene discovery platform, which we refer to as the "Trait Factory", to develop improved Camelina varieties to produce proprietary products, and to produce other high value seed traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. Our goals are to efficiently develop and commercialize a high value crop products business based on developing superior varieties of Camelina for the production of feedstock oils, nutritional oils, and PHA bioplastics, and to license our yield traits to major seed companies for commercialization in commercial row crops, including corn, soybean and canola.

### Government Grants

On May 20, 2020, Metabolix Oilseeds, Inc. (“MOI”), the Company’s wholly-owned Canadian research subsidiary, received a research grant through the Industrial Research Assistance Program ("IRAP") administered by National Research Council Canada ("NRC"). The objective of the grant was to provide financial research assistance to innovative, early-stage small and medium-sized enterprises. Under the terms of the agreement, NRC agreed to contribute up to a maximum of $67 for payroll costs incurred by MOI during the period April - June, 2020. During the second quarter of 2020, MOI submitted claims for eligible payroll costs and recognized grant revenue for the full amount of the award. On December 3, 2020, MOI received a second IRAP funded research grant with a similar objective of providing financial research assistance. Under the terms of this second grant, NRC agreed to contribute up to a maximum of $86 for payroll costs incurred by MOI during the

period July - December, 2020. The full amount of the grant was recognized as grant revenue during the fourth quarter and is recorded as accounts receivable in the Company's consolidated balance sheet at December 31, 2020.

During 2018 we entered into a sub-award with Michigan State University ("MSU") to support a Department of Energy ("DOE") funded grant entitled "*A Systems Approach to Increasing Carbon Flux to Seed Oil.*" Our participation under this projected five-year grant is awarded incrementally on an annual basis with the first year commencing September 15, 2017. Cumulative funding for this sub-award in the amount of $2,403 has been appropriated by the U.S. Congress through the fourth contractual year ending in September 2021. During 2021, we anticipate that the final option year ending on September 14, 2022 will be awarded to Yield10, resulting in aggregate total sub-award funding of $2,957, provided the U.S. Congress continues to appropriate funds for the program, we are able to make progress towards meeting grant objectives and we remain in compliance with other terms and conditions of the sub-award.

As of December 31, 2020, proceeds of $531 remain to be earned from the MSU sub-award amounts awarded to date. This includes amounts for reimbursement to our subcontractors, as well as reimbursement for our employees' time, benefits and other expenses related to future performance.

| Program Title | Funding Agency | Total Government Funds | Total revenue recognized through December 31, 2020 | Remaining amount to be recognized as of December 31, 2020 | Contract/Grant Expiration |
|---|---|---|---|---|---|
| Subcontract from Michigan State University project funded by DOE entitled "A Systems Approach to Increasing Carbon Flux to Seed Oil" | Department of Energy | $ 2,403 | $ 1,872 | $ 531 | September 15, 2021 |
| Funding from National Research Council Canada through its Industrial Research Assistance Program (NRC-IRAP) entitled "Innovation Assistance Program" | National Research Council Canada | 67 | 67 | — | June 24, 2020 |
| Funding from National Research Council Canada through its Industrial Research Assistance Program (NRC-IRAP) entitled "Innovation Assistance Program" | National Research Council Canada | 86 | 86 | — | December 19, 2020 |
| Total | | $ 2,556 | $ 2,025 | $ 531 | |

**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 and significant judgments 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. Revenue earned on government grants, but not yet invoiced as of the balance sheet date, is recorded as unbilled receivables in the accompanying consolidated balance sheets for the years ended December 31, 2020 and December 31, 2019. Funds received from government grants in advance of work being performed are recorded as deferred revenue until earned.

**Performance-Based Compensation Accrual**

Our employee compensation program includes a potential for bonus payments based on company and individual performance against annual goals that are established early in the fiscal year by management and the Company's Board of Directors. Bonus payments are generally paid at the end of February following the most recently completed fiscal year. The Compensation Committee of our Board of Directors is responsible for reviewing annual performance against goals and approving bonus payments for the Company's executive officers. Annual cash bonuses are accrued evenly throughout the fiscal year unless management and/or the Compensation Committee determine that bonus compensation payments are unlikely to be paid at the existing rate. In that event, we make a cumulative year-to-date adjustment to our bonus accrual and adjust quarterly accruals for the remainder of the year in order to achieve a bonus compensation accrual at year-end that matches expected bonus payments. Our quarterly performance-based compensation expense and accrual balances may vary significantly during the year as performance judgments change and we revise our estimates.

**Stock-Based Compensation**

The accounting standards for stock-based compensation require that all stock-based awards 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 individual receiving the award meets 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 10 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.

**Income Taxes**

Due to the Company's history of annual income tax losses, it has never incurred significant income tax expenses. The Company has, however, recorded significant deferred income tax assets for net operating loss carry forwards and research tax credits that are available to offset future income taxes. Deferred income taxes are measured by applying currently enacted tax rates to the differences between financial statement and income tax reporting. We routinely assess the realizability of the Company's deferred tax assets and have historically concluded that it is unlikely that deferred tax assets derived from our U.S. operations will be realized under accounting standards and therefore we have maintained a full valuation allowance. MOI is our wholly-owned research and development subsidiary located in Canada. MOI performs research services for us under a research services agreement subject to intercompany transfer pricing regulations that annually results in MOI reporting taxable income in Canada. MOI files separate federal and provincial income tax returns in Canada and has accumulated research credits that may be used to offset future taxable income. For the year ended December 31, 2020, we have determined, based on our assumption of MOI's continued profitability derived from intercompany transfer pricing, that the subsidiary will more likely than not continue to show taxable income in future tax years. We have therefore concluded that a valuation allowance against MOI's deferred tax asset related to the research credits is not appropriate.

**Securities Offerings**

We offer our securities for sale to public and private investors from time to time. The structure of these offerings can be complex, requiring significant judgment in their accounting treatment, financial reporting and disclosure. On November 19, 2019, for example, we closed on two securities offerings that included a public offering and a private placement. The public portion of the offerings included the sale of common stock, Series A Convertible Preferred Stock and warrants to purchase common stock. The private placement included the sale of Series B Convertible Preferred Stock and warrants to purchase common stock. We primarily followed the guidance of ASC 480, *Distinguishing Liabilities from Equity*, and ASC 815, *Derivatives and Hedging*, in reaching conclusions that the Series A Convertible Preferred Stock, the Series B Convertible Preferred Stock and the warrants issued in the offering should be recorded in permanent equity, temporary equity and liabilities, respectively, in our consolidated balance sheet as of December 31, 2019, included herein. We also applied applicable accounting guidance in order to calculate the fair value of the warrants sold in the offerings and determined that the Black-Scholes fair value of the liability classified warrants exceeded the proceeds received in the offering. This resulted in a charge of $13,018 to other income (expense) on the date of issuance. At December 31, 2019, we completed a mark-to-market revaluation of the warrants and recorded a gain of $9,541 within other income (expense) for the

year ended December 31, 2019. The Company re-measured the fair value of the warrants again on January 15, 2020 following the effective time of the 1-for-40 reverse stock split, resulting in the recognition of a loss of $957. As a result of the 1-for-40 reverse stock split, sufficient shares of authorized, but unissued shares of common stock became available for Series A and Series B warrant holders to exercise their warrants resulting in their reclassification from warrant liability to equity in the Company's consolidated balance sheet. See Note 9 to the consolidated financial statements for further discussion on the November 2019 securities offerings.

**Comparison of the Years Ended December 31, 2020 and 2019**

**Revenue**

| | Year ended December 31, | | |
|---|---|---|---|
| | **2020** | **2019** | **Change** |
| Grant revenue | $ 799 | $ 806 | $ (7) |

Total grant revenue was $799 and $806 for the years ended December 31, 2020 and 2019, respectively. Grant revenue for each of the years was derived primarily from the Company's DOE sub-award with Michigan State University. During the year ended December 31, 2020, $153 in grant revenue was also recognized from two research support grants awarded by National Research Council Canada to our subsidiary Metabolix Oilseeds, Inc.

We anticipate that MSU grant revenue will fluctuate slightly over the next twelve months as a result of varying annual budget appropriations awarded under the MSU sub-award and our application of company resources to the grant. Our forecast related to grant revenue is subject to change, should we receive new grants or if our ability to earn revenue from our existing grant is negatively impacted by the COVID-19 pandemic.

**Expenses**

| | Year ended December 31, | | |
|---|---|---|---|
| | **2020** | **2019** | **Change** |
| Research and development expenses | $ 5,361 | $ 4,848 | $ 513 |
| General and administrative expenses | 5,047 | 4,554 | 493 |
| Total expenses | $ 10,408 | $ 9,402 | $ 1,006 |

**Research and Development Expenses**

Research and development expense increased by $513, or 11%, to $5,361 during the year ended December 31, 2020, from $4,848 recorded during the year ended December 31, 2019. The 2020 variance is partially the result of a $146 increase in employee compensation and benefits and a $146 increase in Camelina and canola field trial costs for plant trials conducted in the U.S. and Canada to further evaluate our traits under development. Facility expense also increased by $128 during the year ended December 31, 2020, primarily as a result of higher landlord maintenance costs associated with our Woburn, Massachusetts headquarters. Early in 2020, we returned 7,409 square feet of underutilized space in our Woburn facility to the landlord for the remaining term of the lease. As a result of this lease modification, we wrote off $141 in leasehold improvements and office furniture previously used to support our research and development activities which also contributed to the increase in expense during the year ended December 31, 2020.

Based on our current planning and budgeting, we anticipate that research and development expense will increase over the next twelve months as we continue to expand our plant field trials and continue to prepare our Camelina germplasm for future commercial launch. Our forecasts related to research and development expense are subject to change due to the potential impact of the COVID-19 pandemic, or as new collaborative and other business opportunities arise that alter our plans.

**General and Administrative Expenses**

General and administrative expenses were $5,047 and $4,554 for the fiscal years ended December 31, 2020 and December 31, 2019, respectively. The increase of $493, or 11%, was primarily due to increased employee compensation and benefits, professional fees and higher insurance premiums. Employee compensation and benefits increased by $198, from $1,826 during the year ended December 31, 2019 to $2,024 during the year ended December 31, 2020, and was primarily a result of recording employee bonuses for 2020. Stock compensation expense increased by $58 during the year ended December 31, 2020, as a result of stock option awards issued to employees during the year. Professional fees increased by $239, due to work performed by our outside legal and accounting firms in connection with securities registrations and corporate governance activities. During the year ended December 31, 2020, insurance expense increased by $81 as a result of higher director and officer ("D&O") liability insurance premiums. Higher D&O premiums are being assessed nationwide by insurance underwriters due to consecutive years of increased class action lawsuits and settlement claims.

Based on our current planning and budgeting, we anticipate that general and administrative expense will increase over the next twelve months as we add regulatory support and senior operations and business development resources to our Company in connection with the future launch of our Camelina products. Our forecasts related to general and administrative expense are subject to change due to the potential impact of the COVID-19 pandemic, or as new collaborative and other business opportunities arise that alter our plans.

**Other Income (Expense), net**

| | Year ended December 31, | | |
|---|---|---|---|
| | **2020** | **2019** | **Change** |
| Loss on issuance of securities | $ — | $ (13,018) | $ 13,018 |
| Offering costs | — | (1,254) | 1,254 |
| Change in fair value of warrants | (957) | 9,541 | (10,498) |
| Loan forgiveness income | 333 | — | 333 |
| Other income (expense), net | 83 | 117 | (34) |
| Total other income (expense), net | $ (541) | $ (4,614) | $ 4,073 |

*Loss on Issuance of Securities*

On November 19, 2019, we closed on concurrent securities offerings that included a total of 2,875,000 warrants that received liability classification and were determined to have a Black-Scholes fair value of $24,518 on their date of issuance. The gross proceeds of the 2019 offerings were first allocated to the warrants. In accordance with applicable accounting guidance, the warrants were recorded at their full fair value and the difference between the fair value and the proceeds of $13,018 was recorded to other income (expense). See Note 9 - Capital Stock and Warrants, in our consolidated financial statements.

