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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 31, 2022

OR

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

For the transition period from _____ to _____

Commission File Number: 001-40097

GINKGO BIOWORKS HOLDINGS, INC.
(Exact Name of Registrant as Specified in its Charter)

Delaware	**87-2652913**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
27 Drydock Avenue 8th Floor Boston, MA	**02210**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (877) 422-5362

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Class A common stock, par value $0.0001 per share	DNA	NYSE
Warrants to purchase one share of Class A common stock, each at an exercise price of $11.50 per share	DNA.WS	NYSE

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, 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 has 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 is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes ☒ No ☐

As of May 9, 2022, the registrant had 1,093,522,711 shares of Class A common stock, 395,114,230 shares of Class B common stock and 288,000,000 shares of non-voting Class C common stock outstanding.

Cautionary Note Regarding Forward Looking Statements

This report includes forward-looking statements regarding, among other things, the plans, strategies and prospects, both business and financial, of Ginkgo Bioworks Holdings, Inc. ("Ginkgo"). These statements are based on the beliefs and assumptions of the management of Ginkgo. Although Ginkgo believes that its plans, intentions and expectations reflected in or suggested by these forward-looking statements are reasonable, Ginkgo cannot assure you that it will achieve or realize these plans, intentions or expectations. Forward-looking statements are inherently subject to risks, uncertainties and assumptions. Generally, statements that are not historical facts, including statements concerning possible or assumed future actions, business strategies, events or results of operations, are forward-looking statements. These statements may be preceded by, followed by or include the words "believes", "estimates", "expects", "projects", "forecasts", "may", "will", "should", "seeks", "plans", "scheduled", "anticipates" or "intends" or similar expressions. Forward-looking statements contained in this Quarterly Report on Form 10-Q include, but are not limited to, statements about:

- Ginkgo's ability to raise financing in the future and to comply with restrictive covenants related to long-term indebtedness;
- Ginkgo's ability to retain or recruit, or adapt to changes required in, its founders, senior executives, key personnel or directors;
- factors relating to the business, operations and financial performance of Ginkgo, including:
    - Ginkgo's ability to effectively manage its growth;
    - Ginkgo's exposure to the volatility and liquidity risks inherent in holding equity interests in certain of its customers;
    - rapidly changing technology and extensive competition in the synthetic biology industry that could make the products and processes Ginkgo is developing obsolete or non-competitive unless it continues to collaborate on the development of new and improved products and processes and pursue new market opportunities;
    - Ginkgo's reliance on its customers to develop, produce and manufacture products using the engineered cells and/or biomanufacturing processes that Ginkgo develops;
    - Ginkgo's ability to comply with laws and regulations applicable to its business; and
    - market conditions and global and economic factors beyond Ginkgo's control;
- intense competition and competitive pressures from other companies worldwide in the industries in which Ginkgo operates;
- litigation and the ability to adequately protect Ginkgo's intellectual property rights;
- the success of Ginkgo's programs and their potential to contribute revenue; and
- other factors detailed under the section entitled "Risk Factors."

These and other factors that could cause actual results to differ from those implied by the forward-looking statements in this Quarterly Report on Form 10-Q are more fully described under the heading "Risk Factors" and elsewhere in this report. The risks described under the heading "Risk Factors" are not exhaustive. Other sections of this Quarterly Report on Form 10-Q describe additional factors that could adversely affect the business, financial condition or results of Ginkgo. New risk factors emerge from time to time and it is not possible to predict all such risk factors, nor can Ginkgo assess the impact of all such risk factors on the business of Ginkgo, or the extent to which any factor or combination of factors may cause actual results to differ materially from those contained in any forward-looking statements. Forward-looking statements are not guarantees of performance. You should not put undue reliance on these statements, which speak only as of the date hereof. All forward-looking statements attributable to Ginkgo or persons acting on its behalf are expressly qualified in their entirety by the foregoing cautionary statements. Ginkgo undertakes no obligation to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

Risk Factors Summary

Investing in our securities involves risks. You should carefully consider the risks described under the heading "Risk Factors" before making a decision to invest in our Class A common stock. If any of these risks actually occur, our business, financial condition and

results of operations would likely be materially adversely affected. Some of the risks related to Ginkgo's business and industry are summarized below. References in the summary below to "we," "us," "our" and "the Company" generally refer to Ginkgo.

- We have a history of net losses. We expect to continue to incur losses for the foreseeable future, and we may never achieve or maintain profitability.
- We are not, and do not intend to become, regulated as an "investment company" under the Investment Company Act of 1940, as amended ("Investment Company Act"), and if we were deemed an "investment company" under the Investment Company Act, applicable restrictions could make it impractical for us to continue our business as contemplated and could have a material adverse effect on our business.
- Only our employees and directors are entitled to hold shares of Class B common stock (including shares of Class B common stock granted or otherwise issued to our employees and directors in the future), which shares have ten votes per share. This limits or precludes other stockholders' ability to influence the outcome of matters submitted to stockholders for approval, including the election of directors, the approval of certain employee compensation plans, the adoption of certain amendments to our organizational documents and the approval of any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.
- Outstanding Class C common stock may have the effect of extending voting power in Class B common stock, and may discourage potential acquisitions of our business and could have an adverse effect on the trading price of Class A common stock.
- We may need substantial additional capital in the future in order to fund our business.
- We have experienced rapid growth and expect our growth to continue, and if we fail to effectively manage our growth, then our business, results of operations, and financial condition could be adversely affected.
- Our limited operating history makes it difficult to evaluate our current business and future prospects.
- We currently own and may in the future own equity interests in other operating companies, including certain of our customers; consequently, we have exposure to the volatility and liquidity risks inherent in holding their equity and overall operational and financial performance of these businesses.
- We may pursue strategic acquisitions and investments that are dilutive to our stockholders and that could have an adverse impact on our business if they are unsuccessful.
- We must continue to secure and maintain sufficient and stable supplies of laboratory reagents, consumables, equipment, and laboratory services. We depend on a limited number of suppliers, some of which are single-source suppliers, and contract manufacturers for critical supplies, equipment, and services for research, development, and manufacturing of our products and processes. Our reliance on these third parties exposes us to risks relating to costs, contractual terms, supply, and logistics, and the loss of any one or more of these suppliers or contract manufacturers or their failure to supply us with the necessary supplies, equipment, or services on a timely basis, could cause delays in our research, development, or production capacity and adversely affect our business.
- We use biological, hazardous, flammable and/or regulated materials that require considerable training, expertise and expense for handling, storage and disposal and may result in claims against us.
- Third parties may use our engineered cells, materials, and organisms and accompanying production processes in ways that could damage our reputation.
- If our customers discontinue their development, production and manufacturing efforts using our engineered cells and/or biomanufacturing processes, our future financial position may be adversely impacted.
- Our revenue is concentrated in a limited number of customers, some of which are related parties, and our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer.
- In certain cases, our business partners may have discretion in determining when and whether to make announcements about the status of our collaborations, including about developments and timelines for advancing programs, and the price of our common stock may decline as a result of announcements of unexpected results or developments.

- Uncertainty regarding the ongoing demand and/or capacity (including capacity at third party clinical testing laboratories) of our COVID-19 individual and pooled sample tests could materially adversely affect our business.
- Uncertainty regarding the sales and delivery of our COVID-19 individual and pooled sample tests could materially adversely affect our business.
- We may be subject to tort liability if the COVID-19 tests we utilize in our testing programs provide inaccurate results.
- Rapidly changing technology and emerging competition in the synthetic biology industry could make the platform, programs, and products we and our customers are developing obsolete or non-competitive unless we continue to develop our platform and pursue new market opportunities.
- Ethical, legal and social concerns about GMOs and Genetically Modified Materials and their resulting products could limit or prevent the use of products or processes using our technologies, limit public acceptance of such products or processes and limit our revenues.
- If we are unable to obtain, maintain and defend patents protecting our intellectual property, our competitive position will be harmed.
- Under certain circumstances, we may share or lose rights to intellectual property developed under U.S. federally funded research grants and contracts.
- The use of digital genetic sequence information may be subject to the Nagoya Protocol, which could increase our costs and adversely affect our business.
- We rely on our customers, joint venturers, equity investees and other third parties to deliver timely and accurate information in order to accurately report our financial results in the time frame and manner required by law.
- Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.
- Failure to comply with federal, state, local and international laws and regulations could adversely affect our business and our financial condition.
- We may incur significant costs complying with environmental, health and safety laws and regulations, and failure to comply with these laws and regulations could expose us to significant liabilities.
- We may become subject to the comprehensive laws and rules governing billing and payment, noncompliance with which could result in non-payment or recoupment of overpayments for our services or other sanctions.
- We and our laboratory partners are subject to a variety of laboratory testing standards, compliance with which is an expensive and time-consuming process, and any failure to comply could result in substantial penalties and disruptions to our business.
- If we fail to comply with healthcare and other governmental regulations, we could face substantial penalties and our business, financial condition and results of operations could be adversely affected.
- We are engaged in certain research activities involving controlled substances, including cannabinoids and other chemical intermediates, the making, use, sale, importation, exportation, and distribution of which may be subject to significant regulation by the DEA and other regulatory agencies.
- Significant disruptions to our and our service providers' information technology systems or data security incidents could result in significant financial, legal, regulatory, business and reputational harm to us.
- Our business could be adversely affected by legal challenges to our telehealth partner's business model.

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PART I—FINANCIAL INFORMATION

Item 1. Financial Statements.

Ginkgo Bioworks Holdings, Inc.
Condensed Consolidated Balance Sheets
(unaudited)
(in thousands, except share and per share data)

	As of March 31, 2022	As of December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 1,492,971	$ 1,550,004
Accounts receivable, net	167,256	131,544
Accounts receivable - related parties	3,814	4,598
Inventory, net	8,697	3,362
Prepaid expenses and other current assets	33,094	33,537
Total current assets	1,705,832	1,723,045
Property and equipment, net	149,171	145,770
Investments	103,031	102,037
Equity method investments	8,207	13,194
Intangible assets, net	20,829	21,642
Goodwill	21,040	21,312
Other non-current assets	49,616	43,990
Total assets	$ 2,057,726	$ 2,070,990
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 35,257	$ 8,189
Deferred revenue (includes $8,023 and $12,502 from related parties)	35,232	33,240
Accrued expenses and other current liabilities	88,758	93,332
Total current liabilities	159,247	134,761
Non-current liabilities:		
Deferred rent, net of current portion	19,262	18,746
Deferred revenue, net of current portion (includes $143,037 and $148,319 from related parties)	170,176	155,991
Lease financing obligation	27,309	22,283
Warrant liabilities	50,803	135,838
Other non-current liabilities	16,881	35,992
Total liabilities	443,678	503,611
Commitments and contingencies (Note 7)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 200,000,000 shares authorized; none issued	—	—
Common stock, $0.0001 par value (Note 5)	162	161
Additional paid-in capital	4,471,418	3,804,844
Accumulated deficit	(2,888,430)	(2,297,925)
Accumulated other comprehensive loss	(2,355)	(1,715)
Total Ginkgo Bioworks Holdings, Inc. stockholders' equity	1,580,795	1,505,365
Non-controlling interest	33,253	62,014
Total stockholders' equity	1,614,048	1,567,379
Total liabilities and stockholders' equity	$ 2,057,726	$ 2,070,990

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

Ginkgo Bioworks Holdings, Inc.
Condensed Consolidated Statements of Operations and Comprehensive Loss
(unaudited)
(in thousands, except share and per share data)

	Three Months Ended March 31,	
	2022	2021
Foundry revenue (related party revenue of $13,528 and $12,660 for the three months ended March 31 2022 and 2021, respectively)	$ 21,488	$ 22,504
Biosecurity revenue:		
Product	13,947	5,775
Service	132,970	15,818
Total revenue	168,405	44,097
Costs and operating expenses:		
Cost of Biosecurity product revenue	8,095	9,935
Cost of Biosecurity service revenue	77,337	13,765
Research and development	322,720	59,585
General and administrative	434,768	17,927
Total operating expenses	842,920	101,212
Loss from operations	(674,515)	(57,115)
Other income (expense):		
Interest expense, net	(397)	(475)
Loss on equity method investments	(20,887)	(28,624)
Gain on investments	450	12,622
Change in fair value of warrant liabilities	85,035	—
Gain on deconsolidation of subsidiary	15,900	—
Other income (expense), net	1,637	(1,345)
Total other income (expense), net	81,738	(17,822)
Loss before income taxes	(592,777)	(74,937)
Income tax benefit	(184)	(159)
Net loss	(592,593)	(74,778)
Net loss attributable to non-controlling interest	(2,088)	(1,209)
Net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders	$ (590,505)	$ (73,569)
Net loss per share attributable to Ginkgo Bioworks Holdings, Inc. common stockholders, basic and diluted [1]	$ (0.37)	$ (0.06)
Weighted average common shares outstanding, basic and diluted [1]	1,607,499,887	1,290,282,994
Comprehensive loss:		
Net loss	$ (592,593)	$ (74,778)
Other comprehensive loss:		
Foreign currency translation adjustment	(640)	—
Total other comprehensive loss	(640)	—
Comprehensive loss	$ (593,233)	$ (74,778)

(1) Amounts for the three months ended March 31, 2021 have been retroactively restated for the reverse recapitalization as described in Note 1.

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

Ginkgo Bioworks Holdings, Inc.
Condensed Consolidated Statements of Stockholders' Equity
(unaudited)
(in thousands, except share data)

	Common Stock [1]						
	Shares	Amount	Additional Paid-In Capital [1]	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
Balance as of December 31, 2020	1,288,595,876	$ 129	$ 929,125	$ (467,878)	—	$ 8,676	$ 470,052
Issuance of common stock upon exercise or vesting of equity awards	2,817,317	—	27	—	—	—	27
Issuance of warrants to purchase Series D convertible preferred stock	—	—	150	—	—	—	150
Stock-based compensation expense	—	—	118	—	—	—	118
Net loss	—	—	—	(73,569)	—	(1,209)	(74,778)
Balance as of March 31, 2021	1,291,413,193	$ 129	$ 929,420	$ (541,447)	$ —	$ 7,467	$ 395,569
Balance as of December 31, 2021	1,611,392,152	$ 161	$ 3,804,844	$ (2,297,925)	$ (1,715)	$ 62,014	$ 1,567,379
Issuance of common stock upon exercise or vesting of equity awards	10,957,595	1	75	—	—	—	76
Tax withholdings related to net share settlement of equity awards	(295,621)	—	(981)	—	—	—	(981)
Issuance of common stock upon exercise of Public Warrants	30	—	—	—	—	—	—
Deconsolidation of subsidiary (Note 4)	—	—	—	—	—	(28,783)	(28,783)
Stock-based compensation expense	—	—	667,480	—	—	2,110	669,590
Foreign currency translation	—	—	—	—	(640)	—	(640)
Net loss	—	—	—	(590,505)	—	(2,088)	(592,593)
Balance as of March 31, 2022	1,622,054,156	$ 162	$ 4,471,418	$ (2,888,430)	$ (2,355)	$ 33,253	$ 1,614,048

(1) Balances presented related to the first quarter of 2021 were retroactively restated for the reverse recapitalization as described in Note 1.

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

Ginkgo Bioworks Holdings, Inc.
Condensed Consolidated Statements of Cash Flows
(unaudited) (in thousands)

	Three Months Ended March 31,	
	2022	2021
Cash flows from operating activities:		
Net loss	$ (592,593)	$ (74,778)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	9,488	5,629
Stock-based compensation	652,821	118
Loss on equity method investments	20,887	28,624
Gain on investments	(450)	(12,622)
Change in fair value of loans receivable	(584)	1,825
Change in fair value of warrant liabilities	(85,035)	—
Change in fair value of contingent consideration liability	1,513	—
Gain on deconsolidation of subsidiary (Note 4)	(15,900)	—
Other non-cash activity	104	—
Changes in operating assets and liabilities:		
Accounts receivable ($784 and ($1,846) from related parties)	(34,928)	(9,541)
Prepaid expenses and other current assets	700	1,633
Inventory	(5,335)	(681)
Other non-current assets	2,212	(678)
Accounts payable	26,250	516
Accrued expenses and other current liabilities	9,973	16,807
Deferred revenue, current and non-current (($9,702) and ($6,491) from related parties)	11,444	(5,512)
Deferred rent, non-current	516	688
Other non-current liabilities	(20,981)	(159)
Net cash used in operating activities	(19,898)	(48,131)
Cash flows from investing activities:		
Purchases of property and equipment	(3,580)	(21,935)
Prepayment for marketable equity securities	(3,691)	—
Deconsolidation of subsidiary - cash	(28,772)	—
Prepayment for business acquisition	—	(1,210)
Other	58	99
Net cash used in investing activities	(35,985)	(23,046)
Cash flows from financing activities:		
Proceeds from exercise of stock options	75	27
Taxes paid related to net share settlement of equity awards	(981)	—
Principal payments on capital leases and lease financing obligation	(286)	(285)
Payment of deferred offering costs	—	(175)
Net cash used in financing activities	(1,192)	(433)
Effect of foreign exchange rates on cash and cash equivalents	(8)	—
Net decrease in cash, cash equivalents and restricted cash	(57,083)	(71,610)
Cash and cash equivalents, beginning of period	1,550,004	380,801
Restricted cash, beginning of period	42,924	5,076
Cash, cash equivalents and restricted cash, beginning of period	1,592,928	385,877
Cash and cash equivalents, end of period	1,492,971	308,128
Restricted cash, end of period	42,874	6,139
Cash, cash equivalents and restricted cash, end of period	$ 1,535,845	$ 314,267
Supplemental disclosure of non-cash investing and financing activities:		
Purchases of equipment through capital leases	$ 770	$ 3,175
Purchases of property and equipment included in accounts payable and accrued expenses	$ 5,017	$ 15,324
Equity received in related parties	$ —	$ 24,595
Warrants received for Foundry services	$ 543	$ —
Lease financing obligation for build-to-suit lease	$ 5,134	$ —
Loans receivable issued for Foundry services	$ 4,189	$ —
Deferred offering costs in accounts payable and accrued expenses	$ —	$ 2,288

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

Ginkgo Bioworks Holdings, Inc.
Notes to Condensed Consolidated Financial Statements
(unaudited)

1. Basis of Presentation and Summary of Significant Accounting Policies

Basis of Presentation

The accompanying condensed consolidated financial statements have been prepared in conformity with the rules and regulations of the Securities and Exchange Commission and generally accepted accounting principles in the United States ("GAAP") for interim financial reporting. Accordingly, certain detailed footnote disclosures which would normally be included with complete financial statements have been omitted. In the opinion of management, all normal recurring adjustments necessary for a fair presentation have been made. These condensed consolidated financial statements should be read in conjunction with the Company's 2021 Annual Report on Form 10-K. Interim results are not necessarily indicative of results for a full year.

On September 16, 2021, Soaring Eagle Acquisition Corp. ("SRNG") consummated the merger transaction contemplated by the agreement and plan of merger, dated as of May 11, 2021, and amended on May 14, 2021 (the "Merger Agreement"), by and among SRNG, SEAC Merger Sub Inc., a Delaware corporation ("Merger Sub"), and Ginkgo Bioworks, Inc., a Delaware corporation ("Old Ginkgo"), whereby Merger Sub merged with and into Old Ginkgo, the separate corporate existence of Merger Sub ceased and Old Ginkgo survived the merger as a wholly owned subsidiary of SRNG (the "Business Combination"). In connection with the consummation of the Business Combination, SRNG changed its name to "Ginkgo Bioworks Holdings, Inc." and, among other transactions contemplated by the Merger Agreement, the existing equity holders of Old Ginkgo exchanged their equity interests of Old Ginkgo for equity interests of Ginkgo Bioworks Holdings, Inc.

The Business Combination was accounted for as a reverse recapitalization, in accordance with GAAP (the "Reverse Recapitalization"). Under this method of accounting, SRNG was treated as the "acquired" company for financial reporting purposes. Accordingly, for accounting purposes, the Reverse Recapitalization was treated as the equivalent of Old Ginkgo issuing stock for the net assets of SRNG, accompanied by a recapitalization. The net assets of SRNG are stated at historical cost, with no goodwill or other intangible assets recorded. The consolidated assets, liabilities and results of operations prior to the Reverse Recapitalization are those of Old Ginkgo. The shares and corresponding capital amounts and loss per share related to Old Ginkgo's outstanding convertible preferred stock and common stock prior to the Reverse Recapitalization have been retroactively restated to reflect the Exchange Ratio established in the Merger Agreement.

Principles of Consolidation

The accompanying condensed consolidated financial statements include the accounts of the Company, its wholly owned subsidiaries, majority owned subsidiaries and variable interest entities if the Company is the primary beneficiary. All intercompany accounts and transactions have been eliminated.

Reclassifications

Certain prior year amounts have been reclassified for consistency with the current year presentation. These reclassifications had no effect on the reported results of operations.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenues and expenses, and the disclosure of contingent liabilities in the condensed consolidated financial statements. Estimates used in the preparation of these condensed consolidated financial statements include, among others, the fair value of equity instruments and equity awards, revenue recognition, the fair value of loans receivable, the fair value of certain investments including equity method investments, the fair value of warrant liabilities, accrued expenses and income taxes. Actual results could differ materially from those estimates.

Significant Accounting Policies

There have been no new or material changes to the Company's significant accounting policies during the three months ended March 31, 2022 as compared to the significant accounting policies described in Note 2 to the Company's 2021 consolidated financial statements included in the 2021 Annual Report on Form 10-K.

Recently Issued Accounting Pronouncements

The Company is an emerging growth company as defined in the Jumpstart Our Business Startups Act of 2012, under which it may take advantage of an extended transition period for complying with new or revised accounting standards until such time as those standards apply to private companies. The Company has elected not to opt out of this extended transition period and, as a result, these

condensed consolidated financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842): Amendments to the FASB Accounting Standards Codification (“ASC 842”), which has been clarified and amended by various subsequent updates. ASC 842 requires lessees to record a right-of-use ("ROU") asset and a lease liability on the balance sheet for all leases with a lease term of more than 12 months. ASC 842 also requires additional disclosures about the amount, timing and uncertainty of cash flows arising from leases. The Company plans to adopt ASC 842 for the fiscal year ending December 31, 2022, and for interim periods within the fiscal year beginning on January 1, 2023. In connection with the adoption of ASC 842, the Company will apply the modified retrospective approach and recognize a cumulative-effect adjustment to the opening balance of accumulated deficit in the period of adoption. The Company has elected to apply the package of practical expedients that allows for not reassessing (i) whether any expired or existing contracts are or contain leases, (ii) the lease classification of any expired or existing leases, and (iii) the accounting for initial direct costs for any existing leases. The Company has also elected, by class of underlying asset, not to apply the recognition requirements of ASC 842 to short-term leases. While the Company continues to assess the various impacts of adoption, the most significant effects will primarily relate to (1) the recognition of an ROU asset and lease liability on the balance sheet for the Company’s existing operating leases; and (2) providing significant new disclosures about leasing activities. The Company does not anticipate that the adoption of ASC 842 will have a material impact on its results of operations and cash flows.

2. Fair Value Measurements

No transfers between levels have occurred during the periods presented. The following tables present information about the Company’s financial assets and liabilities measured at fair value on a recurring basis (in thousands):

		As of March 31, 2022			
	Classification	Total	Level 1	Level 2	Level 3
Assets:					
Money market funds	Cash and cash equivalents	$ 1,438,295	$ 1,438,295	$ —	$ —
Synlogic, Inc. common stock	Investments	15,218	15,218	—	—
Synlogic, Inc. warrants	Investments	6,115	—	6,115	—
Cronos Group Inc. common stock	Investments	10,959	5,691	5,268	—
Loans receivable	Prepaid expenses and other current assets	12,143	—	—	12,143
Total assets		$ 1,482,730	$ 1,459,204	$ 11,383	$ 12,143
Liabilities:					
Public Warrants	Warrant liabilities	$ 30,360	$ 30,360	$ —	$ —
Private Placement Warrants	Warrant liabilities	20,443	—	—	20,443
Contingent consideration	Other non-current liabilities	9,980	—	—	9,980
Total liabilities		$ 60,783	$ 30,360	$ —	$ 30,423

Ginkgo Bioworks Holdings, Inc.
Notes to Condensed Consolidated Financial Statements
(unaudited)

	Classification	As of December 31, 2021			
		Total	Level 1	Level 2	Level 3
Assets:					
Money market funds	Cash and cash equivalents	$ 1,482,063	$ 1,482,063	$ —	$ —
Synlogic, Inc. common stock	Investments	15,345	15,345	—	—
Synlogic, Inc. warrants	Investments	6,166	—	6,166	—
Cronos Group Inc. common stock	Investments	10,331	—	10,331	—
Loans receivable	Prepaid expenses and other current assets	11,559	—	—	11,559
Total assets		$ 1,525,464	$ 1,497,408	$ 16,497	$ 11,559
Liabilities:					
Public Warrants	Warrant liabilities	$ 77,280	$ 77,280	$ —	$ —
Private Placement Warrants	Warrant liabilities	58,558	—	—	58,558
Contingent consideration	Other non-current liabilities	8,467	—	—	8,467
Total liabilities		$ 144,305	$ 77,280	$ —	$ 67,025

The fair value of the warrants to purchase Synlogic common stock is calculated as the value of the underlying common stock, less the related unpaid exercise price and represents a Level 2 measurement within the fair value hierarchy.