*Offering Costs*

The combined proceeds of the November 2019 offerings were allocated solely to the liability classified warrants. All of the offering costs of $1,254 were therefore assigned to the warrants and expensed immediately to other income (expense).

*Change in Fair Value of Warrants*

The fair value of the liability classified warrants issued in the November 2019 concurrent offerings were subject to mark-to-market adjustment on subsequent balance sheet dates. We remeasured the fair value of the warrant liability at December 31, 2019, recording a gain from the change in fair value of $9,541. On January 15, 2020, we remeasured the fair value of the warrant liability again in connection with the Company's 1-for-40 reverse stock split, recording a loss from the change in fair value of $957. The reverse stock split increased the number of shares of common stock available for issuance resulting in reclassification of the warrants from a liability to equity.

*Loan Forgiveness Income*

During April 2020, we received $333 in loan proceeds through the Paycheck Protection Program Flexibility Act ("PPP"), established pursuant to the CARES Act. Under the CARES Act and the PPP, a borrower may apply for and be granted forgiveness for all or a part of its PPP loan. The amount of loan proceeds eligible for forgiveness is based on a formula that takes into account a number of factors, including the amount of loan proceeds used by the borrower during the twenty-four-week period after the loan origination for certain purposes including payroll costs, rent payments on certain leases, and certain qualified utility payments. We utilized the entire PPP Loan amount for qualifying expenses and applied for loan forgiveness, receiving a favorable determination in November 2020 for the full amount of the loan. As a result, we recorded the $333 as loan forgiveness income within other income (expense) in our consolidated statement of operations for the year ended December 31, 2020.

*Interest Income (expense), net*

Other income (expense) for the years ended December 31, 2020 and December 31, 2019 was derived primarily from investment income earned from the Company's cash equivalents and short-term investments.

**Liquidity and Capital Resources**

We require cash to fund our working capital needs, to purchase capital assets, to pay our 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 equivalents 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, we have recorded annual losses since the Company's initial founding, including our fiscal year ended December 31, 2020. As of December 31, 2020, we had an accumulated deficit of $375,100. Our total unrestricted cash, cash equivalents and short-term investments as of December 31, 2020, totaled $9,702 as compared to $11,117 at December 31, 2019. As of December 31, 2020, we had no outstanding debt.

Our cash, cash equivalents and short-term investments at December 31, 2020, were held for working capital purposes. As of December 31, 2020, we had restricted cash of $264, which consisted of $229 held in connection with the lease agreement for our Woburn, Massachusetts facility and $35 held in connection with our corporate credit card program.

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 consequently, 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, 2020, we were in compliance with this policy.

Subsequent to year-end, on February 3, 2021, we raised $11,996, net of estimated offering costs of $744, through the public sale of 1,040,000 shares of common stock at an issuance price of $12.25. These shares were offered by us pursuant to a registration statement on Form S-3 (File No. 333-237539) ("Shelf Registration"), as initially filed with the SEC on April 1, 2020 and declared effective on April 10, 2020. During August 2020, we completed a public offering of 951,835 shares of our common stock at a public offering price of $4.25 per share. Gross proceeds from this offering totaled $4,045 before issuance costs of $425. These shares were also offered pursuant to the Shelf Registration. Concurrent with the August public offering, we completed a private offering of 396,450 shares of common stock at a price $4.25 per share, receiving proceeds of $1,685. During April 2020, we received $333 in loan proceeds through the Federal Paycheck Protection Program ("PPP"), established pursuant to the CARES Act. Under the CARES Act and PPP, we applied for and were granted forgiveness for the full amount of the PPP loan. During 2020, warrants equal to 207,296 shares of the Company's common stock were exercised by warrant holders, generating cash proceeds of $1,658. Subsequent to our December 31, 2020 year-end, an additional 481,973 warrants were exercised providing us with cash proceeds of $3,856.

We currently anticipate net cash usage of $10,000 - $11,000 during 2021 to fund operations, including our expanded research and development activities and our preparations for future commercial launch of our Camelina products. We estimate that our current cash resources, including those received subsequent to year-end, will be sufficient to fund operations and meet our obligations into the first quarter of 2023.

We follow the guidance of ASC Topic 205-40, *Presentation of Financial Statements-Going Concern*, in order to determine whether there is substantial doubt about our ability to continue as a going concern for one year after the date our

financial statements are issued. Based on our cash forecast, we expect that our present capital resources will be sufficient to fund our planned operations for at least that period of time. This forecast of cash resources is forward-looking information that involves risks and uncertainties, and the actual amount of expenses could vary materially and adversely as a result of a number of factors. Our ability to continue operations after our current cash resources are exhausted will depend upon our ability to obtain additional financing through, among other sources, public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, warrant holders' ability and willingness to exercise the Company's outstanding warrants, additional government research grants or collaborative arrangements with third parties, as to which no assurances can be given. We do not know whether additional financing will be available on terms favorable or acceptable to us when needed, if at all. If adequate additional funds are not available when required, we may be forced to curtail our research efforts, explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

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 in operating activities was $8,659 during the year ended December 31, 2020, compared to net cash used by operating activities during 2019 of $8,654. Net cash used by operations during the year ended December 31, 2020 primarily reflects the net loss of $10,206, cash payments made to reduce the Company's lease liabilities of $601 and our payment of 2019 bonus compensation of $344. Non-cash charges offsetting a portion of the net loss include include depreciation expense of $182, a loss recorded from our revaluation of the Company's warrant liability of $957, forgiveness of our PPP loan of $333, losses from the disposal of fixed assets of $206, stock-based compensation expense of $739, 401(k) stock matching contribution expense of $109 and non-cash lease expense of $429 resulting from amortization of our leased right-of-use assets. The net cash usage for operating activities during the year ended December 31, 2019 of $8,654 was primarily the result of the Company's net loss of $12,956, lease payments and modifications to reduce lease liabilities of $2,244, partially offset by non-cash expenses, including the Company's loss on issuance of securities of $13,018 representing the difference between the fair value of the liability classified warrants issued in the Company's November 2019 securities offering and the proceeds received from the offering. Net cash used for operating activities during the year ended December 31, 2019 also included an offsetting non-cash gain of $9,541 as a result of remeasuring the fair value of the warrants on December 31, 2019 and other non-cash expenses recorded during 2019, including stock-based compensation, depreciation, 401(k) stock matching contributions and non-cash lease expense resulting from our amortization of our leased right-of-use assets.

Net cash of $645 was used in investing activities during the year ended December 31, 2020, compared to net cash used in investing activities during 2019 of $3,015. During the year ended December 31, 2020, the Company purchased $9,279 in short-term investments, primarily U.S. Treasury notes and federal agency bonds. Also during 2020, $8,700 of short-term investments matured and converted to cash. During the year ended December 31, 2019, we purchased $5,704 in similar short-term investments and investments totaling $2,750 matured and converted to cash.

Net cash of $7,279 was provided by financing activities during the year ended December 31, 2020, compared to net cash provided by financing activities of $14,079 during the year ended December 31, 2019. As discussed above, during the year ended December 31, 2020, we completed a public offering of 951,835 shares of our common stock at a public offering price of $4.25 per share. Proceeds from the offering were $4,045, before issuance costs of $425. Concurrent with the public offering, we completed a private offering of 396,450 shares of common stock at a price $4.25 per share, receiving proceeds of $1,685. During the year ended December 31, 2020, we also received cash proceeds of $1,658 from the exercise of 207,296 warrants issued in the Company's November 2019 securities offering and cash proceeds of $333 from the PPP loan issued through the CARES Act. During the year ended December 31, 2019, we completed a registered direct offering of 60,541 shares of our common stock at an offering price of $48.40 per share, receiving cash proceeds from the transaction of $2,583, net of issuance costs of $349. During November 2019, we also closed on two concurrent securities offerings that included a public offering and a private placement. Proceeds from the two offerings totaled $10,246, net of issuance costs of $1,254. During the years ended December 31, 2020 and 2019, the Company paid taxes of $17 and $4, respectively, related to our net settlement of employee restricted stock units ("RSUs"). As RSUs vest, we withhold a number of shares with an aggregate

fair market value equal to the minimum federal and state tax withholding amount from the common stock issuable at the vest date.

**Related Party Transactions**

The Company did not engage in any transactions during the years ended December 31, 2020 and December 31, 2019 that qualify as 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, 2020 our disclosure controls and procedures were effective to provide reasonable assurance that the 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 SEC 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. 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, 2020. 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, 2020, 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 24, 2021, 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 | (9) | Purchase Agreement between Metabolix, Inc. and CJ Research Center LLC, dated September 16, 2016. |
| 3.1.1 | (14) | Amended and Restated Certificate of Incorporation, as amended, of the Registrant. |
| 3.1.2 | (18) | Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the Registrant. |
| 3.1.3 | (17) | Certificate of Designation of Preferences, Rights and Limitations with respect to the Series A Preferred Stock. |
| 3.1.4 | (17) | Certificate of Designation of Preferences, Rights and Limitations with respect to the Series B Preferred Stock. |
| 3.2 | (10) | Amended and Restated By-laws of the Registrant. |
| 4.1 | * | Description of Securities of the Registrant. |
| 4.1.2 | (21) | Specimen Stock Certificate for shares of the Registrant's Common Stock. |
| 4.1.5 | (12) | Form of Investor Warrant to Purchase Common Stock. |
| 4.6 | (13) | Form of Series A Common Warrant to purchase shares of Common Stock. |
| 4.7 | (17) | Form of Common Stock Purchase Warrant. |
| 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 | †(5) | 2014 Stock Option and Incentive Plan, Revised and Restated. |
| 10.2.1 | †(6) | 2014 Stock Option and Incentive Plan, Form of Incentive Stock Option Award. |
| 10.2.2 | †(6) | 2014 Stock Option and Incentive Plan, Form of Non-Qualified Stock Option Award. |
| 10.2.3 | †(6) | 2014 Stock Option and Incentive Plan, Form of Restricted Stock Unit Award. |
| 10.2.4 | †(14) | 2018 Stock Option and Incentive Plan. |
| 10.2.5 | †(15) | Amended and Restated 2018 Stock Option and Incentive Plan, Form of Stock Option Agreement. |
| 10.2.6 | †(19) | 2018 Stock Option and Incentive Plan, Form of Restricted Stock Unit Agreement. |
| 10.3 | †(11) | Employment Agreement between the Company and Oliver P. Peoples dated March 28, 2017. |
| 10.4 | †(11) | Employment Agreement between the Company and Charles B. Haaser dated March 28, 2017. |
| 10.5 | †(11) | Employment Agreement between the Company and Lynne H. Brum dated March 28, 2017. |
| 10.6 | †(11) | Employment Agreement between the Company and Kristi Snell dated March 28, 2017. |
| 10.7 | †(11) | 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. |
| 10.8 | †(1) | Form of Indemnification Agreement between the Registrant and its Directors and Officers. |
| 10.19 | (2) | Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated March 30, 2007. |
| 10.9.1 | (3) | First Amendment of Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated February 29, 2012. |
| 10.9.2 | (4) | Second Amendment of Lease between Fortune Wakefield, LLC and Metabolix, Inc. dated October 24, 2013. |
| 10.10 | (7) | Standstill Agreement dated June 19, 2015 between the Company and Jack W. Schuler, Renate Schuler and the Schuler Family Foundation. |
| 10.11 | (8) | 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. |
| 10.12 | @(11) | Exclusive License Agreement, dated as of June 30, 2015, between the Company and the University of Massachusetts. |
| 10.13 | (11) | Sublease between CJ Research Center LLC and the Company, dated as of September 16, 2016. |
| 10.14 | (12) | Form of Securities Purchase Agreement dated July 3, 2017 between the Company and the Purchasers named therein. |

| | | |
|---|---|---|
| 10.15 | @(14) | Exclusive License Agreement, dated May 17, 2018, between the Company and the University of Missouri. |
| 10.16 | (16) | Form of Securities Purchase Agreement dated March 14, 2019 between the Company and the Investors named therein. |
| 10.17 | (17) | Securities Purchase Agreement, dated as of November 14, 2019, by and between Yield10 Bioscience, Inc. and the Investors listed on Schedule I thereto. |
| 10.18 | (20) | Securities Purchase Agreement, dated as of August 22, 2020, by and between Yield10 Bioscience, Inc. and the Investors listed on Schedule I thereto. |
| 14.1 | (15) | 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, 2020 formatted in XBRL; (i) Consolidated Balance Sheets, December 31, 2020 and December 31, 2019; (ii) Consolidated Statements of Operations, Years Ended December 31, 2020 and 2019; (iii) Consolidated Statements of Comprehensive Income (Loss), Years Ended December 31, 2020 and 2019; (iv) Consolidated Statements of Cash Flows, Years Ended December 31, 2020 and 2019; (v) Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2020 and 2019; 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 granted for certain portions of this document.

(1) Incorporated by reference herein to the exhibits to the Company's Registration Statement on Form S-1/A filed on September 21, 2006 (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 Quarterly Report on Form 10-Q for the quarter ended March 31, 2012 (File No. 001-33133)

(4) 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)

(5) 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)

(6) 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)

(7) 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)

(8) 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)

(9) 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)

(10) 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)

(11) 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)

(12) 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)

(13) 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)

(14) Incorporated by reference herein to Appendix A to the Company's Proxy Statement for its 2020 Annual Meeting of Stockholders, filed on March 25, 2020 (File No. 001-33133)

(15) Incorporated by reference herein to the exhibits to the Company's Annual Report on Form 10-K filed March 28, 2019 (File No. 001-33133)

(16) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on March 15, 2019 (File No. 001-33133)

(17) Incorporated by reference herein to the exhibits to the Company’s Report on Form 8-K filed on November 20, 2019 (File No. 001-33133)

(18) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on January 15, 2020 (File No. 001-33133)

(19) Incorporated by reference herein to the exhibits to the Company's Annual Report on Form 10-K filed on March 25, 2020 (File No. 001-33133)

(20) Incorporated by reference herein to the exhibits to the Company's Report on Form 8-K filed on August 25, 2020 (File No. 001-33133)

(21) Incorporated by reference herein to the exhibits to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2020 (File No. 001-33133)

**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 Section 13 or 15(d) 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 16, 2021 By: /s/ OLIVER P. PEOPLES

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

**POWER OF ATTORNEY**

We, the undersigned directors and officers of Yield10 Bioscience, Inc., hereby severally constitute and appoint Oliver P. Peoples, Charles B. Haaser, and Lynne H. Brum, and each of them singly, our true and lawful attorneys, with full power to them, and to each of them singly, to sign for us and in our names in the capacities indicated below, this Annual Report on Form 10-K, and any and all amendments to said Annual Report, and to file or cause to be filed the same, with all exhibits thereto and other documents in connection therewith, with the SEC, granting unto said attorneys, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as each of us might or could do in person, and hereby ratifying and confirming all that said attorneys, and each of them, or their substitute or substitutes, shall do or cause to be done by virtue of this Power of Attorney.

Pursuant to the requirements of the Securities Exchange 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<br>Oliver P. Peoples, Ph.D. | President and Chief Executive Officer and Director (Principal Executive Officer) | March 16, 2021 |
| /s/ CHARLES B. HAASER<br>Charles B. Haaser | Vice President, Finance, and Chief Accounting Officer (Principal Financial and Accounting Officer) | March 16, 2021 |
| /s/ SHERRI M. BROWN<br>Sherri M. Brown | Director | March 16, 2021 |
| /s/ RICHARD W. HAMILTON<br>Richard W. Hamilton, Ph.D. | Director | March 16, 2021 |
| /s/ ANTHONY J. SINSKEY<br>Anthony J. Sinskey, Sc.D. | Director | March 16, 2021 |
| /s/ ROBERT L. VAN NOSTRAND<br>Robert L. Van Nostrand | Chairman | March 16, 2021 |

**YIELD10 BIOSCIENCE, INC.**
**Index to Consolidated Financial Statements**

## Report of Independent Registered Public Accounting Firm

To the Stockholders 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, 2020 and 2019, the related consolidated statements of operations, comprehensive loss, series B convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the years then ended, and the related notes to the consolidated financial statements (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, 2020 and 2019, 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.

**Critical Audit Matters**
Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ RSM US LLP

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

Boston, Massachusetts
March 16, 2021

**YIELD10 BIOSCIENCE, INC.**

**CONSOLIDATED BALANCE SHEETS**
**(In thousands, except share and per share amounts)**

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| **Assets** | | |
| Current Assets: | | |
| Cash and cash equivalents | $ 3,423 | $ 5,417 |
| Short-term investments | 6,279 | 5,700 |
| Accounts receivable | 86 | 72 |
| Unbilled receivables | 27 | 20 |
| Prepaid expenses and other current assets | 527 | 475 |
| Total current assets | 10,342 | 11,684 |
| Restricted cash | 264 | 332 |
| Property and equipment, net | 921 | 1,243 |
| Right-of-use assets | 2,712 | 3,141 |
| Other assets | 283 | 318 |
| Total assets | $ 14,522 | $ 16,718 |
| | | |
| **Liabilities, Convertible Preferred Stock and Stockholders' Equity (Deficit)** | | |
| Current Liabilities: | | |
| Accounts payable | $ 60 | $ 279 |
| Accrued expenses | 1,297 | 1,326 |
| Lease liabilities | 457 | 602 |
| Total current liabilities | 1,814 | 2,207 |
| Lease liabilities, net of current portion | 3,163 | 3,619 |
| Warrant liability (Note 9) | — | 14,977 |
| Other liabilities | 13 | — |
| Total liabilities | 4,990 | 20,803 |
| Commitments and contingencies (Note 7) | | |
| Series B Convertible Preferred Stock ($0.01 par value per share); 0 and 5,750 shares issued and outstanding at December 31, 2020 and December 31, 2019, respectively (Note 9) | — | — |
| Stockholders' Equity (Deficit): | | |
| Series A Convertible Preferred Stock ($0.01 par value per share); 0 and 796 shares issued and outstanding at December 31, 2020 and December 31, 2019, respectively | — | — |
| Common stock ($0.01 par value per share); 60,000,000 shares authorized at December 31, 2020 and 2019, respectively, and 3,334,048 and 933,423 shares issued and outstanding at December 31, 2020 and 2019, respectively | 33 | 9 |
| Additional paid-in capital | 384,758 | 360,926 |
| Accumulated other comprehensive loss | (159) | (126) |
| Accumulated deficit | (375,100) | (364,894) |
| Total stockholders' equity (deficit) | 9,532 | (4,085) |
| Total liabilities, convertible preferred stock and stockholders' equity (deficit) | $ 14,522 | $ 16,718 |

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

**YIELD10 BIOSCIENCE, INC.**

**CONSOLIDATED STATEMENTS OF OPERATIONS**
**(In thousands, except share and per share amounts)**

| | Years Ended December 31, | |
|---|---|---|
| | **2020** | **2019** |
| Revenue: | | |
| Grant revenue | $ 799 | $ 806 |
| Total revenue | 799 | 806 |
| Expenses: | | |
| Research and development | 5,361 | 4,848 |
| General and administrative | 5,047 | 4,554 |
| Total expenses | 10,408 | 9,402 |
| Loss from operations | (9,609) | (8,596) |
| Other income (expense): | | |
| Loss on issuance of securities (Note 9) | — | (13,018) |
| Offering costs (Note 9) | — | (1,254) |
| Change in fair value of warrants (Note 9) | (957) | 9,541 |
| Loan forgiveness income (Note 12) | 333 | — |
| Other income (expense), net | 83 | 117 |
| Total other income (expense) | (541) | (4,614) |
| Net loss from operations before income taxes | (10,150) | (13,210) |
| Income tax (provision) benefit | (56) | 254 |
| Net loss | $ (10,206) | $ (12,956) |
| | | |
| Basic and diluted net loss per share | $ (4.30) | $ (35.50) |
| Number of shares used in per share calculations: | | |
| Basic & diluted | 2,373,265 | 364,967 |

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

**YIELD10 BIOSCIENCE, INC.**

**CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS**
**(In thousands)**

| | Years Ended December 31, | |
|---|---|---|
| | **2020** | **2019** |
| Net loss | $ (10,206) | $ (12,956) |
| Other comprehensive income (loss): | | |
| Change in foreign currency translation adjustment | (33) | (16) |
| Total other comprehensive loss | (33) | (16) |
| Comprehensive loss | $ (10,239) | $ (12,972) |

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

**YIELD10 BIOSCIENCE, INC.**

**CONSOLIDATED STATEMENTS OF CASH FLOWS**
**(In thousands)**

| | Years Ended December 31, | |
|---|---|---|
| | **2020** | **2019** |
| **Cash flows from operating activities** | | |
| Net loss | $ (10,206) | $ (12,956) |
| Adjustments to reconcile net loss to cash used in operating activities: | | |
| Depreciation | 182 | 203 |
| Loss on issuance of securities | — | 13,018 |
| Change in fair value of warrants | 957 | (9,541) |
| Loan forgiveness income (Note 12) | (333) | — |
| Loss on disposal of fixed assets | 206 | — |
| Expense for 401(k) company common stock match | 109 | 98 |
| Stock-based compensation | 739 | 656 |
| Noncash lease expense | 429 | 1,625 |
| Deferred tax asset | 56 | (254) |
| Changes in operating assets and liabilities: | | |
| Accounts receivable | (14) | 22 |
| Unbilled receivables | (7) | 46 |
| Prepaid expenses and other assets | (69) | 9 |
| Accounts payable | (219) | 162 |
| Accrued expenses | 99 | 502 |
| Other liabilities | 13 | — |
| Lease liabilities | (601) | (2,244) |
| Net cash used in operating activities | (8,659) | (8,654) |
| **Cash flows from investing activities** | | |
| Purchase of property and equipment | (76) | (61) |
| Proceeds from sale of property and equipment | 10 | — |
| Purchase of investments | (9,279) | (5,704) |
| Proceeds from sale and maturity of short-term investments | 8,700 | 2,750 |
| Net cash used by investing activities | (645) | (3,015) |
| **Cash flows from financing activities** | | |
| Proceeds from warrants exercised | 1,658 | — |
| Proceeds from PPP loan (Note 12) | 333 | — |
| Proceeds from securities offerings, net of issuance costs (Note 9) | 5,305 | 14,083 |
| Taxes paid on employees' behalf related to vesting of stock awards | (17) | (4) |
| Net cash provided by financing activities | 7,279 | 14,079 |
| Effect of exchange rate changes on cash, cash equivalents and restricted cash | (37) | (16) |
| Net (decrease) increase in cash, cash equivalents and restricted cash | (2,062) | 2,394 |
| Cash, cash equivalents and restricted cash at beginning of period | 5,749 | 3,355 |
| Cash, cash equivalents and restricted cash at end of period | $ 3,687 | $ 5,749 |
| **Supplemental Cash Flow Disclosure:** | | |
| Interest paid | $ 8 | $ 7 |