As of December 31, 2021, the fair value of the Cronos Group Inc. common stock was calculated as the quoted price of the common stock adjusted by a discount for lack of marketability due to regulatory sales restrictions and classified as Level 2 within the fair value hierarchy. During the three months ended March 31, 2022, the Company removed the discount on 1,467,490 shares as the sales restrictions lapsed related to these shares, which are valued based on their quoted (unadjusted) price and classified as Level 1 within the fair value hierarchy as of March 31, 2022. The remaining 1,467,490 restricted shares continue to be subject to the regulatory sales restrictions and are classified as Level 2 as of March 31, 2022.

Loans Receivable

As of March 31, 2022 and December 31, 2021, loans receivable measured at fair value on a recurring basis consisted of a revolving promissory note with Glycosyn, LLC ("Glycosyn", and such promissory note, the "Glycosyn Promissory Note") and a series of convertible notes with Access Bio, Inc. ("Access Bio Convertible Notes"). The fair value of the Glycosyn Promissory Note and Access Bio Convertible Notes were determined based on significant inputs not observable in the market, which represent a Level 3 measurement within the fair value hierarchy. Significant changes in these unobservable inputs in isolation could have resulted in a significantly lower or higher fair value measurement.

The Company estimated the fair value of the Glycosyn Promissory Note using a probability-weighted discounted cash flow model under a dissolution scenario with partial recovery and no recovery as Glycosyn was in default as of December 31, 2021. The significant assumptions used in valuing the Glycosyn Promissory Note as of March 31, 2022 were scenario probabilities of 50%, a recovery rate on first lien debt of 63.3% and a discount rate of 15%. The significant assumptions used in valuing the Glycosyn Promissory Note as of December 31, 2021 were scenario probabilities of 50%, a recovery rate on first lien debt of 63% and a discount rate of 15%. As of March 31, 2022 and December 31, 2021, the Glycosyn Promissory Note had an unpaid principal balance of $5.4 million and a fair value of $1.8 million.

The Company estimated the fair value of the Access Bio Convertible Notes using a binomial lattice model. Key assumptions used as of March 31, 2022 included 87% equity volatility, 0.63 years to maturity, 1.2% risk-free rate, 32.6% risk-adjusted rate and 0% dividend yield. Key assumptions used as of December 31, 2021 included 85.5% equity volatility, 0.88 years to maturity, 0.3% risk-free rate, 30.9% risk-adjusted rate and 0% dividend yield. As of March 31, 2022 and December 31, 2021, the Access Bio Convertible Notes had an unpaid principal balance of $10.0 million. The Access Bio Convertible Notes had a fair value of $10.4 million as of March 31, 2022 and $9.8 million as of December 31, 2021.

The following table provides a reconciliation of loans receivable measured at fair value using Level 3 significant unobservable inputs (in thousands):

	2022	2021
Balance at January 1	$ 11,559	$ 15,566
Proceeds from loans receivable	—	(99)
Change in fair value	584	(1,825)
Balance at March 31	$ 12,143	$ 13,642

Warrant Liabilities

Upon the closing of the Business Combination, the Company assumed 34,499,925 publicly-traded warrants ("Public Warrants") and 17,325,000 private placement warrants (the "Private Placement Warrants") previously issued in connection with SRNG's initial public offering. The fair value of the Private Placement Warrants has been estimated using a Monte Carlo simulation model. The fair value of the Public Warrants has been measured based on the quoted price of such warrants on the New York Stock Exchange. The estimated fair value of the Private Placement Warrants is determined using Level 3 inputs. Inherent in a Monte Carlo simulation are assumptions related to expected stock-price volatility, expected life, risk-free interest rate and dividend yield. Material increases (or decreases) in any of those inputs may result in a significantly higher (or lower) fair value measurement. The Company estimates the volatility of its Private Placement Warrants based on implied volatility from the Company's Public Warrants and from historical volatility of select peer company's common stock that matches the expected remaining life of the warrants. The risk-free interest rate is based on the U.S. Treasury zero-coupon yield curve for a maturity similar to the expected remaining life of the warrants. The expected life of the warrants is assumed to be equivalent to their remaining contractual term. The dividend yield is based on the historical rate, which the Company anticipates remaining at zero.

The following table provides quantitative information regarding Level 3 inputs used in the recurring valuation of the Private Placement Warrants as of their measurement date:

	March 31, 2022	December 31, 2021
Exercise price	$ 11.50	$ 11.50
Stock price	$ 4.03	$ 8.31
Volatility	66.2%	58.7%
Term (in years)	4.46	4.71
Risk-free interest rate	2.39%	1.25%

The following table provides a reconciliation of the Private Placement Warrants measured at fair value using Level 3 significant unobservable inputs (in thousands):

	2022
Balance at January 1	$ 58,558
Change in fair value	(38,115)
Balance at March 31	$ 20,443

Contingent Consideration

In connection with the acquisition of Dutch DNA Biotech B.V. ("Dutch DNA") in July 2021, the Company recorded contingent consideration liabilities for the estimated fair value of earnout payments up to a maximum of $20.0 million payable to the seller upon the achievement of certain technical and commercial milestones by Dutch DNA pursuant to a Technical Development Agreement executed between the Company and Dutch DNA prior to the acquisition. The contingent consideration liabilities are measured at fair value and are based on significant inputs not observable in the marketplace, which represent a Level 3 measurement. Material increases (or decreases) in any of those inputs may result in a significantly higher (or lower) fair value measurement. The fair value of the earnouts was estimated using a combination of probability weighted present value and discounted cash flow models. The key valuation inputs used as of March 31, 2022 were management's estimate of the probability of achieving each milestone ranging from 10% to 90% and projections related to Dutch DNA's after-tax revenues for each of the calendar years through 2028. The key valuation inputs used as of December 31, 2021 were probabilities ranging from 10% to 80% and revenue projections through 2037. The earnout payments were discounted at rates ranging from 9.5% to 12% as of March 31, 2022 and from 9% to 11.3% as of December 31, 2021.

The following table provides a reconciliation of the contingent consideration measured at fair value using Level 3 significant unobservable inputs (in thousands):

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	2022
Balance at January 1	$ 8,467
Change in fair value	1,513
Balance at March 31	$ 9,980

3. Investments and Equity Method Investments

The Company partners with other investors to form new ventures, including Joyn Bio, LLC ("Joyn"), Motif FoodWorks, Inc. ("Motif"), Allonnia, LLC ("Allonnia"), Arcaea, LLC ("Arcaea") and Verb Biotics, LLC ("Verb"), subsequent to the deconsolidation discussed below in Note 4, (collectively "Platform Ventures"). The Company also partners with existing entities, including Genomatica, Inc. ("Genomatica") and Synlogic, Inc. ("Synlogic") (collectively, "Structured Partnerships"), with complementary assets for high potential synthetic biology applications. The Company holds equity interests in these Platform Ventures and Structured Partnerships. The Company's investments in Platform Ventures are accounted for under the equity method. The Company's investments in Synlogic, a publicly traded company, are carried at fair value. As of March 31, 2022 and December 31, 2021, the Company held 6,340,771 shares of Synlogic common stock and warrants to purchase an aggregate of 2,548,117 shares of Synlogic common stock. Prior to the third quarter of 2021, the Company's investment in Synlogic common stock was classified as an equity method investment based on the Company's ownership interest in Synlogic and accounted for under the fair value option. Due to a decrease in the level of ownership interest during the third quarter of 2021, the investment was reclassified from equity method investments to investments on the Condensed Consolidated Balance Sheets, and from loss on equity method investments to (loss) gain on investments on the Condensed Consolidated Statements of Operations and Comprehensive Loss for all periods presented. However, the Company continues to account for its investments in Synlogic at fair value.

The Company's non-marketable equity securities are investments in privately held entities without readily determinable fair values. The investment in Genomatica preferred stock and investments in other non-marketable equity securities issued by various other entities are initially recorded using the measurement alternative at cost and subsequently adjusted for any impairment and observable price changes in orderly transactions for the identical or a similar security of the same issuer. As of March 31, 2022 and December 31, 2021, no impairment or adjustment from observable price changes have been recognized related to investments accounted for under the measurement alternative.

Investments and equity method investments consisted of the following (in thousands):

	As of March 31, 2022	As of December 31, 2021
Investments:		
Genomatica, Inc. preferred stock	$ 55,000	$ 55,000
Synlogic, Inc. common stock	15,218	15,345
Synlogic, Inc. warrants	6,115	6,166
Cronos Group, Inc. common stock	10,959	10,331
Non-marketable equity securities	15,739	15,195
Total	$ 103,031	$ 102,037
Equity method investments [(1)]:		
Joyn Bio, LLC	$ 6,707	$ 11,694
Other	1,500	1,500
Total	$ 8,207	$ 13,194

(1) Equity method investments in Platform Ventures with a carrying value of zero as of March 31, 2022 and December 31, 2021 were excluded from the table.

(Losses) gains on investments and equity method investments consisted of the following (in thousands):

	Three Months Ended March 31,	
	2022	2021
(Loss) gain on investments:		
Synlogic, Inc. common stock	$ (127)	$ 9,004
Synlogic, Inc. warrants	(51)	3,618
Cronos Group, Inc. common stock	628	—
Total	$ 450	$ 12,622
Loss on equity method investments:		
Joyn Bio, LLC	$ (4,987)	$ (4,029)
Allonnia, LLC	—	(12,698)
Arcaea, LLC	—	(11,897)
Verb Biotics, LLC	(15,900)	—
Total	$ (20,887)	$ (28,624)

4. Variable Interest Entities

Consolidated Variable Interest Entities

As of December 31, 2021, the Company had consolidated three variable interest entities ("VIEs"): Cooksonia, LLC ("Cooksonia"), Verb and Ayana Bio, LLC ("Ayana"), as the Company holds variable interests in and was deemed to be the primary beneficiary of the VIEs. The other investors' equity interests in the consolidated VIEs are presented as non-controlling interests in the accompanying condensed consolidated financial statements.

The Company holds a 70% equity interest in Cooksonia, which was formed by the Company and certain other investors for the purposes of holding the Company's investment in Joyn. The Company concluded that it holds a variable interest in and is the primary beneficiary of Cooksonia as it controls the most significant activities of Cooksonia by controlling 100% of the board of directors of Cooksonia and holds a controlling financial interest in Cooksonia. As a result, the Company has consolidated the financial statements of Cooksonia in accordance with ASC 810, *Consolidation* ("ASC 810") into its financial statements and has recognized a non-controlling interest associated with the minority equity interest held by other investors of Cooksonia, which together hold the remaining 30% equity interest in Cooksonia.

As of December 31, 2021, the Company held an interest in 9,000,000 common units (representing 100% of common units at inception) in each of Ayana and Verb, two Platform Ventures formed in September 2021 by the Company and certain of its investors. The Company has agreed to provide Ayana and Verb with certain licenses to intellectual property for use in the development or production of products that the parties agree to research and develop under technical development plans ("TDPs"). Additionally, in September 2021, Ayana and Verb entered into a Series A Preferred Unit Purchase Agreement under which each entity sold 9,000,000 Series A preferred units to certain of the Company's investors for aggregate proceeds of approximately $30.0 million each. During 2021, the Company concluded that it held a variable interest in and was the primary beneficiary of Ayana and Verb as it controlled the most significant activities of these entities. These conclusions were reached because, as of the primary beneficiary assessment dates in 2021, for both Verb and Ayana: (i) the Company had substantive control of the board of directors; (ii) all capital contributions were made by related parties of Ginkgo; and (iii) Ginkgo or its related parties comprised the entirety of the Joint Steering Committee, the governing body which holds significant oversight with respect to the entities' research and development programs.

As of March 31, 2022, there has been no change in the consolidation status of Cooksonia and Ayana. During the three months ended March 31, 2022, Verb hired a new chief executive officer who was not an affiliate, related party or agent of Ginkgo. The chief executive officer was also appointed to Verb's Joint Steering Committee and board of directors. As a result, the Company no longer has substantive control of the board of directors or the Joint Steering Committee. Accordingly, the Company concluded that it was no longer the primary beneficiary of Verb as it no longer controlled the most significant activities of the entity. As a result of this change in the primary beneficiary determination, the Company deconsolidated the entity and recorded a gain on deconsolidation of $15.9 million in the Condensed Consolidated Statements of Operations and Comprehensive Loss equal to the fair value of the retained interest as of the deconsolidation date. The fair value of the retained interest was determined using the option pricing method. The option pricing method used a back-solve methodology to infer the total equity value based on the pricing of the Series A preferred unit financing given the proximity of the deconsolidation event to the financing.

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Subsequent to the deconsolidation, Verb and Ginkgo jointly agree on TDPs, through equal representation on the Joint Steering Committee, under which the Company will perform agreed-upon research and development services in return for consideration on a cost-plus basis for all services provided. Ginkgo has agreed to provide Verb with licenses to certain of its intellectual property for use in the development, production and commercialization of Verb's products under the TDPs. The Company's common unit investment in Verb is accounted for as an equity method investment, and accordingly, Verb is a related party of Ginkgo. The initial carrying value of the equity method investment in Verb was equal to the fair value of the retained interest of $15.9 million as of the deconsolidation date. The Series A preferred units issued by Verb receive a liquidation preference prior to common units. As such, the Company concluded that this represents a substantive profit-sharing arrangement, and the Company is recognizing earnings and losses on the equity method investment using the hypothetical liquidation at book value ("HLBV") method. The Company recorded a $15.9 million loss on its equity method investment in Verb in the first quarter of 2022 due to a basis difference associated with in-process research and development identified as part of the initial accounting for the equity method investment. As of March 31, 2022, the carrying value of the equity method investment in Verb has been reduced to zero. There is no commitment for the Company to provide further financial support to Verb, and therefore the carrying value of the equity method investment will not be reduced below zero.

The following table presents the carrying amounts and classification of the VIEs' assets and liabilities included in the Condensed Consolidated Balance Sheets (in thousands):

	As of March 31, 2022	As of December 31, 2021
Cash and cash equivalents	$ 28,557	$ 58,025
Prepaid expenses and other current assets	247	737
Equity method investments	6,707	11,694
Property and equipment, net	24	—
Total assets	$ 35,535	$ 70,456
Accounts payable	$ 478	$ 188
Accrued expenses and other current liabilities	311	440
Total liabilities	$ 789	$ 628

Unconsolidated Variable Interest Entities

With respect to the Company's investments in Motif, Allonnia, Genomatica, Arcaea and Verb subsequent to the deconsolidation (collectively "Unconsolidated VIEs"), the Company has concluded these entities represent VIEs. However, although the Company holds board representation and is involved in the ongoing development activities of the entities via its participation on joint steering committees, the Company has concluded that it is not the primary beneficiary of these entities. This conclusion is supported by the fact that: (i) it does not control the board of directors of any of the Unconsolidated VIEs, and no voting or consent agreements exist between the Company and other members of each respective board of directors or other investors, (ii) the holders of preferred security interests in the Unconsolidated VIEs hold certain rights that require their consent prior to the taking of certain actions, which include certain significant operating and financing decisions, and (iii) the Company's representation on the joint steering committee of each respective entity does not give it control over the development activities of any of the Unconsolidated VIEs, as all votes must pass by consensus and there are no agreements in place that would require any of the entities to vote in alignment with the Company. As the Company's involvement in the Unconsolidated VIEs does not give it the power to control the decisions with respect to their development or other activities, which are their most significant activities, the Company has concluded that it is not the primary beneficiary of the Unconsolidated VIEs.

With respect to Cooksonia's investment in Joyn, as Cooksonia does not control Joyn's board of directors, it does not have the power to control the decisions related to the development activities of Joyn, which are its most significant activities. Accordingly, the Company has concluded that Cooksonia is not the primary beneficiary of Joyn.

Additionally, the Company holds equity interests in certain privately-held entities that are not consolidated as the Company is not the primary beneficiary. As of March 31, 2022 and December 31, 2021, the maximum risk of loss related to the Company's unconsolidated VIEs was limited to the carrying value of its investment in such entities.

Refer to Notes 3 and 11 for additional details on the Company's investments and equity method investments.

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5. Supplemental Balance Sheet Information

Cash, Cash Equivalents and Restricted Cash

The reconciliation of cash, cash equivalents and restricted cash reported within the Condensed Consolidated Balance Sheets to the totals shown within the Condensed Consolidated Statements of Cash Flows is as follows (in thousands):

	As of March 31,	
	2022	2021
Cash and cash equivalents	$ 1,492,971	$ 308,128
Restricted cash included in prepaid expenses and other current assets [1]	2,197	—
Restricted cash included in other non-current assets [1]	40,677	6,139
Total cash, cash equivalents and restricted cash	$ 1,535,845	$ 314,267

(1) Includes cash balances collateralizing letters of credit associated with the Company's facility leases and a customer prepayment requiring segregation and restrictions in its use in accordance with the customer agreement.

Inventory, net

Inventory, net consisted of the following (in thousands):

	As of March 31,	As of December 31,
	2022	2021
Finished goods	$ 7,981	$ 3,264
Raw materials	799	64
Work in process	—	50
Less: inventory reserve	(83)	(16)
Inventory, net	$ 8,697	$ 3,362

Property and Equipment, net

Property and equipment, net consisted of the following (in thousands):

	As of March 31,	As of December 31,
	2022	2021
Facilities	$ 12,762	$ 12,762
Furniture and fixtures	4,657	4,617
Lab equipment	116,874	113,963
Computer equipment and software	11,685	10,129
Leasehold improvements	55,755	55,033
Construction in progress	17,181	10,278
Vehicles	39	40
Total property and equipment	218,953	206,822
Less: Accumulated depreciation	(69,782)	(61,052)
Property and equipment, net	$ 149,171	$ 145,770

Capitalization

The following table presents the Company's authorized, issued, and outstanding common stock as of the dates indicated:

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	Authorized	Issued	Outstanding
Common stock as of March 31, 2022:			
Class A	10,500,000,000	1,085,164,390	990,281,200
Class B	4,500,000,000	393,325,079	343,772,956
Class C	800,000,000	288,000,000	288,000,000
	15,800,000,000	1,766,489,469	1,622,054,156
Common stock as of December 31, 2021:			
Class A	10,500,000,000	1,326,146,808	1,273,976,963
Class B	4,500,000,000	364,844,007	337,415,189
Class C	800,000,000	—	—
	15,800,000,000	1,690,990,815	1,611,392,152

During the three months ended March 31, 2022, the Company issued 288,000,000 shares of Class C common stock to a stockholder in exchange for the same number of shares of Class A common stock pursuant to the stockholder exchange agreement.

Refer to Note 8, Stock-Based Compensation, for shares of common stock issued in relation to the Company's equity incentive plans.

6. Goodwill and Intangible Assets, net

All goodwill is allocated to the Foundry reporting unit and segment identified in Note 10. Changes in the carrying amount of goodwill consisted of the following (in thousands):

Balance as of December 31, 2021	$	21,312
Impact of foreign currency translation		(272)
Balance as of March 31, 2022	$	21,040

Intangible assets, net consisted of the following (in thousands):

	Weighted Average Amortization Period	Gross Carrying Value	Accumulated Amortization	Net [1]
Balances as of March 31, 2022				
Acquired technology	13.1	$ 24,670	$ (3,841)	$ 20,829
Balances as of December 31, 2021				
Acquired technology	13.3	$ 25,038	$ (3,396)	$ 21,642

(1) Includes a decrease of $0.4 million in the net intangible assets balance in the three months ended March 31, 2022 due to foreign currency translation.

Amortization expense was $0.4 million and $0.1 million for the three months ended March 31, 2022 and 2021, respectively. Future amortization expense will be $1.4 million for the remainder of 2022 and $1.8 million per year thereafter over the remaining estimated useful life of the intangible assets.

7. Commitments and Contingencies

Purchase Obligations

On March 31, 2022, the Company entered into a four-year supply agreement with Twist Bioscience Corporation for the purchase of diverse products including synthetic DNA. The agreement is effective as of April 1, 2022 and obligates the Company to spend a minimum of $58.0 million over the four-year term with the following minimum annual commitments (each annual year is defined as April 1 to March 31): year 1 $10.0 million; year 2 $13.0 million; year 3 $16.0 million; and year 4 $19.0 million.

As of March 31, 2022, the Company had approximately $84.0 million remaining in minimum purchase commitments under its noncancelable collaboration agreement with Berkeley Lights, Inc. to be met over the next several years through 2026.

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Legal Proceedings

The Company is not currently party to any material legal proceedings. As of each reporting date, the Company evaluates whether or not a potential loss amount or range of loss amounts is reasonably estimable and probable of being incurred and whether such amounts meet the requirements to be accrued or disclosed pursuant to ASC 450, *Contingencies*. The Company expenses costs related to such legal proceedings as incurred.

8. Stock-Based Compensation

The following table summarizes stock-based compensation included in the Company's Condensed Consolidated Statements of Operations and Comprehensive Loss for the periods presented (in thousands):

	Three Months Ended March 31,	
	2022	2021
Research and development	$ 261,008	$ 18
General and administrative	391,813	100
Total	$ 652,821	$ 118

The Company currently grants stock-based incentive awards pursuant to the 2021 Incentive Award Plan (the "2021 Plan"). As of March 31, 2022, there were 217,598,789 shares available for future issuance under the 2021 Plan.

Stock Options

A summary of stock option activity for the three months ended March 31, 2022 is presented below:

	Number of Shares	Weighted Average Exercise Price per Share	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value (1)
			(in years)	(in thousands)
Outstanding as of December 31, 2021	22,454,663	$ 0.05		
Exercised	(3,822,794)	$ 0.02		
Outstanding as of March 31, 2022	18,631,869	$ 0.06	2.07	$ 74,478
Exercisable as of March 31, 2022	18,562,438	$ 0.02	2.04	$ 74,478

(1) The aggregate intrinsic value is calculated as the difference between the Company's closing stock price on the last trading day of the quarter and the exercise prices, multiplied by the number of in-the-money stock options.

The aggregate intrinsic value of stock options exercised during the three months ended March 31, 2022 and 2021 was $15.3 million and $11.4 million, respectively.

As of March 31, 2022, there was $0.4 million of unrecognized compensation expense related to stock options to be recognized over a weighted-average period of 2.3 years.

Restricted Stock and Restricted Stock Units

In addition to a service-based vesting condition, the restricted stock units ("RSUs") granted under the 2014 Stock Incentive Plan (the "2014 Plan") were subject to a performance-based vesting condition that was met through a liquidity event in the form of either a change of control or an initial public offering ("the performance condition"). Prior to the Business Combination, no stock-based compensation expense had been recognized related to RSUs granted under the 2014 Plan as the performance condition was not probable of being met and the Business Combination did not meet the definition of a liquidity event as defined in the 2014 Plan. As a result of the Business Combination, in the fourth quarter of 2021, the board of directors modified the vesting terms of RSUs to allow all RSUs granted under the 2014 Plan to vest in full with respect to the performance condition on or before March 15, 2022 (the original service-based vesting condition is still applicable). As a result of these modifications, the performance condition for all RSUs granted under the 2014 Plan became probable of being met in the fourth quarter of 2021 and the awards were remeasured using the price of $13.59 per share as of the modification date. Subsequent to the modification, compensation expense for RSUs is recognized using an accelerated attribution method over the requisite service period for each employee award. The Company recognized $581.8 million of compensation expense related to the modified RSUs in the three months ended March 31, 2022.

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During the three months ended March 31, 2022, the Company cash settled approximately 3.2 million RSUs granted to non-employee directors for a total cash payment of $9.8 million.

A summary of the RSU and restricted stock award ("RSA") activity for the three months ended March 31, 2022 is presented below:

	Restricted Stock Units		Restricted Stock Awards	
	Number of Shares	Weighted Average Grant Date Fair Value (1)	Number of Shares	Weighted Average Grant Date Fair Value
Nonvested as of December 31, 2021	168,321,952	$ 13.58	182,622	$ 1.99
Granted	52,039,851	$ 4.05		
Vested	(7,468,371)	$ 13.59	(44,632)	$ 1.99
Forfeited	(1,352,407)	$ 9.16		
Nonvested as of March 31, 2022	211,541,025	$ 11.26	137,990	$ 1.99

(1) The weighted average grant date fair value of awards granted prior to the modification date reflect the modification-date fair value and not the original grant date fair value.

The weighted average grant date fair value of RSUs granted during the three months ended March 31, 2022 and 2021 was $4.05 and $5.02, respectively. The weighted average grant date fair value of RSUs granted during the three months ended March 31, 2021 is no longer relevant for expense recognition due to the modification in the fourth quarter of 2021. No RSAs were granted during the three months ended March 31, 2022 and 2021.