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

**YIELD10 BIOSCIENCE, INC.**

**CONSOLIDATED STATEMENTS OF SERIES B CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)**
**(In thousands, except share amounts)**

| | Series B Convertible Preferred Stock | | Series A Convertible Preferred Stock | | Common Stock | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Shares | Par Value | Shares | Par Value | Shares | Par Value | Additional Paid-In Capital | Accumulated Other Comprehensive Income (Loss) | Accumulated Deficit | Total Stockholders' Equity (Deficit) |
| **Balance, December 31, 2018** | — | $ — | — | $ — | 250,631 | $ 3 | $ 357,743 | $ (110) | $ (351,938) | $ 5,698 |
| Non-cash stock-based compensation expense | — | — | — | — | — | — | 521 | — | — | 521 |
| Issuance of common stock for 401(k) match | — | — | — | — | 2,885 | — | 89 | — | — | 89 |
| Issuance of common stock upon vesting of restricted stock units | — | — | — | — | 116 | — | (4) | — | — | (4) |
| Issuance of common stock for registered direct offering, net of $349 offering costs | — | — | — | — | 60,541 | — | 2,583 | — | — | 2,583 |
| Issuance of common and preferred stock in connection with public offering | — | — | 2,504 | — | 405,750 | 4 | (4) | — | — | — |
| Issuance of common stock in connection with private offering | 5,750 | — | — | — | — | — | — | — | — | — |
| Issuance of common stock upon conversion of Series A Convertible Preferred Stock | — | — | (1,708) | — | 213,500 | 2 | (2) | — | — | — |
| Effect of foreign currency translation | — | — | — | — | — | — | — | (16) | — | (16) |
| Net loss | — | — | — | — | — | — | — | — | (12,956) | (12,956) |
| **Balance, December 31, 2019** | 5,750 | $ — | 796 | $ — | 933,423 | $ 9 | $ 360,926 | $ (126) | $ (364,894) | $ (4,085) |
| Non-cash stock-based compensation expense | — | — | — | — | — | — | 864 | — | — | 864 |
| Issuance of common stock for 401(k) match | — | — | — | — | 20,788 | — | 112 | — | — | 112 |
| Issuance of common stock upon vesting of restricted stock units | — | — | — | — | 6,006 | — | (17) | — | — | (17) |
| Issuance of common stock for warrant exercises | — | — | — | — | 207,296 | 2 | 1,656 | — | — | 1,658 |
| Issuance of common stock upon conversion of Series A Convertible Preferred Stock | — | — | (796) | — | 99,500 | 2 | (2) | — | — | — |
| Issuance of common stock upon conversion of Series B Convertible Preferred Stock | (5,750) | — | — | — | 718,750 | 7 | (7) | — | — | — |
| Reclassification of warrant liability to equity | — | — | — | — | — | — | 15,934 | — | — | 15,934 |
| Issuance of common stock for private and public offering, net of offering costs of $425 | — | — | — | — | 1,348,285 | 13 | 5,292 | — | — | 5,305 |
| Effect of foreign currency translation | — | — | — | — | — | — | — | (33) | — | (33) |
| Net loss | — | — | — | — | — | — | — | — | (10,206) | (10,206) |
| **Balance, December 31, 2020** | — | $ — | — | $ — | 3,334,048 | $ 33 | $ 384,758 | $ (159) | $ (375,100) | $ 9,532 |

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

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

## 1. Nature of Business and Basis of Presentation

Yield10 Bioscience, Inc. is an agricultural bioscience company that is using its differentiated trait gene discovery platform, the "Trait Factory", to develop improved Camelina varieties to produce proprietary products, and to produce other high value genetic traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. The Company's goals are to efficiently develop and commercialize a high value crop products business by developing superior varieties of Camelina for the production of feedstock oils, nutritional oils, and PHA bioplastics, and to license its yield traits to major seed companies for commercialization in major row crops, including corn, soybean and canola.

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 a single year, the Company has recorded losses since its initial founding, including its fiscal year ending December 31, 2020.

During the year ended December 31, 2020, the Company was successful in raising adequate capital to fund its operations, ending the year with unrestricted cash, cash equivalents and short-term investments of $9,702. Subsequent to year-end, on February 3, 2021, the Company raised a further $11,996 in cash, net of estimated offering costs of $744, through the sale of 1,040,000 shares of common stock at an issuance price of $12.25. Also subsequent to year-end, and through March 15, 2021, 481,973 of the Company's outstanding warrants issued in its November 2019 securities offering were exercised by warrant holders providing the Company with additional cash of $3,856.

The Company follows the guidance of Accounting Standards Codification ("ASC") Topic 205-40, *Presentation of Financial Statements-Going Concern*, 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. The Company's ability to continue operations after its current cash resources are exhausted depends on its ability to obtain additional financing through, among other sources, public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, warrant holders' ability and willingness to exercise the Company's outstanding warrants, additional government grants or collaborative arrangements with third parties, as to which no assurance can be given. Management does not know whether additional financing will be available on terms favorable or acceptable to the Company when needed, if at all. If adequate additional funds are not available when required, management may be forced to curtail the Company's research efforts, explore strategic alternatives and/or wind down the Company's operations and pursue options for liquidating its remaining assets, including intellectual property and equipment. Based on its current cash forecast, including funds received after year-end from its common stock offering and the exercise of warrants, management has determined that the Company's present capital resources will be sufficient to fund its planned operations for at least one year from when these financial statements are issued. This forecast of cash resource is forward-looking information that involves risks and uncertainties, and the actual amount of expenses could vary materially and adversely as a result of a number of factors.

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, as amended, (the "Internal Revenue Code") 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.

On January 30, 2020, the World Health Organization ("WHO") announced a global health emergency because of a new strain of coronavirus originating in Wuhan, China ("COVID-19") and the risks to the international community as the virus spreads globally beyond its point of origin. In March 2020, the WHO classified COVID-19 outbreak as a pandemic, based on the rapid increase in exposure globally. The full impact of the COVID-19 outbreak continues to evolve as of the

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

date of this report. As such, it is uncertain as to the full magnitude that the pandemic will have on the Company's financial condition, liquidity and future results of operations. While management currently expects the impact of COVID-19 to be temporary, there is uncertainty around the duration and its broader impact on the economy and therefore the effects it will have on Yield10's financial condition, liquidity, operations, suppliers, industry, and workforce. Given the daily evolution of the COVID-19 outbreak and the global responses to curb its spread, the Company is not able to estimate the effects of the COVID-19 outbreak on its results of operations, financial condition, or liquidity for future periods.

**2. Summary of Significant Accounting Policies**

**Basis of Presentation**

The accompanying consolidated financial statements have been prepared in accordance with accounting standards set by the Financial Accounting Standards Board (FASB). The FASB sets generally accepted accounting principles (GAAP) that the Company follows to ensure its financial condition, results of operations, and cash flows are consistently reported. References to GAAP issued by the FASB in these notes to the consolidated financial statements are to the FASB Accounting Standards Codification (ASC).

**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.

**Reverse Stock Split**

On January 15, 2020, the Company effected a 1-for-40 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, Cash Equivalents and Restricted Cash**

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.

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the Company's condensed consolidated balance sheets included herein:

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| Cash and cash equivalents | $ 3,423 | $ 5,417 |
| Restricted cash | 264 | 332 |
| Total cash, cash equivalents and restricted cash | $ 3,687 | $ 5,749 |

Amounts included in restricted cash represent those required to be set aside by contractual agreement. Restricted cash of $264 at December 31, 2020 and $332 at December 31, 2019, primarily consists of funds held in connection with the Company's lease agreement for its Woburn, Massachusetts facility.

**Investments**

Short-term investments represent holdings of available-for-sale marketable debt securities in accordance with the Company's investment policy. 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 long-term investments at December 31, 2020 and December 31, 2019.

Investments in marketable debt securities are recorded at fair value, with any unrealized gains and losses reported within accumulated other comprehensive income as a separate component of stockholders' equity (deficit) until realized or until a determination is made that an other-than-temporary decline in market value has occurred. The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity. Such amortization and accretion together with interest on securities are included in interest income on the Company's consolidated statements of operations. The cost of marketable securities sold is determined based on the specific identification method and any realized gains or losses on the sale of investments are reflected as a component of other income (expense).

**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 (deficit) that are excluded from net income (loss). The Company includes unrealized gains and losses on debt 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, short-term investments 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.

The Company's receivables related to U.S. and Canadian government grants are believed to have a low risk of default. At December 31, 2020, the Company's accounts and unbilled receivables of $113 include $27 due from Michigan State University for support to a Department of Energy funded grant under which the Company serves as a subcontractor and $86 is due from National Research Council Canada under a Canadian government research assistance grant administered through the Industrial Research Assistance Program. At December 31, 2019, $62 of the Company's total billed and unbilled receivables of $92 were from grants with the U.S. government.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

**Fair Value Measurements**

The carrying amounts of the Company's financial instruments as of December 31, 2020 and December 31, 2019, which include cash equivalents, accounts receivable, unbilled receivables, accounts payable, and accrued expenses, approximate their fair values due to the short-term nature of these instruments. See Note 4 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 and production of specialty oils and niche crops. 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, 2020, and December 31, 2019, less than 10% of the Company's combined total assets were located outside of the United States. During the years ended December 31, 2020 and December 31, 2019, the reported net loss from the Company's foreign subsidiaries was less than 10% of the combined net loss of the consolidated Company.

**Property and Equipment**

Property and equipment are stated at cost less accumulated depreciation. Repairs and maintenance are charged to operating expense 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:

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

**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. Accounting 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, 2020 and December 31, 2019. Funds received from government grants in advance of work being performed, if any, are recorded as deferred revenue until earned.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

**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 incurred in connection with government research 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 within operating expense based on the straight-line recognition of their grant date fair value over the period during which the recipient is required to provide service in exchange for the award. See Note 10 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.

**Basic and Diluted Net Loss per Share**

Basic net loss per share is computed by dividing net loss available to common shareholders by the weighted-average number of common shares outstanding. Diluted net loss per share is computed by dividing net loss 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, 2020 and 2019, all common stock equivalents are excluded from the calculation because they would have an anti-dilutive effect in the calculation of loss per share; 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 income available to common stockholders to be allocated between common and participating securities based on their respective rights to receive dividends. 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 November 2019, the Company completed an offering of its securities that included Series A Convertible Preferred Stock and Series B Convertible Preferred Stock meeting the definition of participating securities (See Note 9). However, due to the Company's net losses reported for the years ended December 31, 2020 and December 31, 2019, no allocation of the losses were allocated to the preferred shares as the holders of the preferred shares did not have a contractual obligation to fund losses. The loss per share for each year has been computed and presented based on the loss being fully assigned to the Company's weighted average outstanding common shares during the respective years.

The Company's calculation of basic and diluted loss per share for the year ended December 31, 2020 excludes 1,040,000 shares of common stock issued on February 3, 2021, in connection with a completed public stock offering. It also

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

excludes 481,973 shares of common stock issued after December 31, 2020 from the exercise of outstanding warrants by warrant holders. See Note 17 - Subsequent Events.

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, 2020 and 2019, respectively, are shown below:

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Options | 218,964 | 54,430 |
| Restricted stock awards | 11,775 | 42 |
| Series A Convertible Preferred Stock | 12,737 | 18,420 |
| Series B Convertible Preferred Stock | 31,421 | 82,705 |
| Warrants | 2,843,699 | 180,467 |
| Total | 3,118,596 | 336,064 |

**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 deferred tax assets to a level which, more likely than not, will be realized.

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.

See Note 13 for further discussion of income taxes. The Company had no amounts recorded for any unrecognized tax benefits as of December 31, 2020 and 2019.

**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. During the year ended December 31, 2020, the Company adopted the following new accounting guidance.

In August 2018, the FASB issued ASU No. 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement*. This standard modifies certain disclosure requirements on fair value measurements. This standard became effective for the Company on January 1, 2020 and did not have a material impact on its disclosures.

In November 2018, the FASB issued ASU No. 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606*. This standard makes targeted improvements for collaborative arrangements as follows:

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

- Clarifies that certain transactions between collaborative arrangement participants should be accounted for as revenue under ASC 606, *Revenue from Contracts with Customers*, when the collaborative arrangement participant is a customer in the context of a unit of account. In those situations, the guidance in ASC 606 should be applied, including recognition, measurement, presentation and disclosure requirements;
- Adds unit-of-account guidance to ASC 808, *Collaborative Arrangements*, to align with the guidance in ASC 606 (that is, a distinct good or service) when an entity is assessing whether the collaborative arrangement or a part of the arrangement is within the scope of ASC 606; and
- Precludes a company from presenting transactions with collaborative arrangement participants that are not directly related to sales to third parties with revenue recognized under ASC 606 if the collaborative arrangement participant is not a customer.

This standard became effective on January 1, 2020. However, since the Company is not currently participating in any collaborative arrangements, the new standard does not impact its financial statements.

The following new pronouncement is not yet effective but may impact the Company's financial statements in the future.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments.* The FASB subsequently issued amendments to ASU 2016-13, which have the same effective date and transition date as the initial pronouncement. This standard requires entities to estimate an expected lifetime credit loss on financial assets ranging from short-term trade accounts receivable to long-term financings and report credit losses using an expected losses model rather than the incurred losses model that was previously used, and establishes additional disclosures related to credit risks. For available-for-sale debt securities with unrealized losses, this standard now requires allowances to be recorded instead of reducing the amortized cost of the investment. This standard limits the amount of credit losses to be recognized for available-for-sale debt securities to the amount by which carrying value exceeds fair value and requires the reversal of previously recognized credit losses if fair value increases. The guidance is effective for fiscal years beginning after December 15, 2022 for SEC filers that are eligible to be smaller reporting companies under the SEC's definition, and interim periods within those fiscal years. The Company is currently evaluating the impact this guidance will have on the Company's condensed consolidated financial statements.

## 3. INVESTMENTS

The Company's investments consist of the following:

| | Accumulated Cost at December 31, 2020 | Unrealized Gain | Unrealized (Loss) | Market Value at December 31, 2020 |
|---|---|---|---|---|
| Short-term investments | | | | |
| U.S. government and agency securities | $ 6,279 | $ — | $ — | $ 6,279 |
| Total | $ 6,279 | $ — | $ — | $ 6,279 |

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

| | Accumulated Cost at December 31, 2019 | Unrealized Gain | Unrealized (Loss) | Market Value at December 31, 2019 |
|---|---|---|---|---|
| Short-term investments | | | | |
| U.S. government and agency securities | $ 5,700 | $ — | $ — | $ 5,700 |
| Total | $ 5,700 | $ — | $ — | $ 5,700 |

All short-term investments are classified as available for sale as of December 31, 2020 and December 31, 2019. The Company held no long-term investments at December 31, 2020 and December 31, 2019.

**4. Fair Value Measurements**

The Company has certain financial assets recorded at fair value which have been classified as Level 1 and Level 2 within the fair value hierarchy as described in the accounting standards for fair value measurements. In addition, during November 2019 the Company issued Series A Warrants and Series B Warrants in its concurrent securities offerings that were considered free standing financial instruments, that were legally detachable and separately exercisable from the common and preferred stock issued in the two offerings (see Note 9). The Company determined that all of the Series A Warrants and Series B Warrants should be classified as a warrant liability in accordance with ASC 480, *Distinguishing Liabilities from Equity*, and recognized at their inception date fair value due to the insufficiency of common shares available to permit their exercise. The warrant liability met Level 3 classification criteria for classification within the fair value hierarchy. 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.

The Company’s financial assets classified as Level 2 at December 31, 2020 and December 31, 2019 were initially valued at the transaction price and subsequently valued utilizing third-party pricing services. Because the Company’s investment portfolio may include securities that do not always trade on a daily basis, the pricing services use many observable market inputs to determine value including reportable trades, benchmark yields and benchmarking of like securities. The Company validates the prices provided by the third-party pricing services by reviewing their pricing methods and obtaining market values from other pricing sources. After completing the validation procedures, the Company did not adjust or override any fair value measurements provided by these pricing services as of December 31, 2020 and December 31, 2019.

The $14,977 fair values of the Series A and Series B Warrant liability at December 31, 2019 was determined using the Black-Scholes valuation model. The expected volatility and the risk free discount rate used in the Black-Scholes model were determined based on the Company's historical market price published by the Nasdaq Capital Market and from published U.S. Treasury yield curves, respectively, for a period matched to the contractual term of each warrant series.

| At December 31, 2019 | Series A Warrants | Series B Warrants |
|---|---|---|
| Fair market of common stock (per share) | $6.86 | $6.86 |
| Expected term (years) | 2.3 | 7.3 |
| Risk free rate | 1.62% | 1.83% |
| Volatility | 127% | 115% |

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

On January 15, 2020, the Company filed an amendment to its Certificate of Incorporation with the State of Delaware to effect a 1-for-40 reverse stock split. As a result of the reverse stock split, the Company's number of authorized but unissued shares of Common Stock increased significantly and the Series A Warrants and Series B Warrants issued under the offerings completed in November 2019 became eligible for exercise. Prior to reclassification as equity on January 15, 2020, the Company adjusted the warrant liability to its then $15,934 fair value using the assumptions below, recording a loss on the adjustment to fair value of $957.

| At January 15, 2020 | Series A Warrants | Series B Warrants |
|---|---|---|
| Fair market of common stock (per share) | $3.77 | $3.77 |
| Expected term (years) | 2.3 | 7.3 |
| Risk free rate | 1.62% | 1.83% |
| Volatility | 127% | 115% |

The tables below present information about the Company's assets and liabilities that are measured at fair value on a recurring basis as of December 31, 2020 and December 31, 2019 and indicate the fair value hierarchy of the valuation techniques utilized to determine such fair value.

| | Fair value measurements at December 31, 2020 | | | |
|---|---|---|---|---|
| Description | Quoted prices in active markets for identical assets (Level 1) | Significant other observable inputs (Level 2) | Significant unobservable inputs (Level 3) | Balance as of December 31, 2020 |
| Assets | | | | |
| Cash equivalents: | | | | |
| Money market funds | $ 2,873 | $ — | $ — | $ 2,873 |
| Short-term investments: | | | | |
| U.S. government and agency securities | — | 6,279 | — | 6,279 |
| Total assets | $ 2,873 | $ 6,279 | $ — | $ 9,152 |

| | Fair value measurements at December 31, 2019 | | | |
|---|---|---|---|---|
| Description | Quoted prices in active markets for identical assets (Level 1) | Significant other observable inputs (Level 2) | Significant unobservable inputs (Level 3) | Balance as of December 31, 2019 |
| Assets | | | | |
| Cash equivalents: | | | | |
| Money market funds | $ 2,622 | $ — | $ — | $ 2,622 |
| U.S. government and agency securities | — | 1,750 | — | 1,750 |
| Short-term investments: | | | | |
| U.S. government agency securities | — | 5,700 | — | 5,700 |
| Total assets | $ 2,622 | $ 7,450 | $ — | $ 10,072 |
| Liabilities | | | | |
| Warrant liability | $ — | $ — | $ 14,977 | $ 14,977 |
| Total liabilities | $ — | $ — | $ 14,977 | $ 14,977 |

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

There were no transfers of financial assets or liabilities between category levels for the years ended December 31, 2020 and December 31, 2019.

The following tables show a reconciliation of the beginning and ending balances for the Level 3 warrant liability for each of the years ending December 31, 2020 and December 31, 2019. The Company's warrant liability was initially recorded in connection with the Company's concurrent public and private securities offerings completed during the year ended December 31, 2019. See Note 9 for more detailed information.

| | Year ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Warrant liability, beginning of year | $ 14,977 | $ — |
| Warrants issued and classified as Level 3 | — | 24,518 |
| Recognized gain (loss) from mark-to-market adjustment at December 31, 2019 balance sheet date | — | (9,541) |
| Recognized gain (loss) from mark-to-market adjustment prior to reclassification of warrant liability to equity | 957 | — |
| Reclassification from warrant liability to equity | (15,934) | — |
| Warrant liability, end of year | $ — | $ 14,977 |

**5. Property and Equipment, Net**

Property and equipment consist of the following:

| | Year ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Equipment | $ 766 | $ 852 |
| Furniture and fixtures | 43 | 119 |
| Leasehold improvements | 1,414 | 1,748 |
| Software | 22 | 53 |
| Total property and equipment, at cost | 2,245 | 2,772 |
| Less: accumulated depreciation | (1,324) | (1,529) |
| Property and equipment, net | $ 921 | $ 1,243 |

Depreciation expense for the years ended December 31, 2020 and December 31, 2019, was $182 and $203, respectively.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

## 6. Accrued Expenses

Accrued expenses consist of the following:

| | Year ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Employee compensation and benefits | $ 620 | $ 669 |
| Leased facilities | 188 | 51 |
| Professional services | 235 | 327 |
| Other | 254 | 279 |
| Total accrued expenses | $ 1,297 | $ 1,326 |

## 7. Commitments and Contingencies

### Contractual Commitments

*Exclusive Collaboration Agreement with Rothamsted Research ("Rothamsted")*

On November 12, 2020, the Company signed an exclusive collaboration agreement with UK-based Rothamsted to support Rothamsted's program to develop omega-3 oils in Camelina sativa. Under the agreement, Yield10 is providing Rothamsted with financial support for ongoing research including further DHA+EPA trait improvement, field testing and nutritional studies. The Company will pay Rothamsted quarterly research funding and option fees of $31 for two years totaling $250, of which $219 remains outstanding as of December 31, 2020. As part of the agreement, the Company has an exclusive two-year option to sign a global, exclusive or non-exclusive license agreement to the technology. The current agreement terminates automatically on its second anniversary unless terminated earlier in accordance with the terms of the agreement.

*License Agreement with the University of Massachusetts ("UMASS")*

Pursuant to a license agreement with UMASS dated as of June 30, 2015 and subsequently amended, the Company has an exclusive, worldwide license under certain patents and patent applications, including issued patents covering the Company's yield trait gene C3003, relating to the manufacture of plants with enhanced photosynthesis. The agreement provides an exclusive, worldwide license to make, have made, use, offer for sale and import any transgenic plant seed or plant grown from transgenic plant material for sale to a farmer or grower that is derived from (in whole or in part) one or more issued or pending claims of the licensed patents or patent applications.

Pursuant to the UMASS license agreement, the Company is required to use diligent efforts to develop licensed products throughout the field of use and to introduce licensed products into the commercial market. The Company's failure to achieve any milestone provided for under the agreement would give UMASS the right to terminate the agreement, following a notice period, unless the Company is able to reach agreement with UMASS as to a potential adjustment to the applicable milestone.

The Company is obligated to pay UMASS milestone payments relating to 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, if any, related to the licensed products. The Company or UMASS may terminate the agreement in accordance with the terms of the agreement.

*License Agreement with the University of Missouri ("UM")*

Pursuant to a license agreement with UM dated as of May 17, 2018, Yield10 has an exclusive, worldwide license to two novel gene technologies to boost oil content in crops. Both technologies are based on significant new discoveries around

the function and regulation of ACCase, a key rate-limiting enzyme involved in oil production. The UM license was expanded during May 2019 to include an exclusive worldwide license to a third gene in the ACCase complex, that the Company has designated C3012, that may complement the activity of C3007 to boost oil content in crops.

Pursuant to the UM license agreement, the Company is required to use diligent efforts to develop licensed products throughout the licensed field and to introduce licensed products into the commercial market. The Company's failure to achieve any milestone provided for under the license agreement would give UM the right to terminate the license agreement or render it nonexclusive, unless the Company is able to reach agreement with UM as to the potential adjustment of the applicable milestone.

The Company is obligated to pay UM a license execution payment, milestone payments relating to any regulatory filings and approvals covered by the license agreement, royalties on any sales of licensed products following regulatory approval, as well as a percentage of any sublicense royalties, if any, related to the licensed products. The Company or UM may terminate the license agreement in accordance with the terms of the agreement.

*Facility Leases*

The Company leases facilities under non-cancelable leases expiring at various dates through November 30, 2026. See Note 11.

**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, 2020, and December 31, 2019, 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, 2020 and December 31, 2019.