The aggregate fair value of the RSUs that vested during the three months ended March 31, 2022 was $101.5 million. No RSUs vested during the three months ended March 31, 2021 as the performance condition was not probable of being met. The aggregate fair value of the RSAs that vested during the three months ended March 31, 2022 and 2021 was $0.1 million.

As of March 31, 2022, there was $1,534.4 million of unrecognized compensation expense related to RSUs to be recognized over a weighted-average period of 1.9 years and $0.3 million of unrecognized compensation expense related to RSAs to be recognized over a weighted-average period of 0.8 years.

Earnouts

In connection with the Business Combination, holders of Old Ginkgo rollover equity awards (i.e., RSUs, RSAs and options) granted under the Company's stock incentive plans (together the "Rollover Equity Awards") received earnout shares, which are divided into four equal tranches subject to forfeiture to the extent that the vesting conditions described below are not satisfied on or before the fifth anniversary of the closing of the Business Combination (the "Earnout Period"). The earnout shares in respect of the Rollover Equity Awards are subject to the same terms and conditions as the underlying Rollover Equity Awards (including with respect to vesting and termination-related provisions). Additionally, the earnout shares in respect of the Rollover Equity Awards are subject to a market condition that will be met when the trading price of the Company's common stock is greater than or equal to $12.50, $15.00, $17.50 and $20.00 for any 20 trading days within any period of 30 consecutive trading days during the Earnout Period (collectively, the "Earnout Targets"). The first Earnout Target of $12.50 per share was met on November 15, 2021.

The earnout shares related to Old Ginkgo RSUs ("Earnout RSUs") were subject to the same performance condition as the underlying RSUs. As a result of the modification of the RSUs described above, the performance condition became probable of being met in the fourth quarter of 2021 and compensation expense for Earnout RSUs began to be recognized in the same manner as the modified RSUs based on the modification-date fair value of the Earnouts RSUs. The Company recognized $68.3 million of compensation expense related to the modified Earnout RSUs in the three months ended March 31, 2022 .

A summary of activity during the three months ended March 31, 2022 for the Earnout RSUs and the earnout shares underlying Old Ginkgo RSAs ("Earnout RSAs") is presented below:

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	Number of Shares	Weighted Average Grant Date Fair Value
Nonvested as of December 31, 2021	27,863,125	$ 12.87
Vested	(224,585)	$ 13.33
Forfeited	(76,621)	$ 12.92
Nonvested as of March 31, 2022	27,561,919	$ 12.87

The aggregate fair value of the Earnout RSUs and Earnout RSAs that vested during the three months ended March 31, 2022 was $3.0 million.

As of March 31, 2022, there was $151.0 million of unrecognized compensation expense related to earnout shares to be recognized over a weighted-average period of 1.4 years.

9. Revenue Recognition

Disaggregation of Revenue

The following table sets forth the percentage of Foundry revenues by industry based on total Foundry revenue:

	Three Months Ended March 31,	
	2022	2021
Industrial and environment	33%	25%
Consumer and technology	31%	15%
Pharma and Biotech	17%	12%
Food and nutrition	9%	27%
Agriculture	5%	11%
Government and Defense	5%	10%
Total Foundry revenue	100%	100%

The Company's revenue is derived from customers located primarily in the United States. For the three months ended March 31, 2022 and 2021, the Company's revenue from customers within the United States comprised 98% and 91%, respectively, of total revenue.

Contract Balances

The Company recognizes a contract asset when the Company transfers goods or services to a customer before the customer pays consideration or before payment is due, excluding any amounts presented as accounts receivable. The Company had no contract asset balances as of March 31, 2022 and December 31, 2021.

Contract liabilities, or deferred revenue, primarily consist of payments received in advance of performance under the contract or when the Company has an unconditional right to consideration under the terms of the contract before it transfers goods or services to the customer. The Company's collaborative arrangements with its investees and related parties typically include upfront payments consisting of cash or non-cash consideration for future research and development services and non-cash consideration in the form of equity securities for licenses that will be transferred in the future. The Company records the upfront cash payments and fair value of the equity securities as deferred revenue.

The Company also invoices customers based on contractual billing schedules, which results in the recording of deferred revenue to the extent payment is received prior to the Company's performance of the related services. Contract liabilities are recognized as revenue as (or when) the Company performs under the contract.

During the three months ended March 31, 2022, the Company recognized $13.1 million of revenue that was included in the contract liabilities balance of $189.2 million as of December 31, 2021. During the three months ended March 31, 2021, the Company recognized $11.0 million of revenue that was included in the contract liabilities balance of $128.5 million as of December 31, 2020.

Performance Obligations

The aggregate amount of the transaction price that was allocated to performance obligations that have not yet been satisfied or are partially satisfied as of March 31, 2022 and December 31, 2021 was $44.0 million and $21.1 million, respectively. The Company has elected the practical expedient not to provide the remaining performance obligation disclosures related to contracts for which the Company recognizes revenue on a cost-plus basis in the amount to which it has the right to invoice and for contracts with a term of one year or less. As of March 31, 2022, of the performance obligations not yet satisfied or partially satisfied, nearly all is expected to be recognized as revenue during the years 2022 to 2026.

10. Segment Information

Prior to 2022, the Company operated as a single reportable segment. In the first quarter of 2022, the Company reorganized its operations into two operating and reportable segments: Foundry and Biosecurity. The reorganization reflects changes made to the Company's internal management structure and how the Company's chief operating decision makers (“CODMs”) evaluate operating results and make decisions on how to allocate resources. All prior-period comparative segment information was recast to reflect the current reportable segments in accordance with ASC 280, *Segment Reporting*. The Company's reportable segments are described as follows:

- Foundry consists of research and development services performed under collaboration and license agreements relating to the Company’s cell programming platform. The Company’s cell programming platform includes two core assets: the Foundry, highly efficient biology lab facilities, enabled by investment in proprietary workflows, custom software, robotic automation, and data science and analytics, which is paired with the Company’s Codebase, a collection of biological “parts” and a database of biological data used to program cells. The Foundry segment includes costs incurred for the development, operation, expansion and enhancement of the Foundry and Codebase. Foundry revenue is derived from Foundry usage fees and downstream value share in the form of milestone payments, royalties or equity interests.
- Biosecurity consists of COVID-19 testing products and services primarily provided to public health authorities. Biosecurity revenue is derived from sales of test kits and testing and reporting services fees.

The reportable segments are the segments of the Company for which discrete financial information is available and for which segment results are regularly reviewed by the Company's CODMs, comprised of the Chief Executive Officer and the Chief Operating Officer, for purposes of allocating resources and assessing financial performance. The Company’s CODMs evaluate the financial performance of the Company’s segments based upon segment revenues and operating income. The Company’s measure of segment operating income for management reporting purposes excludes the impact of stock-based compensation expense, depreciation and amortization and changes in fair value of certain contingent liabilities. The Company’s CODMs do not evaluate operating segments using asset information. The accounting policies used in the preparation of reportable segments financial information are the same as those used in the preparation of the Company’s consolidated financial statements.

The following table presents summary results of the Company’s reportable segments for the periods indicated (in thousands):

Ginkgo Bioworks Holdings, Inc.
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	Three Months Ended March 31,	
	2022	2021
Revenue:		
Foundry	$ 21,488	$ 22,504
Biosecurity	146,917	21,593
Total revenue	168,405	44,097
Segment cost of revenue:		
Biosecurity	85,432	23,700
Segment research and development expense:		
Foundry	47,289	30,894
Biosecurity	517	23,403
Total segment research and development expense	47,806	54,297
Segment general and administrative expense:		
Foundry	26,693	13,155
Biosecurity	13,235	4,535
Total segment general and administrative expense	39,928	17,690
Segment operating income (loss):		
Foundry	(52,494)	(21,545)
Biosecurity	47,733	(30,045)
Total segment operating income (loss)	(4,761)	(51,590)
Operating expenses not allocated to segments:		
Stock-based compensation [(1)]	659,035	118
Depreciation and amortization	9,206	5,407
Change in fair value of contingent consideration liability	1,513	—
Loss from operations	$ (674,515)	$ (57,115)

(1) Includes $6.2 million in employer payroll taxes.

11. Significant Collaboration Transactions

Arcaea LLC (FKA Kalo Ingredients, LLC)

Summary of Arrangement

Arcaea was formed in March 2021 to focus on the application of synthetic biology in the personal care products industry. In March 2021, the Company entered into (i) an Intellectual Property Contribution Agreement ("Arcaea IP Agreement") that granted Arcaea a license to certain of the Company's intellectual property, (ii) a Technical Development Agreement ("Arcaea TDA") that establishes the terms under which the Company will provide technical research and development services, and (iii) a Common Unit Issuance Agreement ("Arcaea CUIA") which compensates the Company for its intellectual property contribution. Contemporaneous with these transactions, Arcaea entered into a Series A Preferred Unit Purchase Agreement under which it sold 1,755,000 Series A preferred units to certain of the Company's investors, for aggregate proceeds of approximately $19.5 million. The Series A Preferred Unit Purchase Agreement provided for the sale and issuance of up to an additional 7,245,000 Series A preferred units subsequent to the initial closing. In subsequent closings during 2021, Arcaea issued an additional 5,139,900 Series A preferred units to existing and third-party investors for aggregate proceeds of approximately $57.1 million and closed its Series A preferred unit financing. As a result, the Company received an additional 5,229,900 common units in Arcaea for total consideration of $35.5 million.

Under the Arcaea IP Agreement, the Company licensed certain intellectual property to Arcaea for use in the development or the production of Arcaea's products that the parties will subsequently agree to research and develop under technical development plans ("TDP"). The license rights provide Arcaea with the ability to commercialize the specified products from the corresponding TDP under the Arcaea TDA. In return for the license to the intellectual property, Arcaea has agreed to issue the Company up to 9,000,000 common units in accordance with certain terms and conditions set forth within the agreements. The Company received 1,755,000 common units upon execution of the Arcaea CUIA and an additional 5,229,900 common units upon closing of the Series A preferred unit financing in 2021 (as discussed above). No additional common units are expected to be issued to the Company.

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Under the Arcaea TDA, the parties jointly agree on TDPs, through equal representation on a joint steering committee, under which the Company will perform agreed-upon research and development services in return for consideration on a cost-plus basis for all services provided.

Accounting Analysis

The common unit investment in Arcaea is considered an equity method investment as a result of the Company's ability to exercise significant influence over Arcaea's financial and operating policies through its ownership of common units. The initial carrying value of the equity method investment in Arcaea is the fair value of the common units of $11.9 million received in exchange for the Arcaea IP Agreement which, as discussed below, was accounted for as deferred revenue at inception. The fair value of Arcaea's common units was determined at inception of the agreements using the option pricing method. The option pricing method used a back-solve methodology to infer the total equity value based on the pricing of the Series A preferred unit financing, which was contemporaneous with the Arcaea IP Agreement. Further, the Company determined the rights to up to an additional 7,245,000 common units did not meet the definition of a freestanding financial instrument and are not representative of a derivative. The right to the additional common units is considered variable consideration that is fully constrained at inception and until the contingencies related to the issuance of the additional shares are resolved.

The Series A preferred units issued by Arcaea receive a liquidation preference prior to common units. As such, the Company concluded that this represents a substantive profit-sharing arrangement, and the Company is recognizing earnings and losses on the equity method investment using the HLBV method. The Company recorded a $11.9 million loss on its equity method investment in Arcaea during the first quarter of 2021. The loss allocated to the Company primarily relates to Arcaea's accounting for the non-cash consideration related to the Arcaea IP Agreement as in-process research and development, which resulted in the full value of the Company's intellectual property contribution being expensed in the first quarter of 2021, at which time the carrying value of the equity method investment in Arcaea had been reduced to zero. There is no commitment for the Company to provide further financial support to Arcaea, and therefore the carrying value of the equity method investment will not be reduced below zero.

The relationship with Arcaea is a vendor-customer relationship and is within the scope of ASC 606, as the provision of services and corresponding license rights are considered a part of the Company's ordinary activities. The common units issued to the Company represent non-cash consideration. While the Arcaea TDA has been executed by the parties and provides the payment terms for future services, the Arcaea TDA does not provide for any transfer of goods or services between the parties. However, the Company will provide licenses and services upon execution of the contemplated TDPs. Accordingly, the Company concluded that the Arcaea TDA, in combination with the Arcaea CUIA, met the definition of a contract under ASC 606. Each TDP executed under the Arcaea TDA will be accounted for in accordance with ASC 606.

The Company's performance obligations under the contract consist of ten material rights to future technical research and development services and commercial licenses under individual TDPs that the Company expects to execute under the Arcaea TDA. The material rights represent an advance payment for the license rights, which will be granted upon the execution of future TDPs. As there is no additional payment for these license rights when future TDPs are executed, the Company has determined that there is a material right associated with each of the contemplated additional TDPs under the Arcaea TDA. The Company has allocated approximately $1.2 million of the upfront non-cash consideration to each of the ten material rights based on the estimated standalone selling price of the performance obligations. During 2021, the additional non-cash consideration received of $35.5 million, which is representative of previously constrained variable consideration, was allocated to each of the ten performance obligations under the arrangement with Arcaea of $3.6 million each consistent with the initial relative selling price allocation. Unexercised material rights are recorded as non-current deferred revenue until such time as the parties execute a TDP conveying a commercial license.

Upon the execution of a TDP underlying a material right, the Company is obligated to provide technical research and development services under the TDP and a license to applicable patents and other intellectual property designed and developed under the TDP. The technical research and development services and license provided under a TDP are highly interdependent and interrelated with one another. Without the Company's knowledge, expertise, and platform, there would not be a licensable strain or other commercializable product to transfer to Arcaea. Further, Arcaea has rights to intellectual property created as part of each TDP, irrespective of the result of the development. Therefore, each executed TDP underlying a material right consists of one combined performance obligation for the technical research and development services and license to be provided by the Company.

For each TDP underlying a material right, the transaction price consists of variable consideration for the most likely amount of estimated consideration to be received under the cost-plus arrangement and non-cash consideration allocated to the material rights. As the services performed by the Company under a TDP create or enhance an asset that Arcaea controls as the asset is created or enhanced, the Company satisfies the performance obligation and recognizes revenue over time. The Company uses an input method

that compares total costs incurred relative to total estimated cost to complete to estimate progress under the contract. Any revisions to the estimated total budgeted costs to complete, and the resulting impact to revenue recognition, are reflected in the period of the change through a cumulative catch-up adjustment.

As of March 31, 2022 and December 31, 2021, the Company had a deferred revenue balance of $44.8 million and $47.4 million, respectively, with Arcaea. During the three months ended March 31, 2022, the Company recognized revenue of $3.9 million from services provided to Arcaea. No revenue was recognized during the three months ended March 31, 2021.

Allonnia, LLC

Summary of Arrangement

In December 2019, the Company entered into (i) an Intellectual Property Contribution Agreement ("Allonnia IP Agreement") that granted Allonnia a license to certain of the Company's intellectual property, (ii) a Technical Development Agreement ("Allonnia TDA") that establishes the terms under which the Company is providing technical development services, and (iii) a Common Unit Issuance Agreement, which provides for the issuance of common units of Allonnia to the Company in exchange for the license rights granted under the Allonnia IP Agreement. Contemporaneous with these agreements, Allonnia entered into a Series A Preferred Unit Purchase Agreement under which Allonnia sold 2,970,000 Series A preferred units to certain of the Company's investors, as well as a third-party investor, for aggregate proceeds of approximately $33.0 million. Allonnia also agreed to issue an additional 630,000 Series A preferred units to a strategic partner as compensation for the delivery of future services to Allonnia. The Series A Preferred Unit Purchase Agreement also provided for the sale and issuance of up to an additional 5,400,000 Series A preferred units subsequent to the initial closing. In 2020, Allonnia issued an additional 1,844,911 Series A preferred units, 1,664,911 of which were sold for aggregate proceeds of $18.5 million and 180,000 of which were issued in exchange for the rights to certain intellectual property which will vest based on the achievement of milestones associated with the development of the intellectual property received. In 2021, Allonnia issued an additional 22,500 Series A Preferred Units for aggregate proceeds of $0.2 million and closed their Series A Preferred Unit financing.

Under the Allonnia IP Agreement, the Company licensed intellectual property to Allonnia for use in the development or the production of its products that the parties will subsequently agree to develop under TDPs. The license rights provide Allonnia with the ability to commercialize the specified products from the corresponding strain or enzyme, which can only be developed by the Company under the Allonnia TDA. The Company received 3,600,000 common units as consideration for the license upon execution of the Allonnia IP Agreement and an additional 1,867,411 common units in 2021 in connection with the closing of the Series A preferred unit financing.

Under the Allonnia TDA, the parties jointly agree, through equal representation on a joint steering committee, on TDPs for specific strains and enzymes, in which the Company will perform agreed upon development services in return for consideration on a cost-plus basis for all services provided.

Accounting Analysis

The common unit investment in Allonnia is considered an equity method investment as a result of the Company's ability to exercise significant influence over Allonnia's financial and operating policies through its ownership of common units. The initial carrying value of the equity method investment in Allonnia is the fair value of the common units of $24.5 million received in exchange for the Allonnia IP Agreement which, as discussed below, was accounted for as deferred revenue at inception. The fair value of Allonnia's common units was determined at inception of the agreements using the option pricing method. The option pricing method used a back-solve methodology to infer the total equity value based on the pricing of the Series A Preferred Unit financing, which was contemporaneous with the Allonnia IP Agreement. Further, the Company determined the rights to up to an additional 5,400,000 common units did not meet the definition of a freestanding financial instrument and are not representative of a derivative. The right to the additional common units is considered variable consideration that is fully constrained at inception and until the contingencies related to the issuance of the additional shares are resolved. This contingency was resolved in the first quarter of 2021 when the Company received an additional 1,867,411 common units in connection with the closing of the Series A preferred unit financing.

The Series A Preferred Units issued by Allonnia receive a liquidation preference prior to common units. As such, the Company concluded that this represents a substantive profit-sharing arrangement and the Company is recognizing earnings and losses on the equity method investment using the HLBV method. The Company recorded a loss on equity method investment of $24.5 million in 2019 and $12.7 million in the first quarter of 2021 as a result of the application of the HLBV method. The loss allocated to the Company primarily relates to Allonnia's accounting for the non-cash consideration related to the Allonnia IP Agreement as in-process

research and development, which resulted in the full value of the Company's intellectual property contribution being expensed in the year that the shares were issued. As of March 31, 2022 and December 31, 2021, the carrying value of the equity method investment in Allonnia is zero. There is no commitment for the Company to provide further financial support to Allonnia and therefore the carrying value of the equity method investment will not be reduced below zero.

The relationship with Allonnia is a vendor-customer relationship and is within the scope of ASC 606 as the provision of services and corresponding license rights are considered a part of the Company's ordinary activities and the common units represent non-cash consideration. While the Allonnia TDA has been executed by the parties and provides the payment terms for future services, the Allonnia TDA does not provide for any transfer of goods or services between the parties. However, the Company will provide licenses and services upon execution of the contemplated TDPs. Accordingly, the Company concluded that the Allonnia TDA met the definition of a contract under ASC 606 and each TDP executed under the Allonnia TDA will be accounted for in accordance with ASC 606.

The Company's performance obligations under the contract consist of ten material rights related to the estimated number of TDPs the parties expect to execute under the Allonnia TDA. The material rights represent an advance payment for the license rights which will be granted upon the execution of each TDP. As there is no additional payment for these license rights upon execution of a TDP, the Company has determined that there is a material right associated with each of the contemplated future TDPs. The Company has allocated $2.5 million of the upfront non-cash consideration to each of the ten performance obligations under the contract based on the estimated standalone selling price of the performance obligations. Unexercised material rights are recorded as non-current deferred revenue until such time as the parties execute a TDP.

Upon the execution of each TDP, the Company is obligated to provide development services under the TDP and a license to applicable patents and other intellectual property to the ingredient developed under the plan. The license and research and development services under a TDP are highly interdependent and interrelated with one another. Without the Company's knowledge, expertise, and platform, there would not be a licensable strain or other commercializable product to transfer to Allonnia. Further, Allonnia has rights to all development intellectual property created as part of each TDP, irrespective of the result of the development. Therefore, each executed TDP consists of one combined performance obligation for the license and research and development services to be performed by the Company.

For each TDP, the transaction price consists of variable consideration for the most likely amount of estimated consideration to be received under the cost-plus arrangement and the $2.5 million allocation of the fixed non-cash consideration. As the services performed by the Company create or enhance an asset that Allonnia controls as the asset is created or enhanced, the Company satisfies the performance obligation and recognizes revenue over time. The Company uses an input method that compares total costs incurred relative to total estimated cost to complete to estimate progress under the contract. Any revisions to the estimated total budgeted costs to complete, and the resulting impact to revenue recognition, are reflected in the period of the change through a cumulative catch-up adjustment. In the first quarter of 2021, the additional non-cash consideration of $12.7 million, which represents previously constrained variable consideration, was allocated to all of the performance obligations consistent with the initial relative selling price allocation and a cumulative catch up was recognized for the TDPs in process.

As of March 31, 2022 and December 31, 2021, the Company had a deferred revenue balance of $35.9 million and $38.0 million, respectively, with Allonnia. During the three months ended March 31, 2022 and 2021, the Company recognized revenue of $3.2 million and $2.3 million, respectively, from services provided to Allonnia.

Other Significant Collaboration Transactions

In addition to the activity discussed above related to Arcaea and Allonnia, the Company provided research and development services under existing collaboration arrangements with Joyn, Motif, Synlogic and Genomatica. During the three months ended March 31, 2022 and 2021, there were no material changes to the Company's arrangements with its Platform Ventures and Structured Partnerships, except as noted above and in Note 4 related to the deconsolidation of Verb. For a description of these arrangements and the related accounting conclusions, refer to Note 20 to the audited consolidated financial statements included in the Company's 2021 Annual Report on Form 10-K. Refer to Notes 3 and 4 for additional details on the Company's investments and Note 13 for a summary of transactions with related parties.

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12. Net Loss per Share

As a result of the Business Combination, the Company has retroactively restated the weighted average shares outstanding for the three months ended March 31, 2021 to give effect to the Exchange Ratio.

The Company computes net loss per share using the two-class method required for participating securities. Basic and diluted loss per share was the same for each period presented as the inclusion of all potential common stock equivalents would have been antidilutive. The earnings per share amounts are the same for the different classes of common stock because the holders of each class are legally entitled to equal per share distributions whether through dividends or liquidation.

The following potential common shares, presented based on amounts outstanding at each period end, were excluded from the calculation of diluted net loss per share attributable to Ginkgo Bioworks Holdings, Inc. common stockholders for the periods presented because including them would have been anti-dilutive:

	As of March 31,	
	2022	2021
Warrants to purchase Class A common stock	51,824,895	1,013,708
Outstanding stock options	20,980,800	30,596,549
Unvested RSUs	211,541,025	128,840,112
Unvested RSAs	137,990	360,054
Earnout shares [1]	160,694,031	—
	445,178,741	160,810,423

(1) Represents earnout shares for which the vesting conditions have not been satisfied.

13. Related Parties

The Company's significant transactions with its related parties are primarily comprised of revenue generating activities under collaboration and license agreements.

Significant related party transactions included in the Condensed Consolidated Balance Sheets are summarized below (in thousands):

	As of March 31, 2022	As of December 31, 2021
Accounts receivable:		
Joyn	$ —	$ 5
Motif	1,026	3,020
Allonnia	1,141	849
Arcaea	1,348	724
Other equity investees	299	—
	$ 3,814	$ 4,598
Deferred revenue, current and non-current:		
Joyn	$ 3,426	$ 4,608
Motif	51,933	52,171
Genomatica	13,753	17,111
Allonnia	35,876	38,016
Arcaea	44,771	47,356
Other equity investees	1,301	1,559
	$ 151,060	$ 160,821

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Significant related party transactions included in the Condensed Consolidated Statements of Operations and Comprehensive Loss are summarized below (in thousands):

	Three Months Ended March 31,	
	2022	2021
Foundry revenue:		
Joyn	$ 1,182	$ 1,598
Motif	1,345	5,492
Genomatica	3,358	3,298
Allonnia	3,221	2,266
Arcaea	3,924	—
Other equity investees	498	6
	$ 13,528	$ 12,660

Refer to Notes 3 and 11 for additional details on the Company's investments and equity method investments held in its related parties.

14. Subsequent Events

FGen Acquisition

On April 1, 2022, the Company completed the acquisition of FGen AG ("FGen"), a company organized under the laws of Switzerland that specializes in strain development and optimization. Upon completion of the acquisition, FGen became a wholly-owned subsidiary of the Company. FGen has developed an ultra-high-throughput screening platform built on nanoliter reactor technology which the Company believes will enhance its cell screening capabilities and potentially increase the likelihood of finding enzymes, pathways, and strains or cell lines that perform to diverse cell program specifications. Under the terms of the Share Purchase Agreement dated March 11, 2022, the Company acquired all of the capital stock of FGen for aggregate consideration consisting of (i) $17.5 million, subject to certain adjustments, payable in 4,051,107 unrestricted shares of Ginkgo Class A common stock issued at closing, and (ii) additional contingent consideration of up to $25.0 million payable in cash or Class A common stock related to, among other things, the successful integration and deployment of the FGen technology across the Company's programs.