**8. License Agreements**

In August 2020 the Company entered into a non-exclusive research agreement with GDM ("GDM"), a company specialized in plant genetics, to evaluate novel traits in soybean. Under the terms of the agreement, GDM is working with the Company's yield traits within its research and development program as a strategy to improve soybean yield performance and sustainability. The research agreement includes three novel yield traits in the first phase with the potential to expand the program to more traits in the future.

In October 2019, the Company granted a non-exclusive license to J. R. Simplot ("Simplot"), to evaluate three of the Company's novel traits in potato. Under the agreement, Simplot plans to conduct research with the yield traits C3003, C3004 and C4001 within its research and development program as a strategy to improve crop performance and sustainability.

In September 2018, the Company granted a non-exclusive license to Forage Genetics International, LLC ("Forage Genetics"), a subsidiary of Land O'Lakes, Inc., to evaluate five of the Company's novel traits in forage sorghum. The traits included in the research license include C3003 as well as four traits from the Company's GRAIN platform, C4001, C4002, C4003 and C4029. The key objective of the licensing agreement is to provide Forage Genetics with novel traits to test alone and/or in any combination in sorghum that may lead to the identification of new yield traits for potential future licensing from the Company for development and commercial deployment.

In September 2017, the Company granted a license to Bayer to evaluate the Company's novel C3003 and C3004 yield traits in soybean. Under this license, Bayer has the non-exclusive right to begin work with C3003 in its soybean program as a strategy to improve seed yield. Bayer may also conduct research with the Company's C3004 yield trait, a trait accessible through genome editing, in combination with C3003 to evaluate the effectiveness of the combination in improving seed yield in soybean. In August 2019, the Company expanded its 2017 non-exclusive research license with Bayer, for soybean crop research to include a new discovery related to its C3004 yield trait gene.

None of these research arrangements provide significant licensing revenue to the Company while the third parties perform trait evaluations.

**9. Capital Stock and Warrants**

**Common Stock**

*Registered Public Offering*

On August 26, 2020, the Company completed a public offering of 835,000 shares of its common stock at a public offering price of $4.25 per share. In addition, the underwriter exercised its over-allotment option to purchase 116,835 shares of common stock at the same price for total gross proceeds of $4,045 before issuance costs of $425.

*Private Placement*

Concurrent with the registered public offering described above, the Company completed a separate private placement offering of 396,450 shares of its common stock on August 26, 2020 to certain existing shareholders at the same $4.25 price offered to investors in the public offering. Proceeds from this private placement were $1,685.

*Reverse Stock Split*

On January 15, 2020, the Company completed a 1-for-40 reverse stock split ("reverse stock split") of its common stock by filing a certificate of amendment (the "Charter Amendment") with the State of Delaware to amend its certificate of incorporation. The ratio for the reverse stock split was determined by the Company's board of directors following approval by stockholders at the Company's special meeting held on January 9, 2020. The reverse stock split had the effect of increasing the Company's common shares available for issuance by reducing issued and outstanding common shares by a divisible factor of 40 while its authorized shares remained at its current 60 million shares. Proportional adjustments were made to the Company's outstanding stock options and to the number of shares issued and issuable under the Company's equity compensation plans.

*November 2019 Concurrent Securities Offerings*

On November 19, 2019, the Company closed on concurrent public and private securities offerings, receiving combined gross cash proceeds of $11,500, before issuance costs of $1,254.

The public portion of the offering included sales of Class A Units or Class B Units as follows:

- 405,750 Class A Units priced at a public offering price of $8.00 per unit, with each unit consisting of one share of common stock, par value $0.01 per share, a Series A Warrant to purchase one share of common stock at an exercise price of $8.00 per share, expiring two and one-half-years from the closing date of the offering, and a Series B Warrant to purchase one share of common stock at an exercise price of $8.00 per share, expiring seven and one-half-years from the closing date of the offering. The 405,750 Class A Units sold included the full exercise of the underwriter's over-allotment option of 93,750 Class A Units.

- 2,504 Class B Units, priced at a public offering price of $1,000 per unit, with each unit consisting of one share of Series A Convertible Preferred Stock, par value $0.01 per share, convertible at any time at the holder's option into 125 shares of common stock, par value $0.01 per share, Series A Warrants to purchase 125 shares of common stock at an exercise price of $8.00 per share, expiring two and one-half-years from the closing date of the offering, and Series B Warrants to purchase 125 shares of common stock at an exercise price of $8.00 per share, expiring seven and one-half-years from the closing date of the offering. The Series A Convertible Preferred Stock was convertible into shares of common stock at any time using a conversion ratio of $8.00 per share. As of April 30, 2020, all 2,504 of the Series A Convertible Preferred Stock had converted to 313,000 shares of the Company's common stock.

- Gross proceeds from the sale of Class A Units and Class B Units totaled $5,750.

In the concurrent private placement, certain existing shareholders purchased the following securities:

- 5,750 Units, priced at $1,000 per unit, each unit consisting of one share of the Company's Series B Convertible Preferred Stock, par value $0.01 per share, contingently convertible into 125 shares of common stock at an exercise price of $8.00 per share, Series A Warrants to purchase 125 shares of common stock at an exercise price of $8.00 per share, expiring two and one-half-years from the closing date of the offering, and Series B Warrants to purchase 125 shares of common stock at an exercise price of $8.00 per share, expiring seven and one-half-years from the closing date of the offering.

- At issuance, the Series B Convertible Preferred Stock had various superior rights to the Company's other securities, including the Series A Convertible Preferred Stock sold under the public portion of the concurrent offerings. Upon issuance, the Series B Convertible Preferred Stock was contingently redeemable for cash at the election of the holders if the Charter Amendment to effect a reverse stock split did not occur within twelve months of issuance. The Series B Convertible Preferred Stock also had cumulative quarterly dividend rights, payable starting March 31, 2020, pursuant to which the Series B Convertible Preferred stockholders were entitled to receive a dividend initially equal to 2 percent of stated value, plus all accrued and unpaid dividends. The dividends were payable in additional shares of Series B Convertible Preferred Stock and the dividend rate increased 2 percent quarterly as long as the Series B Convertible Preferred Stock remained outstanding. In the event of a liquidation of the Company, the Series B Convertible Preferred stockholders would be paid the greater of the stated value of the shares plus accrued dividends to the point of liquidation prior to payment to junior securities holders, including common stock and the amount payable on the number of shares of common stock the Series B Convertible Preferred Stock holders would be entitled to on an as-if converted basis.

- Gross proceeds from the private placement also totaled $5,750.

As of the November 19, 2019 closing date of the two offerings, the Company did not have sufficient authorized and available shares of common stock to permit conversion of the Series B Convertible Preferred Stock sold in the private placement or to permit the exercise of the 2,875,000 combined Series A Warrants and Series B Warrants issued under both the public and the private offerings. The Series B Convertible Preferred Shares and the Series A Warrants and Series B Warrants were not convertible or exercisable until more shares of common stock became available for issuance through the Company's filing of the Charter Amendment for the reverse stock split. Upon the filing of the Charter Amendment on January 15, 2020, the Series B Convertible Preferred Stock sold in the private placement automatically converted into 718,750 shares of common stock and the Series A Warrants and Series B Warrants issued in both offerings became eligible for exercise.

Until their conversion to common stock, the Company recorded the Series A Convertible Preferred Stock as permanent equity within the Company's balance sheet. The contingent redemption rights of the Series B Convertible Preferred stockholders were judged to be outside of the Company's control and resulted in their classification as temporary equity within the Company's balance sheet until their automatic conversion to common shares in January 2020.

The Series A Warrants and Series B Warrants are free standing financial instruments, legally detachable and separately exercisable from the common and preferred stock issued in the concurrent offerings. At the time of their issuance, the Company determined that all of the warrants should be classified as a warrant liability recognized at an inception date fair value of $24,518 due to the insufficiency of common shares available to permit their exercise. As the proceeds from the offerings were less than the fair value of their respective warrants, the warrants were recorded at their full fair value and the difference between the fair value and the cash proceeds of $13,018 were recorded to other income (expense) in the Company's consolidated statement of operations during the year ended December 31, 2019. No residual offering proceeds remained to be allocated to the common and preferred shares sold in the offering.

The Company re-measured the fair value of the warrants on December 31, 2019 and again on January 15, 2020 (the date of filing the Charter Amendment to increase available shares of common stock), resulting in, respectively, the recognition of a gain of $9,541 followed by a loss of $957, due to the change in fair value at each valuation date. By filing the Charter Amendment and enacting the 1-for-40 Reverse Stock Split, the Company's outstanding common shares were reduced by a divisible factor of 40 while authorized common shares remained at the current 60 million shares. As a result of this corporate action, sufficient shares of authorized, but unissued shares of common stock became available for Series A and Series B warrant holders to exercise their warrants resulting in their reclassification from warrant liability to equity in the Company's consolidated balance sheet.

At closing, the proceeds of the combined offerings were allocated solely to the liability classified warrants, and as a consequence, the offering costs of $1,254 were immediately expensed to other income (expense) in the consolidated statement of operations for the year ended December 31, 2019 in accordance with accounting guidance.

*March 2019 Registered Direct Offering*

On March 18, 2019, the Company completed a registered direct offering of its common stock. Proceeds from the transaction were $2,932 before issuance costs of $349. Investors participating in the transaction purchased a total of 60,541 shares of common stock at a price of $48.40 per share.

**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.

*Description of Series A Convertible Preferred Stock*

The November 2019 public offering of the Company's securities included the issuance of 2,504 shares of Series A Convertible Preferred Stock. Each Series A Convertible Preferred Share was convertible into 125 shares of common stock at a conversion price of $8.00 per share. As of April 30, 2020, all 2,504 shares of the Series A Convertible Preferred Stock had converted to 313,000 shares of common stock.

*Description of Series B Convertible Preferred Stock*

The November 2019 private offering of the Company's securities included the issuance of 5,750 shares of Series B Convertible Preferred Stock. Each share of Series B Convertible Preferred Stock was convertible into 125 shares of common stock at a conversion price of $8.00 per share. All of the Series B Convertible Preferred Stock converted automatically to 718,750 shares of common stock on January 15, 2020, upon the Company's filing of a Charter Amendment for the reverse stock split described above.

When converted, the shares of Series A Convertible Preferred Stock and Series B Convertible Preferred Stock were restored to the status of authorized but unissued shares of preferred stock, subject to reissuance by the board of directors.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

**Warrants**

The following table summarizes information with regard to outstanding warrants to purchase common stock as of December 31, 2020:

| Issuance | Number of Common Shares Issuable Upon Exercise of Outstanding Warrants | Exercise Price | Expiration Date |
|---|---|---|---|
| November 2019 Public Offering - Series A | 580,727 | $ 8.00 | May 19, 2022 |
| November 2019 Public Offering - Series B | 649,477 | $ 8.00 | May 19, 2027 |
| November 2019 Private Placement - Series A | 718,750 | $ 8.00 | May 19, 2022 |
| November 2019 Private Placement - Series B | 718,750 | $ 8.00 | May 19, 2027 |
| December 2017 Public Offering - Series A | 160,975 | $ 90.00 | December 21, 2022 |
| July 2017 Registered Direct Offering | 14,270 | $ 201.60 | January 7, 2024 |
| Consultant | 750 | $ 116.00 | September 11, 2024 |
| Total | 2,843,699 | | |

*Warrant Exercises*

During the year ended December 31, 2020, a total of 207,296 Series A and Series B warrants issued in the Company's November 2019 securities offering were exercised by warrant holders, providing $1,658 in cash proceeds.

After December 31, 2020, and through March 15, 2021, Yield10 received a further $3,856 in cash from the exercise of 481,973 Series A and Series B warrants issued in the Company's November 2019 securities offering.

**Reserved Shares**

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

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| Stock Options | 339,108 | 62,065 |
| RSUs | 8,500 | — |
| Series A Convertible Preferred Stock - November 2019 Public Offering | — | 99,500 |
| Warrants | 2,843,699 | 175,995 |
| Total number of common shares reserved for future issuance | 3,191,307 | 337,560 |

As of December 31, 2019, the Company did not have sufficient authorized and available shares of common stock to permit conversion of the 718,750 Series B Convertible Preferred Stock sold in the November 2019 private placement or to permit the exercise of the 2,875,000 combined Series A Warrants and Series B Warrants issued in the concurrent public and private offerings. Shares of common stock became available for issuance through the Company's filing of a Charter Amendment for the reverse stock split on January 15, 2020. Because they were not convertible or exercisable as of December 31, 2019, the Series B Convertible Preferred Stock and the Series A Warrants and Series B Warrants were excluded from the table of reserved shares shown above at December 31, 2019.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

## 10. Stock-Based Compensation

*Stock Option Plans*

The Company adopted a stock plan in 2006 (the "2006 Plan"), which provided for the granting of incentive stock options, non-qualified 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 3,662 options were awarded from the 2006 Plan and as of December 31, 2020, 422 of these options remain outstanding and eligible for future exercise.

The 2014 Plan provides for the granting of incentive stock options, non-qualified stock options, stock appreciation rights, deferred stock awards, restricted stock awards, unrestricted stock awards, cash-based awards and dividend equivalent rights. In May 2018, the 2014 Plan was terminated, and the Company adopted a new 2018 Stock Option and Incentive Plan, which was amended in May 2020 (the "2018 Stock Plan"). A total of 16,896 options have been awarded from the 2014 Plan and as of December 31, 2020, 16,322 of these options remain outstanding and eligible for future exercise. A total of 3,619 restricted stock awards have been awarded from the 2014 Plan and as of December 31, 2020, all of these restricted stock awards are vested and outstanding. No further stock awards may be issued from the 2014 Plan.

The 2018 Stock Plan initially reserved for issuance 32,500 shares of the Company's common stock for grants of incentive stock options, non-qualified stock options, stock grants and other stock-based awards. In accordance with the terms of the 2018 Stock Plan, the Company's Board of Directors approved the addition of shares to the 2018 Stock Plan on the first day of January 2019, 2020 and 2021 in amounts equal to 5% of the outstanding shares of the Company's common stock on the day prior to the increase. Total shares added to the 2018 Plan from these annual additions have amounted to 225,906. At its annual meeting of stockholders on May 19, 2020, stockholders approved an amendment to the 2018 Plan to add 250,000 more shares to the plan. As of December 31, 2020, a total of 340,305 options and restricted stock awards have been issued from the 2018 Stock Plan, and as of that date, 330,385 options and restricted stock awards remain outstanding.

*Expense Information for 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 $739 and $656 for the years ended December 31, 2020 and 2019, respectively. At December 31, 2020, there was approximately $1,968 of stock-based compensation expense related to unvested awards not yet recognized which is expected to be recognized over a weighted average period of 3.18 years.

*Stock Options*

Options granted under the 2006 Plan, 2014 Plan and 2018 Stock Plan 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.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

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, 2019 | 62,065 | $ 178.95 | | |
| Granted | 278,421 | 5.95 | | |
| Exercised | — | — | | |
| Forfeited | (721) | 48.40 | | |
| Expired | (657) | 2,654.98 | | |
| Balance at December 31, 2020 | 339,108 | 32.39 | 9.02 | $ — |
| Vested and expected to vest at December 31, 2020 | 339,108 | 32.39 | 9.02 | $ — |
| Exercisable at December 31, 2020 | 86,933 | 99.41 | 8.18 | $ — |

The weighted average grant date fair value per share of options granted during fiscal years 2020 and 2019, was $5.31, and $30.77, respectively. No options were exercised during 2020 and 2019, 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, 2020 was 9.02 years.

For the years ended December 31, 2020, and 2019, 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, | |
|---|---|---|
| | 2020 | 2019 |
| Expected dividend yield | — | — |
| Risk-free rate | 0.5% - 1.9% | 1.7% - 2.5% |
| Expected option term (in years) | 6.1 - 10.0 | 6.0 - 10.0 |
| Volatility | 111% - 129% | 107% - 124% |

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 forfeiture occurs.

*Restricted Stock Units ("RSUs")*

The Company records stock compensation expense for RSUs on a straight-line basis over their requisite service period, which approximates the vesting period, based on each RSU's award date market value. As RSUs vests, the Company withholds a number of shares from its employees 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. The Company then pays the minimum required income tax for the employees. During the years ended December 31, 2020 and December 31, 2019, the Company withheld vested shares with a fair value of $17 and $4 to pay for minimum tax withholding associated with RSU vesting.

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

A summary of RSU activity for the year ended December 31, 2020 is as follows:

| | Number of RSUs | Weighted Average Remaining Contractual Life (years) |
|---|---|---|
| Outstanding at December 31, 2019 | — | |
| Awarded | 17,000 | |
| Released | (8,500) | |
| Forfeited | — | |
| Outstanding at December 31, 2020 | 8,500 | 0.12 |
| Weighted average remaining recognition period (years) | 0.12 | |

The Company did not award any RSUs during the year ended December 31, 2019.

**11. LEASES**

As a lessee, the Company follows the lease accounting guidance codified in ASC 842, *Leases*. Under ASC 842, a lease is classified as a finance lease if any of five criteria described in the guidance apply to the lease. Any lease not classified as a finance lease is classified as an operating lease with expense recognition occurring on a straight-line basis over the term of the lease. The Company's existing lease arrangements meet the standards for operating lease classification.

Under ASC 842, a lease liability is recorded on the commencement date of a lease and is calculated as the present value of the remaining lease payments, using the interest rate implicit in the lease, or if that rate is not readily determinable, using the lessee's incremental borrowing rate. A right-of-use asset equal to the lease liability is also recorded with adjustments made, as necessary, for lease prepayments, lease accruals, initial direct costs and lessor lease incentives that may be present within the terms of the lease. The Company has adopted the short-term lease exception that permits lessees to omit leases with terms of twelve months or less from the accounting requirements of ASC 842.

In November 2019, the Company entered into a lease modification with the landlord for its headquarters located in Woburn, Massachusetts, as described further below. As a result of returning 7,409 square feet of space to the landlord for the remaining term of the lease, the Company remeasured and reduced its associated right-of-use asset and lease liability by $1,011 and $1,401, respectively, and recorded a charge to lease expense of $390.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

*Maturity Analysis of Lease Liabilities*

At December 31, 2020, the Company's lease liabilities will mature as follows:

| Year ended December 31, | Undiscounted Cash Flows |
|---|---|
| 2021 | $ 704 |
| 2022 | 726 |
| 2023 | 749 |
| 2024 | 771 |
| 2025 | 793 |
| Thereafter | 747 |
| Total undiscounted future lease payments | 4,490 |
| Discount | (870) |
| Total lease liabilities | $ 3,620 |
| Short-term lease liabilities | $ 457 |
| Long-term lease liabilities | $ 3,163 |

At December 31, 2020, the Woburn, Massachusetts facility is the only lease included within the Company's right-of-use assets and corresponding lease liabilities.

*Quantitative Disclosure of Lease Costs*

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| **Lease cost:** | | |
| Operating lease cost | $ 688 | $ 640 |
| Short-term lease cost | 676 | 569 |
| Sublease income | (560) | (539) |
| Total lease cost, net | $ 804 | $ 670 |

Operating lease cost of $640 for the year ended December 31, 2019 is shown net of a reduction of $390 related to the Company's modification to its Woburn, Massachusetts lease described above.

| Other information as of: | December 31, 2020 | December 31, 2019 |
|---|---|---|
| Weighted-average remaining lease term (years) | 5.9 | 6.7 |
| Weighted-average discount rate | 7.25% | 7.24% |

*Real Estate Leases*

During 2016, the Company entered into a lease agreement for its headquarters, pursuant to which the Company leased 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 lease agreement does not include any options for an early termination or for an extension of the lease. Pursuant to the lease, the Company is required to 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. Upon the adoption of ASC 842, these improvements were recorded as a reduction in the valuation of the right-of-use asset.

In November 2019, the Company entered into a modification to the Woburn lease in which Yield10 returned 7,409 square feet of underutilized space to the landlord for the remaining term of the lease. In exchange for returning the space, the landlord agreed to fund modifications and upgrades to the remaining office space retained by the Company. The modifications were completed in February 2020, and after that point the Company has no further financial obligations for the vacated space and lease rental charges, including utility, maintenance and real estate tax charges. The security deposit was also proportionally reduced from $307 to $229. During the first quarter of 2020, the Company wrote off $206 in leasehold improvements and office furniture, net of proceeds, associated with the returned space.

In October 2016, the Company entered into a sublease agreement with a subsidiary of CJ CheilJedang Corporation ("CJ") with respect to CJ's sublease of 9,874 square feet of its leased facility located in Woburn, Massachusetts. The sublease space was determined to be in excess of the Company's needs. The CJ sublease is unaffected by the Company's 2019 lease modification with the landlord and remains coterminous with the Company's master lease. CJ will pay pro rata rent and operating expenses equal to the amounts payable to the landlord by the Company, as adjusted from time to time in accordance with the terms of the master lease. Future CJ sublease payments have not been presented as an offset to total undiscounted future lease payments of $4,490 shown in the lease maturity analysis table above. CJ provided the Company with a security deposit of $103 in the form of an irrevocable letter of credit.

Through May 2020, the Company leased approximately 13,702 square feet of unused office and laboratory space in Lowell, Massachusetts. The lease terminated in accordance with the terms of the lease agreement and the facility has been returned to the landlord. No further expenses are anticipated under this lease.

The Company's wholly-owned subsidiary, Metabolix Oilseeds, Inc. ("MOI"), located in Saskatoon, Saskatchewan, Canada, leases approximately 7,000 square feet of office, laboratory and greenhouse space located within Innovation Place at 410 Downey Road and within the research facility of National Research Council Canada located at 110 Gymnasium Place. These leases do not contain renewal or early termination options. MOI's leases for these facilities generally have terms of one year and are extended annually through amendment. Most of these leases will expire on May 31, 2021, unless further amended, and others will expire on various dates through September 30, 2021.

**12. Cares Act Loan**

During April 2020, the Company received $333 in loan proceeds through the Paycheck Protection Program Flexibility Act ("PPP"), established pursuant to the CARES Act. Under the CARES Act and the PPP, a borrower may apply for and be granted forgiveness for all or a part of its PPP loan. The amount of loan proceeds eligible for forgiveness is based on a formula that takes into account a number of factors, including the amount of loan proceeds used by the borrower during the twenty-four-week period after the loan origination for certain purposes including payroll costs, rent payments on certain leases, and certain qualified utility payments. Yield10 utilized the entire PPP Loan amount for qualifying expenses and applied for loan forgiveness, receiving a favorable determination in November 2020 for the full amount of the loan. As a result, the Company recorded the $333 as loan forgiveness income within other income (expense) in its consolidated statement of operations for the year ended December 31, 2020.