BiomEdit

In April 2022, the Company, along with certain of its investors and third-party investors, launched BiomEdit, LLC ("BiomEdit"), a microbiome innovation company that is expected to discover, develop and introduce novel probiotics, bioactive molecules, engineered microbial medicines and microbial monitoring services for animal health. BiomEdit is the Company's latest Platform Venture. The Company contributed intellectual property to BiomEdit for use in the development or production of products that the parties agree to research and develop under technical development plans and, in exchange, the Company received 3.9 million voting common units in BiomEdit. BiomEdit was capitalized through a Series A preferred unit financing that raised approximately $32.5 million in gross proceeds in April 2022.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the unaudited condensed consolidated financial statements and related notes thereto included elsewhere in this Quarterly Report on Form 10-Q. This discussion contains forward-looking statements that reflect our plans, estimates and beliefs that involve risks and uncertainties. As a result of many factors, such as those set forth under "Risk Factors" and "Cautionary Note Regarding Forward-Looking Statements" elsewhere in this Quarterly Report on Form 10-Q, our actual results may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those discussed in Item 1A "Risk Factors" of this Quarterly Report on Form 10-Q.

Overview

Our mission is to make biology easier to engineer.

Ginkgo is building the industry-standard horizontal platform for cell programming. We use our platform to program cells on behalf of our customers. These "cell programs" are designed to enable biological production of products as diverse as novel therapeutics, key food ingredients, and chemicals currently derived from petroleum. We have worked on cell programs in end markets as diverse as specialty chemicals, agriculture, food, consumer products, and pharmaceuticals. Biology did not evolve by end market. All of these applications run on cells which have a common code—DNA—and a common programming platform can enable all of them. Because of this shared platform, we are able to drive scale and learning efficiencies while maintaining flexibility and diversity in our program areas. Ultimately, customers come to us because they believe we maximize the probability of successfully developing their products.

The foundation of our platform includes two core assets that execute a wide variety of cell programs for customers according to their specifications: our Foundry and our Codebase.

- Our Foundry wraps proprietary software and automation around core cell engineering workflows— designing DNA, writing DNA, inserting that DNA into cells, testing to measure cell performance—and leverages data analytics and data science to inform each iteration of design. The software, automation and data analysis pipelines we leverage in the Foundry drive a strong scale economic: we have scaled the output of the Foundry by roughly 3X annually since we started measuring it around 2015 (with the exception of 2020 during the COVID-19 pandemic) and over that time, the average cost per unit operation has fallen by approximately 50% every year. We expect to be able to pass some of these savings along to our customers, allowing them to take more "shots on goal" with their programs.
- Our Codebase includes both our physical (engineered cells and genetic parts) and digital (genetic sequences and performance data) biological assets, and accumulates as we execute more cell programs on the platform. Every program, whether successful or not, generates valuable Codebase and helps inform future experimental designs and provides reusable genetic parts, making our cell program designs more efficient.

As the platform scales, we have observed a virtuous cycle between our Foundry, our Codebase, and the value we deliver to customers. We believe this virtuous cycle sustains Ginkgo's growth and differentiated value proposition.

- Foundry: As we take on more work in the Foundry, we benefit from scale economics, which over time may lead to lower program costs. We expect that these lower costs, in turn, will drive additional demand for our cell programming capabilities.
- Codebase: Cell programs also generate Codebase, which can drive better experimental direction and improve the odds of technical success, further increasing our customer value proposition, which we believe will result in additional demand.

Put simply: we believe that as the platform improves with scale, it drives more scale, which drives further platform improvements, and so on. We believe this positive feedback loop has the potential to drive compounding value creation in the future as every new program we add contributes to both near-term revenues and has the potential to add significant downstream economics.

Our business model mirrors the structure of our platform and we are compensated in two primary ways. First, we charge usage fees for Foundry services, in much the same way that cloud computing companies charge usage fees for utilization of computing capacity or contract research organizations charge for services. Additionally, we negotiate a value share with our

customers (typically in the form of royalties, milestones, and/or equity interests) in order to align our economics with the success of the programs enabled by our platform. As we add new programs, our portfolio of programs with this "downstream" value potential grows.

With a mission to make biology easier to engineer, we have always recognized the imperative to invest in biosecurity as a key component of our platform. We care how our platform is used, and biosecurity is a necessary complement to synthetic biology that helps us ensure our cell programming work is conducted and deployed responsibly. The near-term growth of the biosecurity sector is highly dependent on domestic and international government initiatives and investment and Ginkgo has been supporting and engaging with domestic and international organizations and governments to help shape the understanding of a robust biosecurity program.

In the second quarter of 2020, in response to the COVID-19 pandemic, we launched our commercial offering of COVID-19 testing products and services for businesses, academic institutions, and other organizations in which we generate product and service revenue. Beginning in the first quarter of 2021, we launched our pooled testing initiative which focuses on providing end-to-end COVID-19 testing and reporting services to public health authorities. We are currently offering pooled testing and reporting services for K-12 schools across the United States, at airports through our partnership with XpresCheck and the CDC, as well as through other congregate settings such as our partnership with Eurofins. In the future, we believe that testing services may have a value proposition internationally and in other use cases including wastewater monitoring and air monitoring.

Prior to 2022, we operated as a single reportable segment. In the first quarter of 2022, we reorganized our operations into two operating and reportable segments: Foundry and Biosecurity. The reorganization reflects changes made to our internal management structure and how our chief operating decision maker evaluates operating results and makes decisions on how to allocate resources. Our two operating and reportable segments are described below:

- Foundry consists of research and development services performed under collaboration and license agreements relating to our cell programming platform. Our cell programming platform includes two core assets: the Foundry, highly efficient biology lab facilities, enabled by investment in proprietary workflows, custom software, robotic automation, and data science and analytics, which is paired with our Codebase, a collection of biological "parts" and a database of biological data used to program cells. The Foundry segment includes costs incurred for the development, operation, expansion and enhancement of the Foundry and Codebase. Foundry revenue is derived from Foundry usage fees and downstream value share in the form of milestone payments, royalties or equity interests.
- Biosecurity consists of COVID-19 testing products and services primarily provided to public health authorities. Biosecurity revenue is derived from sales of test kits and testing and reporting services fees.

Generating Economic Value Through Cell Programs

Our cell programming platform is a key enabling technology and source of intellectual property for our customers' products. We earn Foundry revenue for our research and development ("R&D") services as well as through a share of the value of products created using our platform.

We structure Foundry revenue to include some combination of the following:

- Foundry usage fees in the form of:
  - upfront payments upon consummation of an agreement or other fixed payments that are generally recognized over our period of performance;
  - reimbursement for costs incurred for R&D services;
  - milestone payments upon the achievement of specified technical criteria;

plus,

- downstream value share payments in the form of:
  - milestone payments upon the achievement of specified commercial criteria;
  - royalties on sales of products from or comprising engineered organisms;
  - royalties related to cost of goods sold reductions realized by our customers;

or,

- downstream value share in the form of equity interests in our customer.
    - downstream value share in the form of equity interest appreciation is not recognized as revenue but is expected to contribute to future cash flows upon liquidation, the amount and timing of which is inherently unpredictable.

Downstream value share arrangements which involve equity interests generally fall into two categories: Platform Ventures and Structured Partnerships.

Platform Ventures

Platform Ventures allow leading multinationals to partner with Ginkgo and financial investors to form new ventures in identified market segments with potential to benefit from synthetic biology. In exchange for an equity position in the venture, we contribute license rights to our proprietary cell programming technology and intellectual property, while our partners contribute relevant industry expertise, other resources and venture funding. We also provide R&D services for which we receive cash payments for our costs incurred, plus a margin. Platform Ventures include:

Joyn Bio, LLC

Founded in 2017, Joyn Bio, LLC ("Joyn") was formed to focus on engineered microbes for use in agricultural applications. Along with certain of our investors, we formed Cooksonia, LLC ("Cooksonia") which holds a 50% equity interest in Joyn. Bayer CropScience LP contributed cash of $80 million plus intellectual property and holds the remaining 50% equity interest in Joyn. We provided license rights to our intellectual property and platform at inception in return for our equity interest in Joyn, which was recorded at an initial fair value of $97.9 million. The carrying value of our equity method investment in Joyn was $6.7 million as of March 31, 2022. Ginkgo also entered into a Foundry Services Agreement ("Joyn FSA") with Joyn under which we provide R&D services. Joyn paid us a total of $35.0 million in non-refundable prepayments for services to be provided under the Joyn FSA.

Motif FoodWorks, Inc.

Founded in 2018, Motif FoodWorks, Inc. ("Motif") was formed to focus on the application of synthetic biology to reduce the reliance on animal products in the food industry. We entered into an intellectual property contribution agreement that granted Motif rights to our intellectual property, subject to mutually agreed upon technical development plans. In return for our contribution of intellectual property and access to our platform, we received shares of common stock in Motif. The initial fair value of our common stock investment in Motif was $65.1 million which has subsequently been reduced to a carrying value of zero as a result of the allocation of losses under our accounting for equity method investments. Motif was capitalized through Series A preferred stock financings that raised approximately $119 million in gross proceeds from an investor group which included certain of our investors, Louis Dreyfus Company and Fonterra Co-operative Group Limited. In June 2021, Motif raised an additional $226 million through a Series B preferred stock financing. Ginkgo also entered into a Technical Development Agreement with Motif under which we provide R&D services in return for cash consideration on a cost-plus fixed margin basis. Motif launched its first product, HEMAMI, in 2021.

Allonnia, LLC

Founded in 2019, Allonnia, LLC ("Allonnia") was formed to focus on the application of synthetic biology in the waste bioremediation and biorecovery industries. We entered into an intellectual property contribution agreement that granted Allonnia rights to our intellectual property, subject to mutually agreed upon technical development plans. In return for our contribution of intellectual property and access to our platform, we received common units in Allonnia with a right to additional units subject to additional closings of Allonnia's Series A preferred units. The initial fair value of our common units received in Allonnia was $24.5 million, subsequently increased by $12.7 million in 2021, all of which has been reduced to a carrying value of zero as a result of the allocation of losses under our accounting for equity method investments. Allonnia was capitalized through Series A preferred unit financings that raised approximately $52 million in gross proceeds from an investor group which included certain of our investors and Battelle Memorial Institute. Ginkgo also entered into a Technical Development Agreement with Allonnia under which we provide R&D services in return for cash consideration on a cost-plus fixed margin basis.

Arcaea, LLC (FKA Kalo Ingredients, LLC)

Founded in 2021, Arcaea, LLC ("Arcaea") was formed to focus on the application of synthetic biology in the beauty and personal care products industry. In March 2021, we entered into an intellectual property contribution agreement that granted Arcaea rights to our intellectual property, subject to mutually agreed upon technical development plans. In return for our contribution of intellectual property and access to our platform, we received common units in Arcaea with a right to additional units subject to additional closings of Arcaea's Series A preferred units. The initial fair value of our common units received in Arcaea was $11.9 million which has subsequently been reduced to a carrying value of zero as a result of the allocation of losses under our accounting for equity method investments. Arcaea was capitalized through a Series A preferred unit financing that raised approximately $77 million in gross proceeds from an investor group which included certain of our investors, CHANEL and Givaudan. Upon the closing of the Series A preferred unit financing in July 2021, we received an additional 5,229,900 common units in Arcaea. The fair value of our Arcaea common units received in July 2021 of $35.5 million has subsequently been reduced to a carrying value of zero as a result of the allocation of losses under our accounting for equity method investments. Ginkgo also entered into a Technical Development Agreement with Arcaea under which we provide R&D services in return for cash consideration on a cost-plus fixed margin basis.

Ayana Bio, LLC

Founded in September 2021, Ayana Bio, LLC ("Ayana") was formed to identify and design new bioactive compounds for use as complementary medicine to support human health and wellness. Ayana was capitalized through a Series A funding that raised $30 million in gross proceeds from an investor group comprising certain of our investors. We hold an interest in 9,000,000 common units (representing 100% of common units at inception) of Ayana and have also provided Ayana with certain licenses to our intellectual property for use in the development or production of products that we have agreed to research and develop under technical development plans. We concluded that we hold a variable interest in and are the primary beneficiary of Ayana, and as a result, we have consolidated the financial statements of Ayana into our consolidated financial statements.

Verb Biotics, LLC

Founded in September 2021, Verb Biotics, LLC ("Verb") was formed to identify and design new strains of probiotic bacteria with advanced properties for human nutrition, health, and wellness. Verb was capitalized through a Series A funding that raised $30 million in gross proceeds from an investor group comprising certain of our investors. We hold an interest in 9,000,000 common units (representing 100% of common units at inception) of Verb and have also provided Verb with certain licenses to our intellectual property for use in the development or production of products that we have agreed to research and develop under technical development plans. Prior to the first quarter of 2022, we consolidated Verb as a variable interest entity. In the first quarter of 2022, we deconsolidated Verb and began accounting for our retained investment in Verb as an equity method investment. See Note 4 of our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for more detail.

Structured Partnerships

Structured Partnerships allow Ginkgo to: i) partner with early stage synthetic biology product companies to adopt our Foundry as their cell programming R&D platform, in which we offer flexible commercial terms on the Foundry usage fees including the ability to pay a portion or all of such upfront fees in the form of equity, in addition to downstream value share consideration ("Startup Structured Partnership"); and ii) partner with existing entities with complementary assets for high potential synthetic biology applications in a large-scale, multi-program collaboration ("Legacy Structured Partnership"). In the first quarter of 2022, we entered into two Startup Structured Partnerships, which provided for payments of Foundry usage fees with financial instruments that are convertible into equity in the aggregate amount of $4.2 million, which will be recognized as revenue over our period of performance. Prior to 2022, we entered into five Startup Structured Partnerships in which we received $16.5 million in upfront consideration in the form of equity that is recognized as revenue over our period of performance. Our Legacy Structured Partnerships are described below:

Genomatica, Inc.

Genomatica, Inc. ("Genomatica") is a biotechnology company specializing in the development and manufacturing of intermediate and specialty chemicals from both sugar and alternative feedstocks. In 2016 and 2018, we entered into separate preferred stock purchase agreements in which we offered cash and R&D services to Genomatica in exchange for its preferred shares. The initial cost of the investment in Genomatica's preferred stock was $55.0 million, which is the carrying value of the investment at March 31, 2022 as we account for the investment at historical cost.

Synlogic, Inc.

Synlogic, Inc. ("Synlogic") is a publicly traded clinical-stage biopharmaceutical company focused on advancing drug discovery and development for synthetic biology-derived medicines. In 2019, we entered into several agreements with Synlogic whereby we purchased Synlogic common stock and warrants to purchase Synlogic common stock and agreed to provide R&D services to Synlogic. At inception, the fair value of Synlogic common stock and warrants was recorded at $35.8 million and $14.4 million, respectively. As of March 31, 2022, the fair value of Synlogic common stock and warrants was $15.2 million and $6.1 million, respectively.

See Notes 3 and 11 of our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for further details of our investments in and the material terms of our agreements with our Platform Ventures and Structured Partnerships.

Key Business Metrics

A cell program (or "program") is the work we do for our customers to enable their product(s) of interest. Programs are defined by a technical development plan. We generally exclude proof-of-concept projects and other exploratory work undertaken on a customer's behalf from the program count. In the near-term, programs deliver multi-year revenue from platform usage fees. Over the long-term, program growth drives a physical infrastructure scale economic through our Foundry, a data and learning scale economic through our Codebase and accumulation of downstream value share. Our key business metrics comprise New Programs, Current Active Programs, and Cumulative Programs.

	Three Months Ended March 31,		LTM[1]
	2022	2021	2022
New Programs	11	4	38
Current Active Programs	64	44	77
Cumulative Programs	116	78	116

(1) Last 12 months ended March 31, 2022

New Programs

New Programs represent the number of unique programs commenced within the reporting period. As new programs have multi-year durations, we view this metric as an indication of future Foundry revenue growth.

Current Active Programs

Current Active Programs represent the number of unique programs for which we performed R&D services in the reporting period. We view this metric as an indication of current period and future Foundry revenue.

Cumulative Programs

Cumulative Programs represent the cumulative number of unique programs Ginkgo has commenced. We view this metric as an indication of our competitive advantage and as a leading indicator of the mid- to long-term potential economic value derived from downstream value share arrangements. The cumulative number of programs also contributes to Codebase, which accumulates with each additional program we conduct over time and drives better experimental direction and improves the odds of technical success in current and future programs.

We believe the preceding metrics are important to understand our current business. These metrics may change or be substituted for additional or different metrics as our business develops. For example, as our program mix changes, our data gathering abilities expand or our understanding of key business drivers develops, we anticipate updating these metrics or their definitions to reflect such changes.

Business Combination

We entered into the Merger Agreement with Soaring Eagle Acquisition Corp. ("SRNG") on May 11, 2021. On September 14, 2021, the SRNG shareholders approved and adopted the Merger Agreement and the other proposals described in SRNG's definitive proxy statement/prospectus included in SRNG's registration statement on Form S-4 (File No. 333-256121), which was declared effective by the SEC on August 11, 2021. Upon the consummation of the Business Combination on September 16, 2021, SEAC Merger Sub Inc., a wholly owned subsidiary of SRNG ("Merger Sub"), merged with and into Ginkgo, the

separate corporate existence of Merger Sub ceased, and Ginkgo survived the merger as a wholly owned subsidiary of SRNG, which was renamed "Ginkgo Bioworks Holdings, Inc."

The Business Combination was accounted for as a reverse recapitalization in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). Under the guidance in ASC 805*, Business Combinations* ("ASC 805"), SRNG was treated as the "acquired" company for accounting and financial reporting purposes. We were deemed the accounting predecessor of the combined business, and as the parent company of the combined business, are the successor SEC registrant, meaning that our financial statements for previous periods will be disclosed in future periodic reports filed with the SEC. The most significant change in our reported financial position and results of operations as a result of the Business Combination was a net increase in cash (as compared to our audited consolidated balance sheet as of December 31, 2020) of $1,509.6 million, including $760.0 million in proceeds from investments by certain accredited investors for 76,000,000 shares of Ginkgo's Class A common stock (the "PIPE Investment") that was consummated substantially simultaneously with the closing of the Business Combination. The transaction costs for the Business Combination totaled $108.1 million.

As the successor to an SEC-registered and publicly-listed company, we will need to hire additional personnel and implement procedures and processes to address public company regulatory requirements and customary practices. We expect to incur additional expenses as a public company for, among other things, directors' and officers' liability insurance, director fees, and additional internal and external accounting, legal and administrative resources.

Modification of Equity Awards in Connection with Business Combination

Prior to the Business Combination, our restricted stock units ("RSUs") were granted with both a service-based vesting condition and a performance-based vesting condition. We have historically not recognized any stock-based compensation expense associated with these awards as the achievement of the performance condition required a change in control or an initial public offering (both as defined in the underlying award agreement) that was not deemed probable of occurring. The Business Combination did not meet the performance condition required for vesting of our RSUs.

On November 17, 2021 our board of directors modified the vesting terms of RSUs to allow 10% of the RSUs that met the service condition as of the closing of the Business Combination to vest with respect to the performance condition, effective as of November 19, 2021, the date on which the Form S-8 registration statement covering such shares became effective. The remaining RSUs vested in full with respect to the performance condition on or before March 15, 2022. The change to the vesting terms was accounted for as a modification and resulted in approximately $581.8 million of stock-based compensation expense recognized in the first quarter of 2022. Stock-based compensation expense also increased by $68.3 million related to RSU earnout shares which were also subject to the same performance condition as the underlying RSUs, in addition to achieving certain target stock price thresholds. The first target stock price of $12.50 per share was achieved on November 15, 2021.

Components of Results of Operations

Revenue

Foundry Revenue

We generate Foundry revenue through the execution of license and collaboration agreements whereby customers obtain license rights to our proprietary technology and intellectual property for use in the development and commercialization of engineered organisms and derived products. Under these agreements, we typically provide R&D services for cell programming with the goal of producing an engineered cell that meets a mutually agreed specification. Our customers obtain license rights to the output of our services, which are primarily the optimized strains or cell lines, in order to manufacture and commercialize products derived from that licensed strain or cell line. Generally, the terms of these agreements provide that we receive some combination of: (1) Foundry usage fees in the form of (i) upfront payments upon consummation of the agreement or other fixed payments, (ii) reimbursement for costs incurred for R&D services and (iii) milestone payments upon the achievement of specified technical criteria, plus (2) downstream value share payments in the form of (i) milestone payments upon the achievement of specified commercial criteria, (ii) royalties on sales of products from or comprising engineered organisms arising from the collaboration or licensing agreement and (iii) royalties related to cost of goods sold reductions realized by our customers. For the three months ended March 31, 2022 and 2021, royalties did not comprise a material amount of our revenue.

Foundry revenue includes transactions with Platform Ventures as well as Structured Partnerships where, as part of these transactions, we received an equity interest in such entities. Specifically related to the Platform Ventures, in these

transactions, we received upfront non-cash consideration in the form of common equity interests in these entities, while the Platform Ventures each received cash equity investments from strategic partners and financial investors. We view the upfront non-cash consideration as prepayments for licenses which will be granted in the future as we complete mutually agreed upon technical development plans. In these instances, we also receive cash payments for our costs incurred for the R&D services performed by us, plus a margin. We are not compensated through additional milestone or royalty payments under these arrangements. Our transactions with Genomatica and Synlogic included the purchase of equity securities and the provision of R&D services. Our transactions with Startup Structured Partnerships included the provision of R&D services in exchange for equity interests or financial instruments that are convertible into equity and other downstream value share consideration. As we perform R&D services under the mutually agreed upon development plans, we recognize a reduction in the prefunded obligation based on costs incurred, plus margin basis. These arrangements are further described in Notes 3, 4, 11 and 13 of our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q.

Downstream value share in the form of equity interest appreciation is not recognized as revenue but is expected to contribute to future cash flows upon liquidation, the amount and timing of which is inherently unpredictable. Equity investees are accounted for as equity method investments, cost method investments or carried at fair value.

Biosecurity Revenue

In the second quarter of 2020, in response to the COVID-19 pandemic, we launched our commercial offering of COVID-19 testing products and services for businesses, academic institutions, and other organizations in which we generate product and service revenue. We generate product revenue through the sale of lateral flow assay ("LFA") diagnostic test kits, polymerase chain reaction ("PCR") sample collection kits and pooled test kits, all of which we sell to our customers on a standalone basis. We generate service revenue primarily through the sale of our end-to-end COVID-19 testing services which consist of multiple promised goods and services including sample collection kits, physician authorizations, onsite test administration, outsourced laboratory PCR analysis, and access to results reported through a web-based portal.

Generally, the terms of these agreements provide that we are entitled to compensation: (i) upon delivery of diagnostic test kits when no service is provided and (ii) when services are included, upon the reporting of results to the customer.

Beginning in the first quarter of 2021, we launched our pooled testing initiative which focuses on providing end-to-end COVID-19 testing and reporting services to public health authorities. We are currently offering pooled testing and reporting services for K-12 schools across the United States, at airports through our partnership with XpresCheck and the CDC, as well as through other congregate settings such as our partnership with Eurofins and Quest Laboratories in the state of Texas. In the future, we believe that testing services may have a value proposition internationally and in other use cases including wastewater monitoring and air monitoring. The amount and components of Biosecurity revenue are dependent on the demand for COVID-19 testing products and services which is uncertain for the remainder of 2022 and beyond and is subject to seasonality as the demand for COVID-19 testing in schools is diminished during summer vacations and other school breaks.

Costs and Operating Expenses

Cost of Biosecurity Product Revenue

Cost of Biosecurity product revenue consists of costs associated with the sale of diagnostic and sample collection test kits which includes costs incurred to purchase test kits from third parties.

Cost of Biosecurity Service Revenue

Cost of Biosecurity service revenue consists of costs associated with the provision of our end-to-end COVID-19 testing services, which includes costs incurred to provide sample collection kits, physician authorizations, onsite test administration, outsourced laboratory PCR analysis, access to results reported through our proprietary web-based portal and reporting of results to public health authorities.

Research and Development Expenses

The nature of our business, and primary focus of our activities, generates a significant amount of R&D expenses. R&D expenses represent costs incurred by us for the following:

- development, operation, expansion and enhancement of our Foundry and Codebase; and

- development of new offerings, such as Biosecurity.

The activities above incur the following expenses:

- laboratory supplies, consumables and related services provided under agreements with third parties and in-licensing arrangements;
- personnel compensation and benefits; and
- rent, facilities, depreciation, software, professional fees and other direct and allocated overhead expenses.

We expense R&D costs as incurred. As we grow our active programs and customer base and invest in our Foundry and Codebase, we anticipate that our R&D expenses will continue to increase. The nature, timing, and estimated costs required to support our growth will be dependent on advances in technology, our ability to attract new customers and the rate of market penetration within our existing customer industries.