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

## 13. Income Taxes

*Income Taxes and Deferred Tax Assets and Liabilities*

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

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Domestic | $ (10,287) | $ (13,394) |
| Foreign | 137 | 184 |
| Net loss from operations before income tax (provision) benefit | $ (10,150) | $ (13,210) |

The components of the income tax benefit consisted of the following for the years ended December 31, 2020 and 2019:

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| **Current Tax Benefit:** | | |
| Federal | $ — | $ — |
| State | — | — |
| Foreign | — | — |
| Total current | — | — |
| | | |
| **Deferred Tax Benefit:** | | |
| Federal | — | — |
| State | — | — |
| Foreign | 56 | (254) |
| Total deferred | 56 | (254) |
| Total tax provision (benefit) | $ 56 | $ (254) |

**YIELD10 BIOSCIENCE, INC.**

**NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS**
**(In thousands, except for share and per share amounts)**

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

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| **Deferred Tax Assets:** | | |
| Net operating loss carryforward | $ 28,425 | $ 25,799 |
| Capitalization of research and development expense | 938 | 1,162 |
| Credit carryforwards | 2,431 | 2,332 |
| Capital loss carryover | 646 | 646 |
| Stock compensation | 764 | 915 |
| Lease liability | 993 | 1,141 |
| Other temporary differences | 338 | 303 |
| Total deferred tax assets. | 34,535 | 32,298 |
| Valuation allowance | (33,377) | (30,953) |
| Net deferred tax assets | 1,158 | 1,345 |
| **Deferred Tax Liabilities:** | | |
| Depreciation | (216) | (246) |
| Right-of-use asset | (741) | (845) |
| Net deferred taxes | $ 201 | $ 254 |

*Tax Rate*

The items accounting for the difference between the income tax (provision) benefit computed at the federal statutory rate of 21% and the provision for income taxes were as follows:

| | Year Ended December 31, | |
|---|---|---|
| | 2020 | 2019 |
| Federal income tax at statutory federal rate | 21.0 % | 21.0 % |
| State taxes | 5.1 % | 2.0 % |
| Permanent differences | 0.2 % | (0.4)% |
| Tax credits | 1.7 % | 0.6 % |
| Canada credit audit adjustment | 0.0 % | (2.6)% |
| Foreign rate differential | (0.1)% | (0.1)% |
| Non-deductible equity transactions | (2.0)% | (7.5)% |
| Stock compensation | (2.6)% | (0.9)% |
| Other | 0.0 % | (0.7)% |
| Change in valuation allowance | (23.9)% | (9.5)% |
| Total | (0.6)% | 1.9 % |

*Tax Attributes*

At December 31, 2020, the Company had U.S. net operating loss carryforwards (NOLs) for federal and state income tax purposes of approximately $105,163 and $100,333, respectively. Included in the $105,163 of federal net operating losses are losses of $27,354 that will carry forward indefinitely. The remaining federal net operating losses of $77,809 will begin to expire in 2033. The Company's state net operating loss carryforwards will begin to expire on various dates through 2040. The Company also had available research and development and investment tax credits for federal and state income tax

purposes of approximately $1,522 and $896, respectively. These federal and state credits will begin to expire on various dates through 2040. In Canada, the Company has cumulative research tax credits totaling $201 that will begin to expire on various dates through 2035.

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 U.S. federal and state deferred tax assets. Accordingly, a full valuation allowance has been established against the U.S. net deferred tax assets. Alternatively, the Company has concluded that it is more likely than not that the net deferred tax assets of its wholly-owned Canadian subsidiary, Metabolix Oilseeds, Inc. ("MOI"), totaling $201, will be recognized in the future as a result of annual taxable income generated through MOI's research services and transfer pricing agreements with its U.S. parent.

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 through 2020. 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.

*Other*

The tax years 2017 through 2020 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, 2020 and 2019, the Company had no accrued interest or penalties recorded related to uncertain tax positions.

The CARES Act was signed into law on March 7, 2020, and contained specific relief and stimulus measures. The Company has reviewed the impact of the CARES Act and has determined that it does not have a material impact on the Company's tax provision.

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, 2020 and December 31, 2019 approximated $999 and $778, respectively.

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

**14. 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 20,788, and 2,885 shares of common stock during the years ended December 31, 2020, and December 31, 2019, respectively, and recorded $108, and $98, respectively, of related expense. Company contributions are fully vested upon issuance.

**15. Government Research Grants**

On May 20, 2020, MOI, the Company’s wholly-owned Canadian research subsidiary, received a research grant through the Industrial Research Assistance Program ("IRAP") administered by National Research Council Canada ("NRC"). The objective of the grant was to provide financial research assistance to innovative, early-stage small and medium-sized enterprises. Under the terms of the agreement, NRC agreed to contribute up to a maximum of $67 for payroll costs incurred by MOI during the period April - June, 2020. During the second quarter of 2020, MOI submitted claims for eligible payroll costs and recognized grant revenue for the full amount of the award. On December 3, 2020, MOI received a second IRAP funded research grant with a similar objective of providing financial research assistance. Under the terms of this second grant, NRC agreed to contribute up to a maximum of $86 for payroll costs incurred by MOI during the period July - December, 2020. The full amount of the grant was recognized as grant revenue during the fourth quarter and is recorded as accounts receivable in the Company's consolidated balance sheet at December 31, 2020.

During 2018 the Company entered into a sub-award with Michigan State University ("MSU") to support a Department of Energy funded grant entitled "*A Systems Approach to Increasing Carbon Flux to Seed Oil*." The Company's participation under this projected five-year grant is being awarded on an annual basis with the first year commencing on September 15, 2017. Cumulative funding for this sub-award in the amount of $2,403 has been appropriated by the U.S. Congress through the fourth contractual year ending in September 2021. The Company anticipates that the final option year through September 14, 2022 will be awarded to Yield10 during 2021 for total sub-award funding of $2,957, provided the U.S. Congress continues to appropriate funds for the program, the Company is able to make progress towards meeting grant objectives and it remains in compliance with other terms and conditions of the sub-award. During the years ended December 31, 2020 and December 31, 2019, the Company recognized $646 and $806, respectively, in revenue related to this sub-award.

**16. 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, 2020 | | | | |
| Net revenues to unaffiliated customers | $ 646 | $ 153 | $ — | $ 799 |
| Inter-geographic revenues | — | 1,857 | (1,857) | — |
| Net revenues | $ 646 | $ 2,010 | $ (1,857) | $ 799 |
| Identifiable long-lived assets | $ 866 | $ 55 | $ — | $ 921 |
| Year Ended December 31, 2019 | | | | |
| Net revenues to unaffiliated customers | $ 806 | $ — | $ — | $ 806 |
| Inter-geographic revenues | — | 1,883 | (1,883) | — |
| Net revenues | $ 806 | $ 1,883 | $ (1,883) | $ 806 |
| Identifiable long-lived assets | $ 1,186 | $ 57 | $ — | $ 1,243 |

Foreign revenue is based on the country in which the Company's subsidiary that earned the revenue is domiciled. During 2020, grant revenue earned from the Company's Michigan State University sub-award totaled $646, or 80.9% of the Company's total revenue. Revenue earned from the Company's Canadian IRAP grants totaled $153, or 19.1% of the Company's total 2020 revenue.

**17. Subsequent Events**

On February 3, 2021, the Company completed a public offering of its common stock, raising $11,996, net of estimated offering costs of $744. In the offering, 1,040,000 shares of common stock were sold at an issuance price of $12.25.

After December 31, 2020 and through March 15, 2021, warrant holders exercised 481,973 Series A and Series B warrants issued in the Company's November 2019 securities offering, providing $3,856 in cash proceeds.

**Exhibit 4.1**

## DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

Yield10 Bioscience, Inc. (the "Company" or "we") has one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended: our common stock, par value $0.01 per share.

## DESCRIPTION OF COMMON STOCK

The following description of our common stock is a summary and does not purport to be complete. You should refer to our amended and restated certificate of incorporation and our amended and restated by-laws, both of which are incorporated by reference as exhibits to the Company's Annual Report on Form 10-K of which this exhibit is a part. The summary below is also qualified by provisions of applicable law.

### *General*

The holders of our common stock are entitled to one vote per share on all matters submitted to a vote of our stockholders and do not have cumulative voting rights. Subject to preferences that may be applicable to any preferred stock outstanding at the time, the holders of outstanding shares of common stock are entitled to receive ratably any dividends declared by our board of directors out of assets legally available. Upon our liquidation, dissolution or winding up, holders of our common stock are entitled to share ratably in all assets remaining after payment of liabilities and the liquidation preference of any then outstanding shares of preferred stock. Holders of common stock have no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to our common stock.

### *Transfer Agent and Registrar*

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC, with offices at 6201 15th Avenue, Brooklyn, New York 11219.

### *Stock Exchange Listing*

Our common stock is listed for quotation on The Nasdaq Capital Market under the symbol "YTEN."

## CERTAIN PROVISIONS OF DELAWARE LAW AND OF THE COMPANY'S CERTIFICATE OF INCORPORATION AND BYLAWS

### *Anti-Takeover Provisions*

We are subject to Section 203 of the Delaware General Corporation Law. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

***Charter Documents***

Our amended and restated certificate of incorporation and amended and restated by-laws include a number of provisions that may have the effect of delaying, deferring or discouraging another party from acquiring control of our company or preventing changes in our management, including the following:

- *Issuance of Undesignated Preferred Stock*. Our board of directors has the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights, preferences and privileges designated from time to time by our board of directors without further action by stockholders. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences and sinking fund terms, any or all of which may be greater than the rights of common stock.

- *Size of the Board of Directors and Filling Vacancies*. The number of directors constituting our board of directors may be set only by resolution adopted by a majority vote of our entire board of directors. Any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of the board of directors, may only be filled by the affirmative vote of a majority of our directors then in office, even if less than a quorum.

- *Classified Board*. Our board of directors is divided into three classes of directors, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms.

- *No Cumulative Voting*. Our amended and restated certificate of incorporation, as amended, and amended and restated by-laws do not permit cumulative voting in the election of directors. Cumulative voting allows a stockholder to vote a portion, or all of its shares for one or more candidates. The absence of cumulative voting makes it more difficult for a minority stockholder to gain a seat.

- *Removal of Directors*. Directors can only be removed by our stockholders for cause and removal of a director will require a 75% stockholder vote.

- *No Written Consent of Stockholders*. All stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting. Stockholders may not take action by written consent in lieu of a meeting. The inability of stockholders to take action by written consent means that a stockholder would need to wait until the next annual or special meeting to bring business before the stockholders for a vote.

- *Special Meetings of Stockholders*. Special meetings of our stockholders may be called only by our 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 our stockholders.

- *Advance Notice Requirements for Stockholder Proposals and Director Nominations*. Our amended and restated by-laws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. These procedures provide that notice must be given in writing not later than the close of business on the 90th day nor earlier than the close of business on the 120th day prior to the first anniversary of the preceding year’s annual meeting. These procedures

may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempt to obtain control of us.

- *Amendment to Amended and Restated Certificate of Incorporation and By-laws*. Any amendment, repeal or modification of certain provisions of our amended and restated certificate of incorporation or amended and restated by-laws requires a 75% stockholder vote. Provisions requiring such supermajority vote include, among other things, any amendment, repeal or modification of the provisions relating to the classification of our board of directors, the requirement that stockholder actions be effected at a duly called annual or special meeting of our stockholders and the designated parties entitled to call a special meeting of our stockholders.

Exhibit 21.1

# Subsidiaries of the Registrant

| Subsidiary Name | Jurisdiction of Organization |
| --- | --- |
| Yield10 Bioscience Securities Corp. | MA |
| Metabolix Oilseeds, Inc. | Canada |

Exhibit 23.1

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in the Registration Statements on Form S-1 (No. 333-237420 and 333-249388), Form S-3 (No.333-217051 and 333-237539) and Form S-8 (No. 333-138631, 333-145232, 333-155115, 333-157869, 333-165405, 333-172724, 333-181268, 333-187589, 333-194858, 333-194859, 333-202983, 333-217052, 333-226731, 333-231474, 333-235858 and 333-238764) of Yield10 Bioscience, Inc. of our report dated March 16, 2021, relating to the consolidated financial statements of Yield10 Bioscience, Inc., appearing in this Annual Report on Form 10-K of Yield10 Bioscience, Inc., for the year ended December 31, 2020.

/s/RSM US LLP

Boston, Massachusetts
March 16, 2021

**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 16, 2021

/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 16, 2021

/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 (the "Report") of Yield10 Bioscience, Inc. (the "Company") for the year ended December 31, 2020 as filed with the Securities and Exchange Commission on the date hereof, 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 contained 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 16, 2021 By: /s/ OLIVER P. PEOPLES

Oliver P. Peoples
*President and Chief Executive Officer (Principal Executive Officer)*

Date: March 16, 2021 By: /s/ CHARLES B. HAASER

Charles B. Haaser
*Chief Accounting Officer (Principal Financial and Accounting Officer)*