In the first quarter of 2022, R&D expenses included a significant charge for stock-based compensation expense as a result of the modification of vesting terms of RSUs and the vesting of certain earnout shares (as further described above in "Modification of Equity Awards in Connection with Business Combination").

General and Administrative Expenses

General and administrative ("G&A") expenses consist primarily of costs for personnel in executive, business development, finance, human resources, legal and other corporate administrative functions. G&A expenses also include legal fees incurred relating to corporate, intellectual property and patent matters, professional fees incurred for accounting, auditing, tax and administrative consulting services, insurance costs, and facility-related costs not otherwise included in R&D expenses.

We expect our G&A expenses will continue to increase as we pursue organic and inorganic growth initiatives. The increases will likely relate to additional personnel, system costs and increased costs related to business development, finance and legal matters, along with increased expenses related to operating as a publicly traded company, such as fees related to audit, legal and tax services, regulatory compliance programs and investor relations.

In the first quarter of 2022, G&A expenses included a significant charge for stock-based compensation expense as a result of the modification of vesting terms of RSUs and the vesting of certain earnout shares (as further described above in "Modification of Equity Awards in Connection with Business Combination").

Interest Expense, Net

Interest expense, net primarily consists of interest earned on our cash and cash equivalents offset by interest expense related to our lease financing obligation.

Loss on Equity Method Investments

Loss on equity method investments includes our share of losses from certain of our equity method investments under the hypothetical liquidation at book value ("HLBV") method.

Gain on Investments

Gain on investments includes the change in fair value of Synlogic common stock, warrants to purchase Synlogic common stock and change in fair value of Cronos Group Inc. ("Cronos") common stock.

Change in Fair Value of Warrant Liabilities

Change in fair value of warrant liabilities includes the change in fair value of private placement warrants ("Private Placement Warrants") and publicly-traded warrants ("Public Warrants"), which are classified as liabilities and were assumed as part of the Business Combination.

Gain on Deconsolidation of Subsidiary

Gain on deconsolidation of subsidiary relates to our deconsolidation of Verb, a variable interest entity, in the first quarter of 2022. The deconsolidation resulted in the removal of Verb's assets, liabilities and non-controlling interest balances from our balance sheet and the recognition of our retained interest in Verb measured at fair value as of the deconsolidation date.

Other Income (Expense), Net

Other income (expense), net primarily consists of change in fair value of our convertible notes with Access Bio, Inc. accounted for under the fair value option, sublease rent income and payments made by Amyris, Inc. ("Amyris") under a settlement agreement.

Provision for Income Taxes

Income taxes are recorded in accordance with ASC 740*, Income Taxes* ("ASC 740"), which provides for deferred taxes using an asset and liability approach. We recognize deferred tax assets and liabilities for the expected future tax consequences of events that have been included in our financial statements or tax returns. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. A valuation allowance against deferred tax assets is recorded if, based on the weight of the available evidence, it is more likely than not that some or all the deferred tax assets will not be realized. For all periods presented, we have recorded a valuation allowance against the deferred tax assets that are not expected to be realized.

We account 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, including, but not limited to, changes in the 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.

Income taxes are determined at the applicable tax rates adjusted for non-deductible expenses, R&D tax credits and other permanent differences. Our income tax provision may be significantly affected by changes to our estimates.

Results of Operations

Comparison of the Three Months Ended March 31, 2022 and 2021

The following table summarizes our consolidated statements of operations for each period presented:

	Three Months Ended March 31,		
(in thousands)	**2022**	**2021**	**Change**
Foundry revenue	$ 21,488	$ 22,504	$ (1,016)
Biosecurity revenue:			
Product	13,947	5,775	8,172
Service	132,970	15,818	117,152
Total revenue	168,405	44,097	124,308
Costs and operating expenses:			
Cost of Biosecurity product revenue	8,095	9,935	(1,840)
Cost of Biosecurity service revenue	77,337	13,765	63,572
Research and development [(1)]	322,720	59,585	263,135
General and administrative [(1)]	434,768	17,927	416,841
Total operating expenses	842,920	101,212	741,708
Loss from operations	(674,515)	(57,115)	(617,400)
Other income (expense):			
Interest expense, net	(397)	(475)	78
Loss on equity method investments	(20,887)	(28,624)	7,737
Gain on investments	450	12,622	(12,172)
Change in fair value of warrant liabilities	85,035	—	85,035
Gain on deconsolidation of subsidiary	15,900	—	15,900
Other income (expense), net	1,637	(1,345)	2,982
Total other income (expense), net	81,738	(17,822)	99,560
Loss before income taxes	(592,777)	(74,937)	(517,840)
Income tax benefit	(184)	(159)	(25)
Net loss	(592,593)	(74,778)	(517,815)
Net loss attributable to non-controlling interest	(2,088)	(1,209)	(879)
Net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders	$ (590,505)	$ (73,569)	$ (516,936)

[(1)] In the first quarter of 2022, R&D and G&A expenses included a significant charge to stock-based compensation expense as a result of the modification of the vesting terms of RSUs and all related earnout shares (as further described above in "Modification of Equity Awards in Connection with Business Combination"). Total stock-based compensation expense, inclusive of $6.2 million in employer payroll taxes for the three months ended March 31, 2022, was as follows:

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Research and development	$ 266,340	$ 18
General and administrative	392,695	100
Total	$ 659,035	$ 118

Foundry Revenue

Foundry revenue was $21.5 million and $22.5 million for the three months ended March 31, 2022 and 2021, respectively. The decrease of $1.0 million in Foundry revenue was primarily attributable to the completion of certain programs during the course of 2021, partially offset by the progress of Current Active Programs including those New Programs commenced after the first quarter of 2021. Programs typically require a ramp-up period and/or the achievement of technical milestones before contributing in a meaningful way to revenue.

The total number of Current Active Programs increased from 44 to 64 in the three months ended March 31, 2021 and 2022, respectively. In the first quarter of 2022, 11 New Programs commenced compared to 4 New Programs in the comparable prior year period. Cumulative Programs increased from 78 to 116 in the three months ended March 31, 2021 and 2022, respectively. The number of customers increased from 20 to 32 in the three months ended March 31, 2021 and 2022, respectively. We believe the increase in Current Active Programs is consistent with an overall mix of programs earlier in their life cycle requiring a ramp-up period before contributing in a meaningful way to revenue.

While the majority of Foundry revenue today is made up of Foundry usage fees, as we increase Cumulative Programs and to the extent our customers successfully commercialize products built on our platform, downstream value share is expected to comprise a larger proportion of Foundry revenue. Downstream value share in the form of equity interest appreciation is not recognized as revenue but is expected to contribute to future cash flows upon liquidation, the amount and timing of which is inherently unpredictable.

Biosecurity Revenue

Biosecurity revenue was $146.9 million and $21.6 million in the three months ended March 31, 2022 and 2021, respectively. The increase of $125.3 million in Biosecurity revenue was comprised of an increase in product revenue of $8.1 million and an increase in service revenue of $117.2 million.

The amount and components of Biosecurity revenue are dependent on the demand for COVID-19 testing products and services which is uncertain in 2022 and beyond.

Cost of Biosecurity Product and Service Revenue

Cost of Biosecurity product and service revenue was $85.4 million and $23.7 million in the three months ended March 31, 2022 and 2021, respectively. The increase of $61.7 million was driven by the increase in the demand for our COVID-19 testing products and services.

Research and Development Expenses

Research and development expenses were $322.7 million and $59.6 million in the three months ended March 31, 2022 and 2021, respectively. The increase of $263.1 million was attributable to depreciation and amortization expense of $3.3 million and other direct and allocated overhead expenses, offset by a decrease in lab supplies of $8.7 million as a result of lower R&D expenses related to our Biosecurity offering. The remaining change was attributable to an increase in stock-based compensation expense of $266.3 million (inclusive of employer payroll taxes) as a result of the modification of the vesting terms of RSUs and certain earnout shares in the fourth quarter of 2021 (as further described above in "Modification of Equity Awards in Connection with Business Combination").

General and Administrative Expenses

General and administrative expenses were $434.8 million and $17.9 million in the three months ended March 31, 2022 and 2021, respectively. The increase of $416.9 million was attributable to professional fees of $9.1 million primarily as a result of becoming a public company and supporting business scaling, personnel-related compensation and benefits expense of $7.3 million, insurance expense of $3.2 million, software and technology expense of $1.1 million and increases in business taxes, rent and facilities expenses, marketing, travel and entertainment and other direct and allocated overhead expenses. The remaining increase was attributable to stock-based compensation expense of $392.6 million (inclusive of employer payroll taxes) as a result of the modification of the vesting terms of RSUs and certain earnout shares in the fourth quarter of 2021 (as further described above in "Modification of Equity Awards in Connection with Business Combination"). Increases in general and administrative expenses not attributable to stock-based compensation expense supported the growth of Foundry and Biosecurity revenue and activities related to public company readiness.

Interest Expense, Net

Interest expense, net was $0.4 million and $0.5 million in the three months ended March 31, 2022 and 2021, respectively, and was primarily related to our lease financing obligation.

Loss on Equity Method Investments

Loss on equity method investments was $20.9 million and $28.6 million in the three months ended March 31, 2022 and 2021, respectively. The decrease of $7.7 million was attributable to our equity method investments in Verb, Joyn, Arcaea and Allonnia. Upon the deconsolidation of Verb in the first quarter of 2022, we recorded a $15.9 million loss on our retained investment in Verb due to a basis difference associated with in-process research and development identified as part of the initial accounting for the equity method investment. The loss on our equity method investment in Joyn increased from $4.0 million in the three months ended March 31, 2021 to $5.0 million in the three months ended March 31, 2022, representing our share of the investee's losses under the HLBV method. The fair value of the additional equity we received in Arcaea of $11.9 million during the three months ended March 31, 2021 was reduced to zero during the period as a result of the

application of the HLBV method. The fair value of the additional equity we received in Allonnia of $12.7 million during the three months ended March 31, 2021 was also reduced to zero during the period as a result of the application of the HLBV method. Under the HLBV method, we absorb losses as a common unit holder prior to preferred unit holders due to a substantive profit-sharing agreement where the preferred unit holders receive preferential distribution rights. Because we have no commitment to fund the losses of Arcaea or Allonnia, no further losses on these equity method investments were recognized in the three months ended March 31, 2021.

Gain on Investments

Gain on investments was $0.5 million and $12.6 million for the three months ended March 31, 2022 and 2021, respectively. The change of $12.1 million was attributable to fluctuations in the stock price of our shares of Synlogic and Cronos common stock and warrants to purchase Synlogic common stock and the removal of a discount for lack of marketability on half of the shares of Cronos common stock due to lapse of sales restrictions in the first quarter of 2022.

Change in Fair Value of Warrant Liabilities

The change in fair value of warrant liabilities of $85.0 million in the three months ended March 31, 2022 was due to a decrease in the estimated fair value of the Private Placement Warrants and a decrease in the quoted price of the Public Warrants.

Gain on Deconsolidation of Subsidiary

Gain on deconsolidation of subsidiary relates to our deconsolidation of Verb and consisted of our $15.9 million retained interest in Verb measured at fair value as of the deconsolidation date.

Other Income (Expense), Net

Other income (expense), net was $1.6 million and $(1.3) million in the three months ended March 31, 2022 and 2021, respectively. The increase of $2.9 million was primarily attributable to an increase of $2.6 million in the change in fair value of the Access Bio Convertible Notes, a $1.0 million increase in sublease rent income, offset by a $0.5 million decrease in settlement payments from Amyris.

Non-GAAP Information

In addition to our results determined in accordance with U.S. GAAP, we believe that EBITDA and Adjusted EBITDA, each non-GAAP financial measures, are useful in evaluating our operational performance. We use this non-GAAP financial information to evaluate our ongoing operations and for internal planning and forecasting purposes. We believe that this non-GAAP financial information, when taken collectively, may be helpful to investors in assessing our operating performance.

We define EBITDA as net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders before the impact of interest income, interest expense, provision for income taxes and depreciation and amortization.

We define Adjusted EBITDA as EBITDA adjusted for stock-based compensation expense, gain or loss on equity method investments, gain or loss on investments, change in fair value of warrant liabilities and other income and expenses. We believe that the use of EBITDA and Adjusted EBITDA provides an additional tool for investors to use in evaluating ongoing operating results and trends because it eliminates the effect of financing activities, investing activities, and certain non-cash charges and other items. Adjusted EBITDA includes non-cash adjustments such as stock-based compensation, gain or loss on equity method investments, and gain or loss on changes in fair value of our investments, warrant liabilities, loans receivable and contingent consideration liability. Adjusted EBITDA also considers cash components which are not part of our ongoing operating results such as gains related to settlement payments from Amyris. We believe Adjusted EBITDA, although not a replacement for financial performance measures reported under U.S. GAAP, provides investors with a means to compare our financial measures with those of comparable companies, which may present similar non-GAAP financial measures to investors. However, you should be aware that when evaluating EBITDA and Adjusted EBITDA we may generate future income or incur future expenses similar to those excluded when calculating these measures. In addition, our presentation of these measures should not be construed as an inference that our future results will be unaffected by future income or future expenses similar to those excluded when calculating these measures. Our computation of these measures, especially Adjusted EBITDA, may not be comparable to other similarly titled measures computed by other companies because not all companies calculate these measures in the same way.

Because of these limitations, EBITDA and Adjusted EBITDA should not be considered in isolation or as a substitute for performance measures calculated in accordance with U.S. GAAP. We compensate for these limitations by primarily relying on our U.S. GAAP results supplemented by EBITDA and Adjusted EBITDA. You should review the reconciliation of net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders to EBITDA and Adjusted EBITDA below and not rely on any single financial measure to evaluate our business.

The following table reconciles net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders to EBITDA and Adjusted EBITDA for the three months ended March 31, 2022 and 2021, respectively:

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Net loss attributable to Ginkgo Bioworks Holdings, Inc. stockholders	$ (590,505)	$ (73,569)
Interest expense, net	397	475
Income tax benefit	(184)	(159)
Depreciation and amortization	9,488	5,629
EBITDA	(580,804)	(67,624)
Stock-based compensation [(1)]	659,035	118
Loss on equity method investments [(2)]	20,264	27,415
Gain on investments [(3)]	(450)	(12,622)
Change in fair value of warrant liabilities	(85,035)	—
Gain on deconsolidation of subsidiary	(15,900)	—
Other [(4)]	939	1,575
Adjusted EBITDA	$ (1,951)	$ (51,138)

(1) For the three months ended March 31, 2022, includes $6.2 million in employer payroll taxes.

(2) For the three months ended March 31, 2022 and 2021, represents losses on equity method investments under the HLBV method of $20.9 million and $28.6 million, respectively, net of losses attributable to non-controlling interests.

(3) Includes gain on the change in fair value of our common stock investments in Synlogic and Cronos and warrants to purchase Synlogic common stock, which are all carried at fair value.

(4) For the three months ended March 31, 2022, includes a $0.6 million gain on the change in fair value of the Access Bio Convertible Notes offset by $1.5 million loss on the change in fair value of contingent consideration liability related to a business acquisition. For the three months ended March 31, 2021, includes $2.1 million loss on the change in fair value of the Access Bio Convertible Notes offset by a $0.5 million gain related to a settlement payment from Amyris.

Liquidity and Capital Resources

Sources of Liquidity

Prior to the Business Combination, our sources of liquidity have been predominantly from proceeds from equity offerings, convertible notes offerings, payments received for R&D services under license and collaboration arrangements including those received on an upfront basis and upon accomplishment of milestones, payments received from Biosecurity product sales and services, and government grants. Upon the closing of the Business Combination in September 2021, we received net proceeds totaling approximately $1,509.6 million, inclusive of $760.0 million from the PIPE Investment. As of March 31, 2022, we had cash and cash equivalents of $1,493.0 million which we believe will be sufficient to enable us to fund our projected operations through at least the next 12 months from the date of filing of this Quarterly Report on Form 10-Q.

Material Cash Requirements

We anticipate that our expenditures will increase significantly in connection with our ongoing activities, as we:

- continue our R&D, activities under existing and new programs and further invest in our Foundry and Codebase;
- hire additional personnel and secure facilities to support our expanding R&D efforts;
- develop and expand our offerings, including Biosecurity;
- upgrade and expand our operational, financial and management systems and support our operations;
- acquire companies, assets or intellectual property that advance our company objectives;
- maintain, expand, and protect our intellectual property; and

- incur additional costs associated with operating as a public company.

Other than as described below, there have been no significant changes to our material cash requirements during the three months ended March 31, 2022 as compared to the material cash requirements disclosed in "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our 2021 Annual Report on Form 10-K.

Purchase Obligations

During the quarter ended March 31, 2022, we entered into a four-year noncancelable supply agreement for the purchase of diverse products including synthetic DNA. Under the agreement, we are obligated to spend a minimum of $58.0 million over the four-year term, with $10.0 million payable in the next 12 months. See Note 7 to the condensed consolidated financial statements in Part I, Item 1 of this Quarterly Report on Form 10-Q for more information.

Cash Flows

The following table provides information regarding our cash flows for each period presented:

	Three Months Ended March 31,	
(in thousands)	**2022**	**2021**
Net cash used in:		
Operating activities	$ (19,898)	$ (48,131)
Investing activities	(35,985)	(23,046)
Financing activities	(1,192)	(433)
Effect of exchange rate changes	(8)	—
Net decrease in cash, cash equivalents and restricted cash	$ (57,083)	$ (71,610)

Operating Activities

Net cash used in operating activities for the three months ended March 31, 2022 consisted of net loss of $592.6 million, adjusted for net change in operating assets and liabilities of $10.1 million and non-cash charges of $582.8 million. The net change in operating assets and liabilities was primarily due to a $34.9 million increase in accounts receivable driven by an increase in Biosecurity revenue, a $5.3 million increase in inventory from increased purchases of LFAs and pooled test kits in response to higher demand, a $21.0 million decrease in other non-current liabilities primarily due to a reclass of a customer deposit liability to deferred revenue upon finalizing the contract, offset by a $10.0 million increase in accrued expenses and other current liabilities, a $11.4 million increase in deferred revenue from customer prepayments, and an increase of $26.3 million in accounts payable primarily due to timing of processing invoices. Non-cash adjustments primarily consisted of $9.5 million of depreciation and amortization, $652.8 million of stock-based compensation expense, $20.9 million loss on equity method investments, $1.5 million loss on the change in fair value of a contingent consideration liability, partially offset by $85.0 million gain on the change in fair value of warrant liabilities and $15.9 million gain on the deconsolidation of Verb.

Net cash used in operating activities for the three months ended March 31, 2021 consisted of net loss of $74.8 million, adjusted for net change in operating assets and liabilities of $3.1 million and non-cash charges of $23.6 million. The net change in operating assets and liabilities was primarily due to a decrease in current and non-current deferred revenue of $5.5 million and an increase in accounts receivable of $9.5 million, partially offset by a decrease in prepaid expenses and other current assets of $1.6 million and an increase in accrued expenses and other current liabilities of $16.8 million. Non-cash adjustments primarily consisted of depreciation and amortization of $5.6 million, loss on equity method investments of $28.6 million and loss on changes in the fair value of loans receivable of $1.8 million, partially offset by a gain on investments of $12.6 million.

Investing Activities

Net cash used in investing activities for the three months ended March 31, 2022 primarily consisted of purchases of property and equipment of $3.6 million associated with Foundry capacity and capability investments, prepayment for marketable equity securities of $3.7 million and relinquishment of $28.8 million in cash upon the deconsolidation of Verb.

Net cash used in investing activities for the three months ended March 31, 2021 primarily consisted of purchases of property and equipment of $21.9 million associated with Foundry capacity and capability investments.

Financing Activities

Net cash used in financing activities for the three months ended March 31, 2022 primarily consisted of principal payments on capital leases and lease financing obligations and tax withholding payments related to net share settlement of equity awards.

Net cash used in financing activities for the three months ended March 31, 2021 primarily consisted of principal payments on capital leases and lease financing obligations and payments of deferred offering costs.

Critical Accounting Estimates

There have been no material changes to our critical accounting estimates as compared to the critical accounting estimates disclosed in "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our 2021 Annual Report on Form 10-K.

Recently Issued Accounting Pronouncements

See Note 1, "Basis of Presentation and Summary of Significant Accounting Policies," of our condensed consolidated financial statements contained in Part I, Item 1 of this Quarterly Report on Form 10-Q for a discussion of recently issued accounting pronouncements.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

Interest Rate Fluctuation Risk

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our cash equivalents are invested in short-term U.S. Treasury and government obligations. However, because of the short-term nature of the instruments in our portfolio, an immediate change in market interest rates of 100 basis points would not have a material impact on the fair market value of our cash and cash equivalents or on our financial position or results of operations.

Foreign Currency Fluctuation Risk

We are subject to foreign currency exchange risk from the translation of the financial statements of our foreign subsidiary, whose financial condition and results of operations are reported in Euros and then translated into U.S. dollars at the applicable currency exchange rate for inclusion in our consolidated financial statements. Foreign currency translation adjustments were $0.6 million for the three months ended March 31, 2022. Additionally, we have contracted with and may continue to contract with foreign vendors.

Inflation Fluctuation Risk

Inflation generally affects us by increasing our cost of labor. We do not believe that inflation had a material effect on our business, financial condition or results of operations during the three months ended March 31, 2022.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Exchange Act Rule 13a–15(e) and 15d-15(e)) as of March 31, 2022. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that the Company's disclosure controls and procedures were effective as of March 31, 2022.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting (as such term is defined in Exchange Act Rule 13a–15(f) and 15d-15(f)) during the most recent fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

From time to time, we may in the ordinary course of business be named as a defendant in lawsuits, indemnity claims and other legal proceedings. We do not believe any pending litigation to be material, the outcome of which would, in management's judgment based on information currently available, have a material adverse effect on our results of operations or financial condition. See Note 7, *Commitments and Contingencies*, to the unaudited condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q.

Item 1A. Risk Factors.

An investment in our securities involves a high degree of risk. You should carefully consider the following risk factors, together with all of the other information included in this Quarterly Report on Form 10-Q, before making an investment decision. Our business, prospects, financial condition or operating results could decline due to any of these risks and, as a result, you may lose all or part of your investment.

Unless the context otherwise requires, all references in this section to the "Company," "we," "us" or "our" refer to the business of Ginkgo and its subsidiaries.

Risks Related to Ginkgo's Business

We have a history of net losses. We expect to continue to incur losses for the foreseeable future, and we may never achieve or maintain profitability.

We have incurred significant operating losses since our inception. Our net loss attributable to our stockholders was approximately $590.5 million and $73.6 million for the three months ended March 31, 2022 and 2021, respectively. As of March 31, 2022, we had an accumulated deficit of approximately $2,888.4 million. We may incur losses and negative cash flow from operating activities for the foreseeable future as we continue to invest significant additional funds toward further developing our platform, the cell programs we perform on behalf of our customers and otherwise growing our business. Our operating expenses have increased as a result of becoming a public company, and we expect that our operating expenses will continue to increase as we grow our business. We have derived a significant portion of our revenues from fees and milestone payments from technical development services provided to customers to advance programs. Historically, these fees have not been sufficient to cover the full cost of our operations. Additionally, if our customers terminate their agreements or development plans with us, our near-term revenues could be adversely affected. In addition, certain of our customer agreements provide for milestone payments, future royalties and other forms of contingent consideration, the payment of which are uncertain, as they are dependent on our ability to successfully develop engineered cells, bioprocesses, or other deliverables and our customers' ability and willingness to successfully develop and commercialize products and processes.

Our expenses may exceed revenues for the foreseeable future and we may not achieve profitability. If we fail to achieve profitability, or if the time required to achieve profitability is longer than we anticipate, we may not be able to expand or continue our business, and the value of our common stock could be negatively impacted. Our ability to achieve or sustain profitability is based on numerous factors, many of which are beyond our control, including the development of our platform, the initiation of new programs with new and existing customers, the commercial terms of our programs, our ability to advance cell engineering programs in a timely and cost-effective manner, our ability to extend new offerings to customers, our customers' ability to scale up bioprocesses, the ability of our customers to produce and sell products, the impact of market acceptance of our customers' products, and our customers' market penetration and margins. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis.

We may need substantial additional capital in the future in order to fund our business.

We have consumed considerable amounts of capital to date, and we expect to incur continued net losses over the next several years as we continue to develop our business, advance our programs, expand and enhance our platform, and make the capital investments necessary to scale up our Foundry operations and Codebase assets. We may also use additional capital for strategic investments and

acquisitions. We believe that our cash and cash equivalents, short-term investments, and interest earned on investments will be sufficient to meet our projected operating requirements for several years and until we reach profitability. However, these assumptions may prove to be incorrect and we could exhaust our available capital resources sooner than we currently expect. Because of the numerous risks and uncertainties associated with our programs, including risks and uncertainties that could impact the rate of progress of our programs, we are unable to estimate with certainty the amounts of capital outlays and operating expenditures associated with these activities.

We do not currently have any commitments for future funding. We may receive fees, milestones, and royalty payments under our customer agreements, but these are not guaranteed. Additionally, we may be able to sell our equity interests in certain subsidiaries or collaborations but most of these equity stakes are illiquid (e.g., in private companies) and we may not be able to find a buyer or may incur significant impairment if forced to sell these positions for liquidity. We may not receive any further funds under those agreements, the funds we receive may be lower than projected, or our program costs may be higher than projected. In addition, we may not be able to sign new customer agreements or enter into new development plans with existing customers with adequate funds to cover program development expenses. As a result of these and other factors, we do not know whether additional financing will be available when needed, or, if available, whether such financing would be on terms favorable to our stockholders or us.

If future financings involve the issuance of equity securities, our existing stockholders would suffer dilution. If we raise debt financing in the future, we may be subject to restrictive covenants that limit our ability to conduct our business. Our ability to raise funds may be adversely impacted by current or future economic conditions. If we fail to raise sufficient funds and continue to incur losses, our ability to fund our operations, take advantage of strategic opportunities, or otherwise respond to competitive pressures could be significantly limited. If adequate funds are not available, we may not be able to successfully execute our business plan or continue our business.

We have experienced rapid growth and expect our growth to continue, and if we fail to effectively manage our growth, then our business, results of operations, and financial condition could be adversely affected.

We have experienced substantial growth in our business since inception, which has placed and may continue to place significant demands on our company culture, operational infrastructure, and management. We believe that our culture has been a critical component of our success. We have invested substantial time and resources in building our team and nurturing a culture of empowerment of, and active engagement by, our employees. As we expand our business and mature as a public company, we may find it difficult to maintain our culture while managing this growth. Any failure to manage our anticipated growth and organizational changes in a manner that preserves the key aspects of our culture could be detrimental to future success, including our ability to recruit and retain personnel, and effectively focus on and pursue our objectives. This, in turn, could adversely affect our business, results of operations, and financial condition.

In addition, in order to successfully manage our rapid growth, our organizational structure has become more complex and is likely to continue to become more complex. In order to manage these increasing complexities, we will need to continue to scale and adapt our operational, financial, and management controls, as well as our reporting systems and procedures. The expansion of our systems and infrastructure will require us to commit substantial financial, operational, and management resources before our revenue increases and without any assurances that our revenue will increase.

Finally, continued growth could strain our ability to maintain reliable service levels and offerings for our customers. If we fail to achieve the necessary level of capacity, quality and efficiency in performing services and other development activities, or the necessary level of efficiency in our organizational structure as we grow, then our business, results of operations, and financial condition could be adversely affected.

Our limited operating history makes it difficult to evaluate our current business and future prospects.

We have a portfolio of cell engineering programs which vary in start date, duration, complexity, and revenue potential. Additionally, our downstream economics in the form of equity interests, milestone payments, or royalty streams add an additional level of uncertainty to our possible future performance. Consequently, predictions about our future success or viability are highly uncertain and may not be as accurate as they could be if we had a longer company history of successfully developing, commercializing and generating revenue from our programs and/or downstream economic participation. With respect to our biosecurity offering, prior to

2020, we had no experience developing or commercializing testing services. Moreover, as described above, given the limited operating history of our biosecurity offering, our reliance on school funding for testing, potential disruptions from vaccine rollout generally, the availability of COVID-19 therapeutics, the impact of summer vacation and other school breaks, and the increased availability of over-the-counter testing options, the future performance of our COVID-19 testing program is unpredictable. Moreover, we cannot predict how long the COVID-19 pandemic will continue and, therefore, we cannot predict the duration of the revenue stream, which could diminish significantly, from our COVID-19 testing services.

Our long-term objective is to generate free cash flow from the commercialization of programs by customers across a variety of industries, as well as, from our biosecurity-focused offerings. Our estimated costs and timelines for the completion of programs are based on our experiences to date and our expectations for each stage of the program in development. Given the variety of types of programs we support and the continued growth of our platform, there is variability in timelines and costs for launching and executing programs, and completion dates can change over the course of a customer engagement. In addition, our costs and timelines may be greater or subject to variability where regulatory requirements lead to longer timelines, such as in agriculture, food, and therapeutics. In addition, we have equity interests in certain companies and there is and will continue to be variability in the financial performance of these other companies or future companies in which we may have equity interests.

As a business with a limited operating history, we may encounter unforeseen expenses, difficulties, complications, delays, and other known and unknown obstacles. We have encountered in the past, and will encounter in the future, risks and uncertainties frequently experienced by growing companies with limited operating histories in emerging and rapidly changing industries. If our assumptions regarding these risks and uncertainties, which we use to plan and operate our business, are incorrect or change, or if we do not address these risks successfully, our results of operations could differ materially from our expectations, and our business, financial condition, and results of operations could be adversely affected.

If we cannot maintain and expand current customer partnerships and enter into new customer partnerships, our business could be adversely affected.

We do not generate substantial revenue from our own products, and instead generate revenue from customer collaborations in which we provide services, and also receive downstream value in the form of royalties, equity, or milestone payments. As a result, our success depends on our ability to expand the number, size and scope of our customer collaborations. Our ability to win new business depends on many factors, including our reputation in the market, the quality of our service offerings relative to alternatives, the pricing and efficiency of our services relative to alternatives, and our technical capabilities. If we fail to maintain a position of strength in any of these factors, our ability to either sign new customer collaborations or launch new programs with existing customers may suffer and this could adversely affect our prospects. Additionally, in the process of developing programs, we generate Foundry know-how and accumulate meaningful biological and data assets, including optimized proteins and organisms, characterized genetic parts, enhanced understanding of metabolic pathways, biological, chemical, and genetic libraries, and other elements of biological data. Data and know-how generated from our programs provide the basis for expanded capabilities that we believe further supports our customer collaborations. As a result, in addition to reducing our revenue or delaying the development of our programs, the loss of one or more of our customer relationships or the failure to add new customers or programs may hinder our accumulation of such information, thus hindering our efforts to advance our technological differentiation and improve our platform.

We engage in conversations with companies regarding potential customer collaborations on an ongoing basis. We may spend considerable time and money engaging in these conversations and feasibility assessments, including understanding the technical approach to a program, customer concerns and limitations, and legal or regulatory landscape of a potential program or offering, which may not result in a commercial agreement. Even if an agreement is reached, the resulting relationship may not be successful for many reasons, including our inability to complete a program to our customers' specifications or within our customers' time frames, or unsuccessful development or commercialization of products or processes by our customers. In such circumstances, our revenues and downstream value potential from such a collaboration might be meaningfully reduced.

We currently own and may in the future own equity interests in other operating companies, including certain of our customers; consequently, we have exposure to the volatility and liquidity risks inherent in holding their equity and overall operational and financial performance of these businesses.

We currently own equity interests in several of our customers. In the future, we may also own equity interests in other companies. The process by which we receive equity interests and the factors we consider in deciding whether to accept, hold or dispose of these equity positions may differ significantly from those that an independent investor would evaluate when considering equity interests in a company. Owning equity increases our exposure to the risks of the other company and, in the case of customers, beyond the products of our collaborations. Our equity ownership positions expose us to market volatility and the potential for negative returns. We may have restrictions on resale or limited markets to sell our equity ownership. In many cases, our equity position is a minority position which exposes us to further risk, as we are not able to exert control over the companies in which we hold securities.

In connection with future collaborations or joint ventures, we may, from time to time, receive warrants or options, all of which involve special risks. To the extent we receive warrants or options in connection with future collaborations or joint ventures, we would be exposed to risks involving pricing differences between the market value of underlying securities and our exercise price for the warrants or options, a possible lack of liquidity, and the related inability to close a warrant or option position, all of which could ultimately have an adverse effect on our financial position.

We leverage our own resources and partner with strategic and financial investors in order to help early stage companies and innovators secure funding and benefit from our platform, which exposes us to a number of risks.

Since our founding, we have helped to launch new companies (such as BiomEdit LLC, Motif FoodWorks, Inc., Allonnia LLC, Arcaea LLC (formerly known as Kalo), Ayana Bio, LLC and Verb Biotics, LLC) by bringing together strategic and financial investors to secure funding for these early stage and small companies. Going forward, we intend to continue to leverage our own balance sheet and partner with investors to enable companies at all stages to benefit from our platform.

Partnering with and investing in early stage and small companies may expose us to a number of risks, including that early stage and small companies may have:

- shorter operating histories, narrower product lines and smaller market shares than larger businesses, which tend to render small companies more vulnerable to competitors' actions and market conditions, as well as general economic downturns;
- more limited access to capital and higher funding costs, may be in a weaker financial position and may need more capital than originally anticipated to expand, compete and operate their business;
- the inability to obtain financing from the public capital markets or other traditional sources, such as commercial banks, in part because loans made to these types of companies entail higher risks than loans made to companies that have larger businesses, greater financial resources or are otherwise able to access traditional credit sources on more attractive terms;
- a higher likelihood of depending on the management talents and efforts of a small group of persons; therefore, the death, disability, resignation or termination of one or more of these persons could have a material adverse impact on such company and, in turn, on us;
- less predictable operating results, may be engaged in rapidly changing businesses with products subject to a substantial risk of obsolescence, and may require substantial additional capital to support their operations, finance expansion or maintain their competitive position;
- particular vulnerabilities to changes in customer preferences and market conditions, depend on a limited number of customers, and face intense competition, including from companies with greater financial, technical, managerial and marketing resources; and
- fewer administrative resources, which can lead to greater uncertainty in their ability to generate accurate and reliable financial data, including their ability to deliver audited financial statements.

Any of these factors or changes thereto could impair an early stage or small company's financial condition, results of operation, cash flow or result in other adverse events, such as bankruptcy. This, in turn, could result in losses in our investments and a change in our income (loss) on investments.

We may pursue strategic acquisitions and investments that are dilutive to our stockholders and that could have an adverse impact on our business if they are unsuccessful.

We have made acquisitions in the past and, as appropriate opportunities become available, we may acquire additional businesses, assets, technologies, or products to enhance our business in the future, but our ability to do so successfully cannot be ensured. We have also made investments in companies that we view as synergistic with our business. Although we conduct due diligence on these acquisitions and investments, such processes may fail to reveal significant liabilities and we could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by indemnification we may obtain from the seller. Even if we identify suitable opportunities, we may not be able to complete such acquisitions on favorable terms or at all, which could increase the potential for litigation. Any acquisitions we make may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt or spend cash in connection with a strategic acquisition, which may cause us to face liquidity concerns or be subject to restrictive covenants in the future. We have, and in the future may, also issue common stock or other equity securities to the stockholders of the acquired company, which could constitute a material portion of our then-outstanding shares of common stock and may reduce the percentage ownership of our existing stockholders.

In addition, we may not be able to successfully integrate the acquired personnel, assets, technologies, products and/or operations into our existing business in an effective, timely, and non-disruptive manner or retain acquired personnel following an acquisition. Acquisitions may also divert management's attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. In addition, we may not be able to fully recover the costs of such acquisitions or be successful in leveraging any such strategic transactions into increased business, revenue, or profitability. We also cannot predict the number, timing, or size of any future acquisitions or the effect that any such transactions might have on our operating results.

Accordingly, although there can be no assurance that we will undertake or successfully complete any future acquisitions, any transactions that we do complete may not yield the anticipated benefits and may be subject to the foregoing or other risks and have a material and adverse effect on our business, financial condition, results of operations, and prospects. Conversely, any failure to pursue or delay in completing any acquisition or other strategic transaction that would be beneficial to us, including those caused by competing parties, could delay the development of our platform or advancement of our programs and, thus, potential commercialization of our customer's products.

Our programs may not achieve milestones and other anticipated key events on the expected timelines or at all, which could have an adverse impact on our business and could cause the price of our common stock to decline.

We may adopt various technical, manufacturing, regulatory, commercial, and other objectives for our programs. These milestones may include our or our customers' expectations regarding the commencement or completion of technical development, the achievement of manufacturing targets, the submission of regulatory filings, or the realization of other development, regulatory, or commercialization objectives by us or our customers. The achievement of many of these milestones may be outside of our control. All of these milestones are based on a variety of assumptions, including assumptions regarding capital resources, constraints, and priorities, progress of and results from research and development ("R&D") activities, and other factors, including impacts resulting from the COVID-19 pandemic, any of which may cause the timing of achievement of the milestones to vary considerably. If we, our collaborators, or our customers fail to achieve milestones in the expected timeframes, the commercialization of our programs may be delayed, our credibility may be undermined, our business and results of operations may be harmed, and the trading price of our common stock may decline.

We must continue to secure and maintain sufficient and stable supplies of laboratory reagents, consumables, equipment, and laboratory services. We depend on a limited number of suppliers, some of which are single-source suppliers, and contract manufacturers for critical supplies, equipment, and services for research, development, and manufacturing of our products and processes. Our reliance on these third parties exposes us to risks relating to costs, contractual terms, supply, and logistics, and the loss of any one or more of these suppliers or contract manufacturers or their failure to supply us with the necessary supplies, equipment, or services on a timely basis, could cause delays in our research, development, or production capacity and adversely affect our business.

The COVID-19 pandemic has caused substantial disruption in global supply chains and the ability of third parties to provide us services on a timely basis or at all. As a result, we have experienced shortages in some of our key equipment and supplies, including those required in our labs, as well as disruptions in services provided by third parties, and may continue to do so in the future as a result of the pandemic, or otherwise. We may also experience price increases, quality issues and longer lead times due to unexpected material shortages, service disruptions, and other unanticipated events, which may adversely affect our supply of lab equipment, lab supplies, chemicals, reagents, supplies, and lab services. For some suppliers, we do not enter into long-term agreements and instead secure our materials and services on a purchase order basis. Our suppliers may reduce or cease their supply of materials or services to us at any time in the future. If the supply of materials or services is interrupted, our programs may be delayed.

We depend on a limited number of suppliers for critical items, including lab consumables and equipment, for the development of our programs. Some of these suppliers are single-source suppliers. We do not currently have the infrastructure or capability internally to manufacture these items at the necessary scale or at all. Although we have a reserve of supplies and although alternative suppliers exist for some of these critical products, services, and equipment, our existing processes used in our Foundries have been designed based on the functions, limitations, features, and specifications of the products, services, and equipment that we currently utilize. While we work with a variety of domestic and international suppliers, our suppliers may not be obligated to supply products or services or our arrangements may be terminated with relatively short notice periods. Additionally, we do not have any control over the process or timing of the acquisition or manufacture of materials by our manufacturers and cannot ensure that they will deliver to us the items we order on time, or at all.

In particular, we rely on Twist Bioscience Corporation for custom DNA synthesis and Thermo Fisher Scientific Inc. and others for certain instruments and consumables. The price and availability of DNA, chemicals, reagents, equipment, consumables, and instruments have a material impact on our ability to provide Foundry services. We also rely on third parties, such as Berkeley Lights, Inc., to develop workflows to use the equipment they provide to us. We may rely on contract manufacturers like Fermic, s.a. de.c.v for scale-up fermentation development, fermentation, and manufacturing of products for some customers.

The loss of the products, services, and equipment provided by one or more of our suppliers could require us to change the design of our research, development, and manufacturing processes based on the functions, limitations, features, and specifications of the replacement items or seek out a new supplier to provide these items. Additionally, as we grow, our existing suppliers may not be able to meet our increasing demand, and we may need to find additional suppliers. We may not be able to secure suppliers who provide lab supplies at, or equipment and services to, the specification, quantity, and quality levels that we demand (or at all) or be able to negotiate acceptable fees and terms of services with any such suppliers.

As described above, some lab equipment, lab consumables, and other services and materials that we purchase are purchased from single-source or preferred suppliers, which limits our negotiating leverage and our ability to rely on additional or alternative suppliers for these items. Our dependence on these single-source and preferred suppliers exposes us to certain risks, including the following:

- our suppliers may cease or reduce production or deliveries, raise prices, or renegotiate terms;
- we may be unable to locate a suitable replacement on acceptable terms or on a timely basis, if at all;
- if there is a disruption to our single-source or preferred suppliers' operations, and if we are unable to enter into arrangements with alternative suppliers, we will have no other means of continuing the relevant research, development, or manufacturing operations until they restore the affected facilities or we or they procure alternative sources of supply;
- delays caused by supply issues may harm our reputation, frustrate our customers, and cause them to turn to our competitors for future programs; and
- our ability to progress the development of existing programs and the expansion of our capacity to begin future programs could be materially and adversely impacted if the single-source or preferred suppliers upon which we rely were to experience a significant business challenge, disruption, or failure due to issues such as financial difficulties or bankruptcy, issues relating to other customers such as regulatory or quality compliance issues, or other financial, legal, regulatory, or reputational issues.

Moreover, to meet anticipated market demand, our suppliers may need to increase manufacturing capacity, which could involve significant challenges. This may require us and our suppliers to invest substantial additional funds and hire and retain the technical personnel who have the necessary experience. Neither we nor our suppliers may successfully complete any required increase to existing research, development, or manufacturing capacity in a timely manner, or at all.

For the quarter ended March 31, 2022, our cost of lab equipment, lab supplies, and lab services accounted for a significant portion of our total R&D expenses. In the event of price increases by suppliers, we may attempt to pass the increased costs to our customers. However, we may not be able to raise the prices of our Foundry services sufficiently to cover increased costs resulting from increases in the cost of our materials and services, or the interruption of a sufficient supply of materials or services. As a result, materials and services costs, including any price increase for our materials and services, may negatively impact our business, financial condition, and results of operations.

Some of our suppliers and contract manufacturers are foreign entities. We may face disruptions due to the inability to obtain customs clearances in a timely manner or restrictions on shipping or international travel due to the COVID-19 pandemic. As a result of ongoing global supply chain challenges resulting in very long lead times for certain products and equipment, we may order in larger volumes in order to secure the supplies we require for our future operations, which may negatively impact our financial conditions, especially if we are unable to use the supplies ordered.

We use biological, hazardous, flammable and/or regulated materials that require considerable training, expertise and expense for handling, storage and disposal and may result in claims against us.

We work with biological and chemical materials that could be hazardous to human, animal, or plant health and safety or the environment. Our operations produce hazardous and biological waste products, and we largely contract with third parties for the disposal of these products. Federal, state, and local laws and regulations govern the use, generation, manufacture, storage, handling, and disposal of these materials and wastes. Compliance with applicable laws and regulations is expensive, and current or future laws and regulations may restrict our operations. If we do not comply with applicable laws and regulations, we may be subject to fines and penalties.

In addition, we cannot eliminate the risk of (a) accidental or intentional injury or (b) release, or contamination from these materials or wastes, which could expose us to liability. Furthermore, laws and regulations are complex, change frequently, and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. Accordingly, in the event of release, contamination, or injury, we could be liable for the resulting harm or penalized with fines in an amount exceeding our resources and our operations could be suspended or otherwise adversely affected. These liabilities could also include regulatory actions, litigation, investigations, remediation obligations, damage to our reputation and brand, supplemental disclosure obligations, loss of customer, consumer, and partner confidence in the safety of our laboratory operations, impairment to our business, and corresponding fees, costs, expenses, loss of revenues, and other potential liabilities, as well as, increased costs or loss of revenue or other harm to our business.

The release of GMOs or Genetically Modified Materials, whether inadvertent or purposeful, into uncontrolled environments could have unintended consequences, which may result in increased regulatory scrutiny and otherwise harm our business and financial condition.

The genetically engineered organisms and materials that we develop may have significantly altered characteristics compared to those found in the wild, and the full effects of deployment or release of our genetically engineered organisms and materials into uncontrolled environments may be unknown. In particular, such deployment or release, including an unauthorized release, could impact the environment or community generally or the health and safety of our employees, our customers' employees, and the consumers of our customers' products.

In addition, if a high profile biosecurity breach or unauthorized release of a biological agent occurs within our industry, our customers and potential customers may lose trust in the security of the laboratory environments in which we produce genetically modified organisms ("GMOs") and genetically modified plant or animal cells and genetically modified proteins and biomaterials (collectively, "Genetically Modified Materials"), even if we are not directly affected. Any adverse effect resulting from such a release, by us or others, could have a material adverse effect on the public acceptance of products from engineered cells and our business and financial

condition. Such a release could result in increased regulatory scrutiny of our facilities, platform, and programs, and could require us to implement additional costly measures to maintain our regulatory permits, licenses, authorizations and approvals. To the extent such regulatory scrutiny or changes impact our ability to execute on existing or new programs for our customers, or make doing so more costly or difficult, our business, financial condition, or results of operations may be adversely affected. In addition, we could have exposure to liability for any resulting harm, as well as to regulatory actions, litigation, investigations, remediation obligations, damage to our reputation and brand, supplemental disclosure obligations, loss of customer, consumer, and partner confidence in the safety of engineered cells materials and organisms, impairment to our business, and corresponding fees, costs, expenses, loss of revenues, and other potential liabilities, as well as increased costs or loss of revenue or other harm to our business.

We could synthesize DNA sequences or engage in other activity that contravenes biosecurity requirements, or regulatory authorities could promulgate more far-reaching biosecurity requirements that our standard business practices cannot accommodate, which could give rise to substantial legal liability, impede our business, and damage our reputation.

The Federal Select Agent Program ("FSAP") involves rules administered by the Centers for Disease Control and Prevention and the Animal and Plant Health Inspection Service that regulate possession, use, and transfer of biological select agents and toxins that have the potential to pose a severe threat to public, animal, or plant health or to animal or plant products. In accordance with the International Gene Synthesis Consortium's ("IGSC") Harmonized Screening Protocol for screening of synthetic DNA sequence orders, we follow biosafety and biosecurity industry practices and avoid DNA synthesis activities that implicate FSAP rules by screening synthetic DNA sequence orders against the IGSC's Regulated Pathogen Database; however, we could err in our observance of compliance program requirements in a manner that leaves us in noncompliance with FSAP or other biosecurity rules. In addition, authorities could promulgate new biosecurity requirements that restrict our operations. One or more resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business, financial condition, or results of operations.

Third parties may use our engineered cells, materials, and organisms and accompanying production processes in ways that could damage our reputation.

After our customers have received our engineered cells, materials, and organisms and accompanying production processes, we do not have any control over their use and our customers may use them in ways that are harmful to our reputation. In addition, while we have established a biosecurity program designed to comply with biosafety and biosecurity requirements and export control requirements in an effort to ensure that third parties do not obtain our engineered cells or other biomaterials for malevolent purposes, we cannot guarantee that these preventative measures will eliminate or reduce the risk of the domestic and global opportunities for the misuse or negligent use of our engineered cells materials, and organisms and production processes. Accordingly, in the event of such misuse or negligent use, our reputation, future revenue, and operating results may suffer.

International expansion of our business exposes us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

We currently market our services and deliver our programs, materials, and processes outside of the United States and may market future offerings outside of the United States. We, and our suppliers, collaborators, and customers, currently conduct business outside of the United States. From time to time, our services may include the hiring or secondment of our employees outside the United States at third party facilities or require the hiring or secondment of foreign persons within our facilities, including as a result of foreign acquisitions. Accordingly, we are subject to a variety of risks inherent in doing business internationally, and our exposure to these risks will increase as we continue to expand our operations and customer base. These risks include:

- political, social and economic instability;
- fluctuations in currency exchange rates;
- higher levels of credit risk, corruption, and payment fraud;
- enhanced difficulties of integrating any foreign acquisitions;
- increased expenses and diversion of our management's attention from advancing programs;

- regulations that might add difficulties in repatriating cash earned outside the United States and otherwise prevent us from freely moving cash;
- import and export controls and restrictions and changes in trade regulations;
- compliance with the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act, and similar laws in other jurisdictions;
- multiple, conflicting and changing laws and regulations such as privacy, security and data use regulations, tax laws, tariffs, trade regulations, economic sanctions and embargoes, employment laws, anti-corruption laws, regulatory requirements, reimbursement or payor regimes and other governmental approvals, permits and licenses;
- failure by us, our collaborators or our customers to obtain regulatory clearance, authorization or approval for the use of our services in various countries;
- additional potentially relevant third-party patent rights;
- complexities and difficulties in obtaining intellectual property protection and enforcing our intellectual property;
- difficulties in staffing and managing foreign operations, including difficulties related to the increased operations, travel, infrastructure and legal compliance costs associated with international locations;
- logistics and regulations associated with shipping chemicals, biomaterials and product samples, including infrastructure conditions and transportation delays;
- financial risks, such as longer payment cycles, difficulty collecting accounts receivable, the impact of local and regional financial crises, on demand and payment for our products and exposure to foreign currency exchange rate fluctuations;
- natural disasters, political and economic instability, including wars (including the Russian invasion of Ukraine), terrorism and political unrest, the outbreak of disease, or public health epidemics, such as COVID-19, which could have an adverse impact on our employees, contractors, customers, partners, travel and the global economy;
- breakdowns in infrastructure, utilities and other services;
- boycotts, curtailment of trade and other business restrictions; and
- the other risks and uncertainties described in this Quarterly Report on Form 10-Q.

Additionally, as part of our growth strategy, we will continue to evaluate potential opportunities for international expansion. Operating in international markets requires significant resources and management attention and will subject us to regulatory, economic and political risks in addition to those we face in the United States. However, our international expansion efforts may not be successful, which could limit the size of our market or the ability to provide services or programs internationally.

In addition, due to potential costs from any international expansion efforts and potentially higher supplier costs outside of the United States, our international operations may operate with a lower margin profile. As a result, our margins may fluctuate as we expand our operations and customer base internationally.

Any of these factors could significantly harm our future international expansion and operations and, consequently, our revenue and results of operations.

Risks Related to Our Customers

We rely on our customers to develop, produce and manufacture products using the engineered cells and/or biomanufacturing processes that we develop. If these initiatives by our customers are not successful or do not achieve commercial success, or if our customers discontinue their development, production and manufacturing efforts using our engineered cells and/or biomanufacturing processes, our future financial position may be adversely impacted.

We operate as a platform company. As such, we rely on our customers to commercialize products that may be enabled by our engineered cells and/or biomanufacturing processes. A portion of the value in our customer collaborations is earned through downstream value sharing in the form of equity, royalty streams, or milestone payments. If our customers are not successful in bringing these products to market, the downstream portion of our value will be adversely impacted. Because we do not directly control manufacturing, product or downstream process development or commercialization, we have limited ability to impact the quality of our partners' production processes and ultimate commercial success.

In addition, our customers may simply choose not to develop or commercialize a product we have enabled in which we are entitled to downstream value sharing. In our current relationships, we would have limited or no recourse to find alternative methods to monetize these products without the original customer. Because this industry is still nascent and the regulatory environment is evolving, we have limited historical information on the probability of commercial success for bioengineered products or biomanufacturing processes in the market and have limited ability to underwrite the likelihood that our customers will be able to create valuable products or processes in their market using the results of their programs with us. If we overestimate the probability of commercial success, the price of our common stock may be adversely impacted as a result of lower expectations for future cash flows from customer collaborations.

Our revenue is concentrated in a limited number of customers, some of which are related parties, and our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer.

We have derived, and may continue to derive, a significant portion of our revenue from a limited number of large customers. During the quarter ended March 31, 2022, three customers each represented more than 10% of our total revenue and cumulatively represented 40% of our total revenue. Due to the significant time required to acquire new customers, to plan and develop new programs for customers, and to satisfactorily execute on existing programs, the loss of one or both of these customers, or the loss of any other significant customer or a significant reduction in the amount of demand from a significant customer would adversely affect our revenue, results of operations, cash flows and reputation in the marketplace. There is always a risk that existing customers will not elect to do business with us in the future or will experience financial difficulties. If our customers experience financial difficulties or business reversals which reduce or eliminate the need for our services, they may be unable or unwilling to fulfill their contracts with us. There is also the risk that our customers will attempt to impose new or additional requirements on us that reduce the profitability of the services performed by us. Our customer concentration also increases the concentration of our accounts receivable and our exposure to payment defaults by key customers, which could expose us to substantial and potentially unrecoverable costs if we do not receive payment from key customers. Additionally, the loss of any significant customer could pose reputational harm to us and make it more challenging to acquire new customers.

In addition, while our customer collaborations are typically multi-year, we generally do not require our customers to generate a minimum amount of annual demand and without such contracts, our customers are not obligated to use our services beyond the amounts they choose to incur. Our customers may choose to use fewer of our services depending on program progress, their own technological capabilities, market demand for their products and/or their own internal budget cycles. As a result, we cannot accurately predict our customers' decisions to reduce or cease utilizing our services. Even where we enter into long-term contracts with our customers, there is no guarantee that such agreements will be negotiated on terms that are commercially favorable to us in the long-term. In addition, existing customers may choose to perform some or all of the services they expect from us internally, with another third-party partner or by using capabilities from acquisitions of assets.

In certain cases, our business partners may have discretion in determining when and whether to make announcements about the status of our collaborations, including about developments and timelines for advancing programs, and the price of our common stock may decline as a result of announcements of unexpected results or developments.

Generally, we and our customers must mutually agree on determining when and whether to make announcements about the status of our collaborations, including developments in our programs and timelines for commercialization of or improvements to products using engineered cells developed using our platform. However, in some cases our customers may report or otherwise may be obligated to disclose certain matters without our consent. Our partners may also wish to report such information more or less frequently than we intend to or may not wish to report such information at all. We or our partners may announce a collaboration or partnership even if there is no guarantee that we will recognize program fees. The price of our common stock may decline as a result of a public

announcement of unexpected results or developments in our partnerships, or as a result of our partners not consenting to an announcement or withholding information.

Risks Related to the COVID-19 Pandemic

The recent COVID-19 pandemic and the global attempt to contain it may harm our business and results of operations.

The full impact of the continuing COVID-19 pandemic and related public health measures on our business will depend largely on future developments, including the duration and severity of the pandemic, which remains highly uncertain. Extraordinary actions have been taken by international, federal, state and local public health and governmental authorities to contain and combat the outbreak and spread of COVID-19 throughout the world, including travel bans, quarantines, capacity limitations at facilities, "stay-at-home" orders and similar mandates for many individuals to substantially restrict daily activities and for many businesses to curtail or cease normal operations. Additionally, our operations rely on the availability of laboratory scientists, engineers and facility, safety, quality and compliance personnel to work on-site. If a critical team member falls ill or needs to quarantine, or if a critical mass of our personnel falls ill or needs to quarantine, we may not be able to continue operations. The COVID-19 pandemic has also had an adverse effect on our ability to attract, recruit, interview and hire at the pace we would typically expect to support our rapidly expanding operations, as well as on our ability to build out facilities to accommodate expanding operations.

The COVID-19 pandemic has had, and is expected to continue to have, an adverse impact on our operations, particularly as a result of preventive and precautionary measures that we, other businesses, and governments are taking. For example, as part of these efforts and in accordance with applicable government directives, we initially temporarily suspended some programs at our facilities in Boston, Massachusetts in late March 2020. We have continued to operate within the rules and guidance applicable to our business during the pandemic, including by requiring physical distancing, quarantining our personnel and reducing capacity limits in our facilities, and operations at third-party facilities have been similarly impacted by governmental mandates and guidelines; however, a continuing implementation of these restrictions, or the implementation of additional restrictions, could further impact our ability to operate effectively and conduct ongoing R&D, laboratory operations, sales and marketing activities or other activities or operations, or lead to further compliance costs.

We have also incurred expenses associated with our efforts to accommodate personnel during the COVID-19 pandemic, including costs associated with the provision of COVID-19 testing to our personnel, safety accommodations, providing on-site amenities and enhanced on-site cleaning efforts, and we will continue to incur such expenses associated with our operations.

The pandemic has also caused substantial disruption in global supply chains. These interruptions may require us to suspend operations or delay programs. If we continually delay programs with existing customers, we may be in breach of our contracts with existing customers or customers may decide to cease doing business with us or have decreased demand for our products. We may also experience a slow-down in our pipeline of new programs or a termination of existing programs if our customers or potential customers face disruptions during the pandemic. Difficulties and delays such as those we have experienced and may experience in the future may prevent us from meeting our operating and financial goals, both in general and within our targeted timelines, and may cause our revenues and operating results to fluctuate from period to period.

Uncertainty regarding the ongoing demand and/or capacity (including capacity at third party clinical testing laboratories) of our COVID-19 individual and pooled sample tests could materially adversely affect our business.

Our COVID-19 testing programs are subject to inherent risks of commercial viability, such as demand for tests, price or market share erosion due to competition and the duration of the COVID-19 pandemic. We are in a highly competitive market – many companies have launched or are seeking to launch COVID-19 testing products and many of these companies already have an existing commercial and technical infrastructure to market and commercialize such offerings. We have limited experience marketing or commercializing diagnostic or pooled sample testing programs and may not be able to sufficiently support operations with our current base of personnel or recruit enough personnel to effectively commercialize COVID-19 testing programs, particularly during a pandemic, at which time the pipeline for experienced personnel will be in high demand. Moreover, as vaccines for COVID-19 and at-home or over-the-counter COVID-19 tests become more widely available, and as infection rates decrease, demand for COVID-19 testing may also decrease.

Our COVID-19 testing business relies heavily on the adoption of pooled testing in schools, which may be hesitant to adopt COVID-19 testing without positive support from parents or teachers. Although we make test validation results and protocols available to parents and teachers, they may not trust the accuracy of the tests or may have concerns about how the tests are performed, how samples are used or tracked and whether appropriate privacy measures are being taken with respect to individually identifiable health information, including genetic information. The ability for schools to pay for COVID-19 testing relies heavily on the availability of federal, state or local funding for testing. If such funding is depleted, discontinued or otherwise becomes unavailable, or if there are restrictions on the use of such funding for our pooled sample test offerings, our COVID-19 testing business may not be commercially viable. Our COVID-19 testing business is subject to seasonality concerns as the demand for COVID-19 testing in schools is diminished during summer vacations, as well as other school breaks. In addition, as a result of the recent FDA emergency use authorization of a COVID-19 vaccine for children five through eleven years of age, the demand for COVID-19 testing in schools could diminish significantly or be eliminated.

Creating the commercial and technical infrastructure to test on a mass scale is expensive. We may also be limited in our ability to scale up based on expense or unavailability of the required materials, equipment, personnel and infrastructure necessary to deliver diagnostic or pooled sample tests on a mass scale. We may not be able to recover our investment expenses with sufficient revenue generated by our diagnostic and pooled sample testing efforts.

Our ability to commercialize our testing programs is also subject to regulatory or governmental controls, decisions or actions. If the U.S. Department of Health and Human Services ("HHS") terminates its Declaration Justifying Emergency Use of Medical Countermeasures because the circumstances justifying emergency use no longer exist and, if the third-party COVID-19 tests that are used in our testing services are not able to obtain premarket approval, clearance or other marketing authorization from the U.S. Food and Drug Administration ("FDA"), we may be unable to market or distribute these COVID-19 tests, fulfill our contractual testing requirements or generate revenues from our test offerings. We may also experience price erosion if federal or state governments implement price controls.

Finally, the sale of each test is dependent on the supply of the appropriate collection devices authorized for use with the COVID-19 tests we utilize in our testing programs. Disruptions in this supply chain will have a material adverse effect on our ability to sell tests.

Uncertainty regarding the sales and delivery of our COVID-19 individual and pooled sample tests could materially adversely affect our business.

Although we have partnerships with third party clinical testing laboratories to support a high volume of pooled sample testing for COVID-19 nationally, pooled testing has not yet been adopted by all states nor have we established partnerships with clinical testing laboratories in all states. We are continuing to develop processes to scale capacity of COVID-19 pooled sample collection and testing. However, we can give no assurance that we will be able to successfully scale the pooled sample collection and test capacity or that we will be able to establish or maintain the collaborative third party relationships that support such testing capacity. In addition, even if we are able to scale to high volume testing nationwide, there can be no assurance that the testing capacity will be used.

We may be subject to tort liability if the COVID-19 tests we utilize in our testing programs provide inaccurate results.

The Public Readiness and Emergency Preparedness Act (the "PREP Act") provides immunity for manufacturers, distributors, program planners, qualified persons, and their officials, agents, and employees from certain claims under state or federal law for a "loss" arising out of the administration or use of a "covered countermeasure" in the United States. Distributors are certain persons or entities engaged in the distribution of drugs, biologics, or devices. Program planners include persons who supervise or administer a program with respect to the administration, distribution, provision, or use of a Covered Countermeasure (as defined in the PREP Act). Covered Countermeasures include security countermeasures and "qualified pandemic or epidemic products," including products intended to diagnose or treat pandemic or epidemic disease, such as COVID-19 diagnostic tests, as well as treatments intended to address conditions caused by such products. Covered Countermeasures must also be approved, cleared, or authorized for emergency use, or otherwise authorized for investigational use, by the FDA in order to be considered Covered Countermeasures under the PREP Act.

For these immunities to apply, the Secretary of HHS must issue a declaration in cases of public health emergency or "credible risk" of a future public health emergency. On March 10, 2020, the Secretary of HHS issued a declaration under the PREP Act and has issued

subsequent amendments thereto to provide liability immunity for activities related to certain countermeasures against the ongoing COVID-19 pandemic.

We act as the authorized distributor of certain third-party COVID-19 tests and collection kits that have received Emergency Use Authorization ("EUA") and supervise testing programs for our COVID-19 testing customers. While we believe our test distribution and program planning activities with respect to these programs would be covered under the provisions of the PREP Act, this cannot be assured. Also, there can be no assurance that the U.S. Congress will not act in the future to reduce coverage under the PREP Act or to repeal it altogether.

Furthermore, some of the third-party tests used as part of our pooled testing program are not covered by an EUA and, at this time, we do not believe that such testing services, administration, or program planning related to our pooled testing program will qualify for PREP Act immunity. If product liability lawsuits are brought against us in connection with allegations of harm connected to our COVID-19 testing services, we may incur substantial liabilities and may be required to limit our testing services. The PREP Act is a complex law with limited judicial precedent, and thus even for the third-party COVID-19 tests and collection kits used in our testing services that are subject to EUAs, we may have to expend significant time and legal resources to obtain dismissal of a lawsuit on the basis of PREP Act immunity.

If we cannot successfully defend ourselves against claims that our COVID-19 testing services caused injuries and if we are not entitled to immunity under the PREP Act, or the U.S. Congress limits or eliminates coverage under the PREP Act, or if the liability protections under the PREP Act are not adequate to cover all claims, we may incur substantial liabilities. Regardless of merit or eventual outcome, product liability claims may result in decreased demand for our services, injury to our reputation, costs to defend litigation, loss of revenue, and substantial money awards to customers.

We are dependent on our relationships with our telehealth partner to provide healthcare services, and our business would be adversely affected if those relationships were disrupted.

Our contractual relationships with our telehealth partner who provides physician authorization for COVID-19 diagnostic and screening testing may implicate certain state laws in the United States that generally prohibit non-physician entities from practicing medicine, exercising control over physicians or engaging in certain practices such as fee-splitting with physicians. There can be no assurance that these laws will be interpreted in a manner consistent with our practices or that other laws or regulations will not be enacted in the future that could have a material and adverse effect on our business, financial condition and results of operations. Regulatory authorities, state medical boards of medicine, state attorneys general and other parties, including our telehealth partner, may assert that we are engaged in the prohibited corporate practice of medicine, and/or that its arrangements with its telehealth partner constitutes unlawful fee-splitting. If a state's prohibition on the corporate practice of medicine or fee-splitting law is interpreted in a manner that is inconsistent with our practices, we would be required to restructure or terminate our relationship with our telehealth partner to bring our activities into compliance with such laws. A determination of non-compliance, or the termination of or failure to successfully restructure these relationships could result in disciplinary action, penalties, damages, fines, and/or a loss of revenue, any of which could have a material and adverse effect on our business, financial condition and results of operations. State corporate practice of medicine doctrines and fee-splitting prohibitions also often impose penalties on healthcare professionals for aiding the corporate practice of medicine, which could discourage our telehealth partner from providing services to us.

Risks Related to the Synthetic Biology Industry

Rapidly changing technology and emerging competition in the synthetic biology industry could make the platform, programs, and products we and our customers are developing obsolete or non-competitive unless we continue to develop our platform and pursue new market opportunities.

The synthetic biology industry is still emerging and is characterized by rapid and significant technological changes, frequent new product introductions and enhancements, and evolving industry demands and standards. Our future success will depend on our ability to sign and initiate new programs that address the evolving needs of our customers on a timely and cost-effective basis, to advance existing programs and to pursue new market opportunities that develop as a result of technological and scientific advances. Additionally, our customers may face significant competition or other risks which may adversely impact our business and results of operations.

There are a number of companies in the broader synthetic biology industry, and our future success will depend on our ability to maintain a competitive position with respect to technological advances. Technological development by others may result in our platform becoming obsolete. Our ability to compete successfully will depend on our ability to develop proprietary technologies that enable our customers to develop products using our platform in a manner that is either less expensive, faster, superior or otherwise differentiated from what a competitor's technologies and products might enable. If we are unable to continue to successfully advance our platform or the services it provides at scale, or if our customers are unable to commercialize the products or processes made or improved upon by using our platform, our business and results of operations will be adversely impacted.

Due to the significant lead time involved in launching a new program or developing a new product or process using our platform, our customers are required to make a number of assumptions and estimates regarding the commercial feasibility of a new program, including assumptions and estimates regarding the size of an emerging product category and demand for those end-products and processes which will use our technology, the ability to scale-up manufacturing processes to produce a product on a commercial scale, the ability to penetrate that emerging product category, customer adoption of a downstream product, the existence or non-existence of products being simultaneously developed by competitors, potential market penetration and obsolescence, planned or unplanned. As a result, it is possible that we may commence a new program with a customer who wishes to develop a product or process that has been displaced by the time of launch, addresses a market that no longer exists or is smaller than previously thought, that end-consumers do not like or otherwise is not competitive at the time of launch, in each case, after the incurrence of significant opportunity costs on our part to develop such product. The ultimate success of the products developed by our customers using our services may be dependent on the success of other markets in which we or our customers do not operate in or have knowledge or expertise or which, in each case, may not reach the size anticipated by us or our customers or may be replaced by another emerging product category or eliminated entirely.

The market, including customers and potential investors, may be skeptical of our ability to deliver on programs because they are based on a relatively novel and complex technology.

The market, including customers and potential investors, may be skeptical of the viability and benefits of bioengineered products as well as our enabling abilities, including our platform and programs, because they are based on a relatively novel approach and the adoption of complex technology. There can be no assurance that our platform and programs will be understood, approved, or accepted by customers, regulators and potential investors or that we will be able to sell our services profitably at competitive prices and with features sufficient to establish demand.

In addition, in order for novel products from our programs to be successfully commercialized, support from the entire relevant supply chain is needed. Relationships with all parts of the supply chain are important in order to gain visibility into market trends and feature and specification requirements and in order to ensure customers are able to successfully manufacture their products, obtain regulatory approval and gain access to key distribution channels. If we are unable to convince these potential customers, their suppliers, or the consumers who purchase products containing or made or developed using engineered cells and/or biomanufacturing processes, of the utility and value of such products or that such products are superior to the products they currently use, we will not be successful in entering these markets and our business and results of operations will be adversely affected. If potential investors are skeptical of the success of our platform or cell programs, our ability to raise capital and the value of our common stock may be adversely affected.

Ethical, legal and social concerns about GMOs and Genetically Modified Materials and their resulting products could limit or prevent the use of products or processes using our technologies, limit public acceptance of such products or processes and limit our revenues.

Our technologies and the technologies of our customers involve the use of genetically modified cells, organisms and biomaterials, including, without limitation, GMOs, genetically modified microorganisms ("GMMs"), Genetically Modified Materials and their respective products. The use, production and marketing of Genetically Modified Materials, are subject to laws and regulations in many countries, some of which are new and some of which are still evolving. In the United States, the FDA, the Environmental Protection Agency ("EPA") and the U.S. Department of Agriculture ("USDA") are the primary agencies that regulate the use of GMOs, GMMs and potential products derived from GMOs or GMMs. If regulatory approval of the Genetically Modified Materials or resulting products is not secured, our business operations, financial condition and our ability to grow as a business could be adversely affected. We expect to encounter regulations regarding Genetically Modified Materials in most, if not all, of the countries in which our

customers may seek to establish production capabilities or sell their products and the scope and nature of these regulations will likely be different from country to country. Governmental authorities could, for safety, social or other purposes, impose limits on, or implement regulation of, the use, production or marketing of Genetically Modified Materials. If our customers cannot meet the applicable requirements in other countries in which they intend to produce or sell their products, or if it takes longer than anticipated to obtain such approvals, our business could be adversely affected.

In addition, public perception regarding the safety and environmental hazards of, and ethical concerns over, Genetically Modified Materials or the processes used to create them, including gene editing or gene regulating technologies, could influence public acceptance of our and our customers' technologies, products, and processes. For instance, certain advocacy groups engage in efforts that include regulatory legal challenges and labeling campaigns for genetically modified products, as well as application of pressure to consumer retail outlets seeking a commitment not to carry genetically modified foods. These groups in the past have pressured retail food outlets and grocery store chains to publicly state that they will not carry genetically modified foods and have pressured food brands to publicly state that they will not use ingredients produced by genetically modified microbes. In addition, certain labeling-related initiatives have heightened consumer awareness of GMOs, which may make consumers less likely to purchase products containing GMO ingredients, which could have a negative impact on the commercial success of our customers' products and programs. These concerns could result in increased expenses, regulatory scrutiny, delays or other impediments to our programs. The subject of Genetically Modified Materials has received negative publicity, which has aroused public debate. This adverse publicity has led to, and could continue to lead to, greater regulation and trade restrictions on imports of Genetically Modified Materials or their resulting products. In addition, with the acquisitions of Dutch DNA Biotech B.V. and FGen AG ("FGen"), we are expanding into the European Union market, which has increased government regulation and scrutiny over genetically modified products. There is a risk that products produced using our technologies could cause adverse health effects or other adverse events, which could also lead to negative publicity, regulatory action or private litigation. If we are unable to overcome the ethical, legal and social concerns relating to genetic engineering, our programs could face increased expenses, regulatory scrutiny, delays or other impediments to deliver our programs or the commercialization of resulting products and processes.

Finally, the COVID-19 pandemic may increase biosecurity concerns by public and/or governmental stakeholders regarding genetic engineering technologies and risks around engineered viruses, microbes and organisms. Such concerns, restrictions, or governmental restrictions could limit the use of Genetically Modified Materials in our customers' products, which could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Intellectual Property

If we are unable to obtain, maintain and defend patents protecting our intellectual property, our competitive position will be harmed.

Our success depends in part on our ability to obtain and maintain intellectual property protection for our proprietary technologies. We protect our proprietary technologies through patents and trade secrets, both of which entail risk. If we are unable to obtain, maintain or protect intellectual property rights related to our technology, or if our intellectual property rights are inadequate, our competitive position, business, financial conditions, results of operations and prospects may be harmed.

Because of the volume and nature of our inventions, patent protection may not be practicable, available, or appropriate for some aspects of our proprietary technologies. While we own patents and pending patent applications in the United States and in foreign jurisdictions, these applications do not ensure the protection of our intellectual property. There may be prior art of which we are not aware. Additionally, obtaining, maintaining, defending and enforcing patents is costly, time consuming and complex, and we may not be able to file and prosecute all necessary or desirable patent applications, or maintain and enforce any patents that may issue from such patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our technologies before it is too late to obtain patent protection. Although we enter into confidentiality agreements with parties who have access to confidential or patentable aspects of our R&D output, such as our employees, collaborators, consultants, advisors and other third parties, any of these parties may breach the agreements and disclose such output before a patent application is filed, thereby jeopardizing our ability to seek patent protection.

Further, pending applications may not be issued or may be issued with claims significantly narrower than we currently seek. Patents for which claims have been allowed may be successfully challenged and invalidated. Unless and until our pending applications issue, their protective scope is impossible to determine and, even after issuance, their protective scope may be limited.

Recent changes in patent law have made patents covering life science inventions more difficult to obtain and enforce. Further legislative changes or changes in the interpretation of existing patent law could increase the uncertainty and cost surrounding the prosecution of our owned patent applications and the maintenance, enforcement or defense of our owned patents. The Leahy-Smith America Invents Act ("the Leahy-Smith Act") included changes that affect the way patent applications are prosecuted; redefine prior art; enable third-party submission of prior art to the United States Patent and Trademark Office ("USPTO") during patent prosecution; and provide cost-effective avenues for competitors and other third parties to challenge the validity of patents at USPTO-administered post-grant proceedings, including post-grant review, inter partes review, and derivation proceedings. Thus, the Leahy-Smith Act and its continued implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Other changes in the law may further detract from the value of life science patents and facilitate challenges to our patents. In some cases, we use genetic sequence information from naturally occurring organisms, which may not be patentable. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection for naturally occurring sequences and for inventions based on the observation and exploitation of natural phenomena. These decisions have weakened the rights of patent owners in certain situations. The U.S. Court of Appeals for the Federal Circuit has also issued a series of rulings that create obstacles to the patenting of groups of genetic sequences that share functional characteristics, making it more difficult to obtain claims to certain genetic constructs, particularly antibodies. These changes in the law have created uncertainty with respect to the validity and enforceability of patents covering natural and engineered sequences. Depending on future actions by the U.S. Congress, the federal courts and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could have a further material adverse effect on our patent rights and our ability to protect, defend and enforce our patent rights in the future.

Further, the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the United States and abroad. An adverse determination in any such challenge could result in loss of exclusivity, or patent claims being narrowed, invalidated or held unenforceable, in whole or in part. Any of these results could limit our ability to stop others from using or commercializing similar or identical technology to compete directly with us. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us. Such proceedings also may result in substantial cost and require significant time from our scientists and management, even if the eventual outcome is favorable to us.

The laws of some foreign countries do not protect intellectual property rights to the same extent as do the laws of the United States or may apply different rules concerning the assignment of intellectual property rights. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions. We may encounter similar difficulties, particularly as we expand to work with foreign employees and contractors and expand our collaboration activities into foreign markets. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents by foreign holders and, in some cases, do not favor the enforcement of patents at all, particularly patents in the life sciences. This could make it difficult for us to stop the infringement of our patents. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business and could be unsuccessful.

Reductions in the scope or enforceability of our patent protection may adversely affect our customers' ability to commercialize their products and may thus reduce our downstream value from royalties, equity, or commercial milestone payments.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position will be harmed.

Because patent protection may not be available or appropriate for significant aspects of the technology we are developing, our success may depend in large part on our proprietary information, including genetic and other chemical and biological data, processes, know-how, and other trade secrets developed over years of R&D, some of which are embodied in proprietary software. We rely heavily on

trade secret protections, especially in cases where we believe patents or other forms of registered intellectual property protection may not be appropriate or obtainable. However, trade secrets are difficult to protect. The secrecy of the Company's trade secrets must be maintained for them to retain their status and protection as trade secrets. While we strive to protect the secrecy of our trade secrets and other proprietary information, including by requiring our employees, customers, consultants, and contractors to enter into confidentiality agreements and instituting multilayered protections covering our digital environment and biomaterials, we may not be able to adequately protect our trade secrets or other proprietary information. We cannot guarantee that we have entered into such agreements with every party that may have or has had access to our trade secrets, biomaterials or proprietary technology and processes. Further, despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches.

We seek to preserve the integrity and confidentiality of our information by maintaining physical security of our premises and physical and electronic security of our information technology systems, but it is possible that these security measures could be breached. We also rely on systems provided by third parties, which may suffer security breaches or incidents. Such security breaches may be inadvertent or may come about due to intentional misconduct or other malfeasance or by human error or technical malfunctions, including those caused by hackers, employees, contractors, or vendors. It may be difficult or impossible to recover trade secrets or other confidential information once it is hacked, and hackers may operate from jurisdictions that will not cooperate with such efforts. Enforcing any claim that a third party unlawfully obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts in some jurisdictions are less willing or unwilling to protect trade secrets even when a hacker or thief can be identified.

Our competitors may lawfully obtain or independently develop knowledge that is equivalent to one or more of our trade secrets. Were they to do so, we would be unable to prevent them from using that independently developed knowledge. Such a competitor could claim that we had learned the trade secret from them and bring an action against us on that basis. If any of our trade secrets were to be disclosed to or independently developed by a competitor or other third party, our competitive position could be materially and adversely harmed. Moreover, a competitor could file for patent protection covering intellectual property that we have chosen to protect as a trade secret. In such a case, we might be restricted or excluded from using that intellectual property even if we had developed it before our competitor did.

Our facilities hold large collections of microbial strains, cell lines and other biomaterials. Failure to implement adequate controls and protections, failure to implement adequate disposal procedures, unauthorized visitors in the labs, or customers' failure to adequately protect biological materials can put us and our customers at risk of losing valuable assets through negligence or theft and enabling the use of those lost materials by our competitors. While we believe that we take reasonable measures to protect the security of biomaterials owned by us or our customers, it is possible that our security controls and practices may not prevent unauthorized or other improper access to such genetic material. Any unauthorized access, acquisition, use, destruction, or release of the GMOs we engineer could result in our having exposure to significant liability under our contracts, as well as to regulatory actions, litigation, investigations, remediation obligations, damage to our reputation and brand, supplemental disclosure obligations, loss of customer, consumer, or partner confidence in the security of our platform, impairment to our business, and corresponding fees, costs, expenses, loss of revenues, and other potential liabilities.

Our customers sometimes provide organisms, genetic material and/or data to us in connection with our collaborations. In the event that we fail to protect customer materials or data or inadvertently use such materials or data for unauthorized purposes, we could be liable to our customers under trade secret laws or contractual provisions.

There could be unintended consequences to the environment generally or the health and safety of our employees or the public as a result of an unauthorized release of Genetically Modified Materials into uncontrolled environments. In addition, if a biosecurity breach or unauthorized release of genetic material were to occur within our industry, our customers and potential customers might lose trust in the security of the laboratory environments in which we produce GMOs, even if we are not directly affected. Any adverse effect resulting from such a release, by us or others, could have a material adverse effect on the public acceptance of our products and business and our financial condition. Such a release could result in enhanced regulatory activity, and we could have exposure to liability for any resulting harm.

We may be subject to claims challenging the inventorship or ownership of our patents, biomaterials and other intellectual property.

Certain of our employees, consultants and contractors were previously employed at universities or other software or biotechnology companies, including our competitors or potential competitors. Additionally, some of our consultants or contractors may have ongoing relationships with universities. Although we try to ensure that our employees, consultants and contractors do not use the intellectual property of others in their work for us, we may be subject to claims that these individuals or other contractors have used or disclosed intellectual property, including trade secrets or other proprietary information, of another. Litigation may result from these claims.

While it is our policy to require that our employees, consultants and contractors who may be involved in the development of intellectual property execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Our intellectual property assignment agreements with them may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property. Such claims could have a material adverse effect on our business, financial condition, results of operations and prospects.

If we are unsuccessful in litigating any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could have a material adverse effect on our competitive business position and prospects. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to use or commercialize our technology or products, which license might not be available on commercially reasonable terms, or at all. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our management and employees.

The life science academic and research community has abided by norms of free exchange of biomaterials, but recently, norms have begun to change so that parties may assert ownership and control over biomaterials that they permitted to be freely disseminated in the past. Thus, despite our best efforts to confirm our right to use biomaterials in our possession, we may use organisms that we believe to be free of encumbrance that are, in fact, subject to claims of title by others. In such a situation, litigation may be required to clear title, if it can be cleared at all. Similarly, we may be subject to claims that we have used biomaterials obtained from licensors or repositories for unauthorized purposes, or purposes not consistent with the licensing terms of the providing organization.

We may become involved in lawsuits or other enforcement proceedings to protect or enforce our patents or other intellectual property, which could be expensive, time consuming and potentially unsuccessful.

Competitors and other third parties may infringe or otherwise violate our issued patents or other intellectual property. In addition, our patents may become involved in inventorship, ownership, or priority disputes. We may also become subject to claims by collaboration partners that intellectual property or biomaterials that we believe to be owned by us are actually owned by them. Any litigation concerning any of these issues would be expensive, time consuming and uncertain. There can be no assurances that we would prevail in any suit brought by us or against us by third parties, or successfully settle or otherwise resolve those claims. Significant litigation would have substantial costs, even if the eventual outcome were favorable to us, and would divert management's attention from our business objectives.

Under certain circumstances, we may share or lose rights to intellectual property developed under U.S. federally funded research grants and contracts.

Some of our inventions, data, or other intellectual property have been or may be developed during the course of research funded by the U.S. government. The U.S. government may have the right to take title to government-funded inventions if we fail to disclose the inventions to the government in a timely manner or fail to file a patent for the intellectual property within specified time limits. Further, in consequence of our receiving government funding, the U.S. government may have certain rights to intellectual property that we use in our platform or programs pursuant to the Bayh-Dole Act of 1980, as amended (the "Bayh-Dole Act"). Under the Bayh-Dole Act, U.S. government rights in certain "subject inventions" developed under a government-funded program may include a non-exclusive, irrevocable worldwide license to use inventions for any governmental purpose. In some circumstances, the U.S. government may acquire unlimited rights in data we generate. In addition, the U.S. government has the right to require us, or an assignee or exclusive licensee to U.S. Government-funded inventions, to grant licenses to any of these inventions to the government or a third party if the government determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; (iii) government action is necessary to meet requirements for public use

under federal regulations; or (iv) the right to use or sell such inventions is exclusively licensed to an entity within the United States and substantially manufactured outside the United States without the U.S. government's prior approval. Additionally, we may be restricted from granting exclusive licenses for the right to use or sell such inventions unless the licensee agrees to comply with relevant Bayh-Dole Act restrictions (e.g., manufacturing substantially all of the invention in the United States) and reporting requirements. In addition, the U.S. government may acquire title in any country in which a patent application is not filed. Certain technology and inventions are also subject to transfer restrictions during the term of these agreements with the U.S. government and for a period thereafter. These restrictions may limit sales of products or components, transfers to foreign subsidiaries for the purpose of the relevant agreements, and transfers to certain foreign third parties. If any of our intellectual property becomes subject to any of the rights or remedies available to the U.S. government or third parties pursuant to the Bayh-Dole Act, this could impair the value of our intellectual property and could adversely affect our business.

The use of digital genetic sequence information may be subject to the Nagoya Protocol, which could increase our costs and adversely affect our business.

The Nagoya Protocol is a supplemental agreement to the Convention on Biological Diversity ("CBD"). The Nagoya Protocol is designed to provide for equitable sharing of benefits arising from the utilization of genetic resources and traditional knowledge. Under the Nagoya Protocol, countries possessing genetic resources ("source countries") are tasked with setting up procedures and institutional infrastructure for researchers to obtain prior informed consent, both from the source country and from any relevant indigenous or traditional communities, for biological research. Many have been slow to adopt workable institutions permitting the rational negotiation of benefit-sharing agreements. Many source countries are now asserting that the use of digital genetic sequence information is subject to the constraints of the Nagoya Protocol or similar national- or local-level benefit-sharing requirements. It is unclear whether this position will ultimately be adopted or what the implications of such adoption might be. It is unclear what a source country might assert if we used genetic sequences (i) extracted by a third party from a natural resource that was removed from its source country before that source country ratified the CBD or signed the Nagoya Protocol (ii) extracted by a third party and uploaded to public sequence databases after the source country ratified the CBD; (iii) in a heterologous host organism; or (iv) as a base for further engineering, so that the sequence we use no longer conforms to the natural sequence on which it was based.

We make extensive use of public and proprietary sequence databases to support our work. While we undertake efforts to identify and comply with laws and international protocols relating to the use of genetic resources, the uncertainty surrounding the use of digital sequence information and the lack of workable institutions in many source countries for the efficient negotiation of benefit-sharing agreements may limit our use or cause uncertainty in our use of certain sequences that we obtain from public access databases or natural sources. New financial obligations may arise regarding our use of sequence information. Customers that must certify their compliance with Nagoya Protocol obligations may be reluctant to do business with us unless we engage in expensive and time-consuming benefit-sharing negotiations with source countries of publicly available genetic sequences. These changes could increase our R&D costs and adversely affect our business, financial condition, and results.

Third party patents may limit our freedom to operate in certain areas, which may adversely affect our business.

There may be patents that affect our freedom to operate in certain areas, and we may as a result choose to design around or license such patents from third parties. If we must spend significant time and money designing around or licensing patents held by others, our business and financial prospects may be harmed. We may be restricted from carrying out certain operations in our Foundry, or we may be limited in our ability to design new products for our customers. We may become subject to claims by third parties alleging that we are infringing, misappropriating, or otherwise violating their intellectual property rights.

If we are sued for infringing intellectual property rights of third parties, such litigation could be costly and time consuming and could prevent or delay us from using our platform and technologies.

Any litigation arising from any dispute relating to the intellectual property of third parties would be expensive, time-consuming, and uncertain. There can be no assurance that we would prevail in any such dispute. Parties making claims against us might be able to obtain injunctive or other relief, which could block our or our customers' ability to develop, commercialize and sell products or use our technologies, and could result in the award of substantial damages against us, including treble damages, attorney's fees, costs and expenses if we were found to have willfully infringed. In the event of a successful claim against us, we or our customers might be required to pay damages and ongoing royalties, and obtain licenses from third parties, or be prohibited from selling certain products or

using certain technologies. We may not be able to obtain these licenses on acceptable or commercially reasonable terms, if at all. In addition, we or our customers could encounter delays in product or service introductions while we attempt to develop alternative designs or redesign existing products or technologies to avoid or resolve these claims. Our loss in any lawsuit or failure to obtain a license could prevent us from using our platform and technologies. Such a loss or failure could materially affect our business and reputation. Any litigation pertaining to these issues would have substantial costs, even if the eventual outcome were favorable to us, and would divert management's attention from our business objectives.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our registered or unregistered trademarks or trade names may be challenged, infringed, diluted, tarnished, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition among potential collaborators or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement, dilution or tarnishment claims brought by owners of other trademarks or trademarks that incorporate variations of our registered or unregistered trademarks or trade names. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade names, trade secrets, domain names, copyrights or other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely affect our business, financial condition, results of operations and prospects.

Any claims or lawsuits relating to infringement of intellectual property rights brought by or against us will be costly and time consuming and may adversely affect our business, financial condition and results of operations.

Any of the risks identified above could result in significant litigation. In addition to the specific litigation-related risks identified above, litigation of any kind carries certain inherent risks. Because of the substantial amount of discovery required in connection with litigation in U.S. courts, there is a risk that some of our confidential information could be compromised in the discovery process. There could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on our share price.

Further, our agreements with some of our customers, suppliers or other entities require us to defend or indemnify these parties if they become involved in infringement claims that target our products, services or technologies, or in certain other situations. If we must defend or indemnify third parties, we could incur significant costs and expenses that could adversely affect our business, operating results or financial condition.

Intellectual property rights do not necessarily address all potential threats to our business.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations and may not adequately protect our business or permit us to maintain our competitive advantage. The following examples are illustrative:

- we may choose not to file a patent in order to maintain certain intellectual property as trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our owned or licensed intellectual property rights;
- the patents of others may harm our business;
- we might not have been the first to make the inventions covered by the issued patents or pending patent applications that we own;
- we might not have been the first to file patent applications covering certain of our inventions; and

- issued patents that we hold rights to may fail to provide us with any competitive advantage, or may be held invalid or unenforceable, including as a result of legal challenges by our competitors.

Should any of these events occur, they could harm our business, financial condition, results of operations and prospects.

Intellectual property disputes of third parties and customers could have a material adverse effect on our business, financial condition, and results.

We rely, and expect to continue to rely on, certain capital equipment, machinery, consumables, reagents, software, services and intellectual property that we purchase or license from third parties for use in our operations, platform, products, services and offerings. We cannot be certain that our vendors, suppliers, and licensors are not infringing upon the intellectual property rights of others or that they have sufficient rights to the third-party technology used in our business in all jurisdictions in which we may operate. Disputes with any of these third parties over uses or terms could result in the payment of additional royalties or penalties by us, cancellation or non-renewal of the underlying license, termination of supplies or rights to use, or litigation. In the event that we cannot resolve issues of this kind, we may be required to discontinue or limit our use of the operations, platform, products, services or offerings that include or incorporate the licensed intellectual property. Any such discontinuation or limitation could have a material and adverse impact on our business, financial condition and results of operation.

Our customers may become involved in intellectual property disputes with third parties that are related or unrelated to any products or services we have supplied or rendered to them. Such disputes could result in a customer being unable to market its products, thus depriving us of license, milestone, or other revenues. Such deprivation could have a material adverse impact on our financial condition and results.

Our use of "open-source" software could negatively affect our ability to market or provide our services and could subject us to possible litigation.

We have used "open-source" software in connection with the development and deployment of our software platform, and we expect to continue to use open-source software in the future. Open-source software is licensed by its authors or other third parties under open-source licenses, which in some instances may subject us to certain unfavorable conditions, including requirements that we offer our products that incorporate the open-source software for no cost, that we make publicly available all or part of the source code for any modifications or derivative works we create based upon, incorporating or using the open-source software, or that we license such modifications or derivative works under the terms of the particular open-source license.

Companies that incorporate open-source software into their products have, from time to time, faced claims challenging the use of open-source software and compliance with open-source license terms. We could be subject to similar suits by parties claiming ownership of what we believe to be open-source software or claiming noncompliance with open-source licensing terms. While we monitor our use of open-source software and try to ensure that none is used in a manner that would require us to disclose our proprietary source code or that would otherwise breach the terms of an open-source agreement, we cannot guarantee that we will be successful, that all open-source software is reviewed prior to use in our platform, that our developers have not incorporated open- source software into our products that we are unaware of or that they will not do so in the future.

Furthermore, there are an increasing number of open-source software license types, almost none of which have been interpreted by U.S. or foreign courts, resulting in a dearth of guidance regarding the proper legal interpretation of such licenses. As a result, there is a risk that open-source software licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to market or provide our products and services. If we are held to have breached or failed to fully comply with all the terms and conditions of an open-source software license, we could face infringement claims or other liability, or be required to seek costly licenses from third parties to continue providing our offerings on terms that are not economically feasible, if at all, to re-engineer all or a portion of our platform, to discontinue or delay the provision of our offerings if re-engineering could not be accomplished on a timely basis or to make generally available, in source code form, our proprietary code. Further, in addition to risks related to license requirements, use of certain open-source software carries greater technical and legal risks than does the use of third-party commercial software. For example, open-source software is generally provided without any support or warranties or other contractual protections regarding infringement or the quality of the code, including the existence of security vulnerabilities. To the extent that our platform

depends upon the successful operation of open-source software, any undetected errors or defects in open-source software that we use could prevent the deployment or impair the functionality of our systems and injure our reputation. In addition, the public availability of such software may make it easier for others to compromise our platform. Any of the foregoing risks could materially and adversely affect our business, financial condition and results of operations.

Risks Related to Personnel, IT and Physical Infrastructure

Loss of key personnel, including our founders and senior executives, and/or failure to attract, train and retain additional key personnel could delay our cell engineering programs, harm our platform development efforts, limit our biosecurity offerings, and harm our ability to meet our business objectives, particularly given the substantial investment required to train certain of our employees.

Our business involves complex, global operations across a variety of markets and requires a management team and employee workforce that is knowledgeable in the many areas in which we operate. Our future success depends upon our ability to attract, train, retain and motivate highly qualified management, scientific, engineering, information technology, operations, business development and marketing personnel, among others. In addition, the market for qualified personnel is very competitive because of (a) the limited number of people available who have the necessary technical skills and understanding of our technology and products and (b) the nature of our industry which requires certain of our technical personnel to be on-site in our facilities. We compete for qualified technical personnel with other life sciences and information technology companies, as well as academic institutions and research institutions in the markets in which we operate, including Boston, Massachusetts, Cambridge, Massachusetts, Emeryville, California, Utrecht, Netherlands and Basel, Switzerland. In addition, as we add international operations, we will increasingly need to recruit qualified personnel outside the United States. However, doing so may also require us to comply with laws to which we are not currently subject, which could cause us to allocate or divert capital, personnel and other resources from our organization, which could adversely affect our business, financial condition, results of operations, prospects and reputation. Establishing international operations and recruiting personnel has and may continue to be impacted by COVID-19 travel and operational restrictions. Our senior leadership team is critical to our vision, strategic direction, platform development, operations and commercial efforts. Our employees, including members of our leadership team, could leave our company with little or no prior notice and would be free to work for a competitor. We also do not maintain “key person” life insurance on any of our employees. The departure of one or more of our founders, senior leadership team members or other key employees could be disruptive to our business until we are able to hire qualified successors.

Our continued platform development, growth and commercial success depends, in part, on recruiting and retaining highly-trained personnel across our various target industries and markets with the necessary background and ability to develop and use our platform and to effectively identify and sell to current and new customers. New hires require significant training and, in most cases, take significant time before they achieve full productivity. Our failure to successfully hire and integrate these key personnel into our business could adversely affect our business. To attract top talent, we believe we will need to offer competitive compensation and benefits packages, including equity incentive programs, which may require significant investment. If we are unable to offer competitive compensation this may make it more difficult for us to attract and retain key employees. Moreover, if the perceived value of our equity awards declines, it may adversely affect our ability to attract and retain key employees. If we do not maintain the necessary personnel to accomplish our business objectives, we may experience staffing constraints that adversely affect our ability to support our programs and operations.

In addition, some of our personnel are qualified foreign nationals whose ability to live and work in the U.S. is contingent upon the continued availability of appropriate visas and whose ability to work on some of our technologies may require the procurement of appropriate export licenses. Due to the competition for qualified personnel in the key markets in which we operate, we expect to continue to utilize foreign nationals to fill part of our recruiting needs. As a result, changes to United States immigration policies have and could further restrain the flow of technical and professional talent into the United States and adversely affect our ability to hire and retain qualified personnel.

Our business and results of operations are dependent on adequate access to laboratory and office space and suitable physical infrastructure, including electrical, plumbing, HVAC and network infrastructure, to conduct our operations. Our headquarters and laboratories are located in a flood zone in Boston’s Seaport District. If we are unable to access enough space or we experience failures of our physical infrastructure, our business and results of operations could be adversely affected.

Our business depends on providing customers with technical services. In order to properly conduct our business, we need access to sufficient laboratory space and equipment to perform the activities necessary to advance and complete our programs. Additionally, we need to ensure that our laboratories and corporate offices remain operational at all times, which includes maintaining suitable physical infrastructure, including electrical, plumbing and HVAC, logistics and transportation systems and network infrastructure. We lease our laboratories and office spaces and we rely on the landlords for basic maintenance of our leased laboratories and office buildings. If one of our landlords has not maintained a leased property sufficiently, we may be forced into an early exit from the facility, which could be disruptive to our business. Furthermore, we may continue to acquire laboratories not built by us in order to sufficiently scale and expand our output capacity. If we discover that these buildings and their infrastructure assets are not in the condition we expected when they were acquired, we may be required to incur substantial additional costs to repair or upgrade the laboratories.

Problems in and around one or more of our laboratories or corporate offices, whether or not within our control, could result in service interruptions or significant infrastructure or equipment damage. These could result from numerous factors, including:

- human error;
- equipment failure;
- physical, electronic and cybersecurity breaches;
- fire, earthquake, hurricane, flood, tornado and other natural disasters;
- extreme temperatures;
- flood and/or water damage;
- fiber cuts;
- power loss;
- terrorist acts, including acts of bioterrorism;
- sabotage, vandalism and cyberattacks; and
- local epidemics or global pandemics such as the COVID-19 pandemic.

We have timeline obligations to certain customers with respect to their programs. As a result, service interruptions or significant equipment damage in our laboratories could result in difficulty maintaining program timelines for these customers and potential claims related to such failures. Because the services we provide in our laboratories are critical to many of our customers' businesses, service interruptions or significant equipment damage in our laboratories could also result in lost revenue or other indirect or consequential damages to our customers. We cannot guarantee that a court would enforce any contractual limitations on our liability in the event that one of our customers brings a lawsuit against us as a result of a problem at one of our laboratories and we may decide to reach settlements with affected customers irrespective of any such contractual limitations. In addition, any loss of service, equipment damage or inability to meet our service obligations could reduce the confidence of our customers and could consequently impair our ability to obtain and retain customers, which would adversely affect both our ability to generate revenues and our operating results.

Furthermore, we are dependent upon internet service providers, telecommunications carriers and other website operators, some of which have experienced significant system failures and electrical outages in the past.

Our customers may, in the future, experience difficulties due to system failures unrelated to our systems and offerings. If, for any reason, these providers fail to provide the required services, our business, financial condition and results of operations could be materially and adversely impacted.

Risks Related to Financial Reporting

We rely on our customers, joint venturers, equity investees and other third parties to deliver timely and accurate information in order to accurately report our financial results in the time frame and manner required by law.

We need to receive timely, accurate, and complete information from a number of third parties in order to accurately report our financial results on a timely basis. If the information that we receive is not accurate, our consolidated financial statements may be materially incorrect and may require restatement. Although we have audit rights with these parties, performing such an audit could be expensive and time consuming and may not be adequate to reveal any discrepancies in a time frame consistent with our reporting requirements. As a result, we may have difficulty completing accurate and timely financial disclosures, which could have an adverse effect on our business.

We use estimates in determining the fair value of certain assets and liabilities. If our estimates prove to be incorrect, we may be required to write down the value of these assets or write up the value of these liabilities, which could adversely affect our financial position.

Our ability to measure and report our financial position and operating results is influenced by the need to estimate the fair value of an asset or liability. Fair value is estimated based on a hierarchy that maximizes the use of observable inputs and minimizes the use of unobservable inputs. Observable inputs are inputs that reflect the assumptions that market participants would use in pricing the asset or liability developed based on market data obtained from sources independent of the reporting entity. Unobservable inputs are inputs that reflect the reporting entity's own assumptions about the assumptions market participants would use in pricing the asset or liability developed based on the best information available in the circumstances. We estimate the impact or outcome of future events on the basis of information available at the time of the financial statements. An accounting estimate is considered critical if it requires that management make assumptions about matters that were highly uncertain at the time the accounting estimate was made. If actual results differ from management's judgments and assumptions, then they may have an adverse impact on our results of operations and cash flows.

Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.

We have incurred net losses since our inception and we may never achieve or sustain profitability. Generally, for U.S. federal income tax purposes, net operating losses incurred will carry forward. However, net operating loss carryforwards generated prior to January 1, 2018 are subject to expiration for U.S. federal income tax purposes. As of December 31, 2021, we had federal net operating loss carryforwards of approximately $665.2 million, of which $139.2 million begin to expire in 2029. We have approximately $526.0 million of federal net operating losses as of December 31, 2021 that can be carried forward indefinitely. As of December 31, 2021, we had state net operating loss carryforwards of approximately $529.3 million, of which $485.9 million begin to expire in 2029. We have approximately $43.4 million of state net operating losses as of December 31, 2021 that can be carried forward indefinitely. As of December 31, 2021, we had federal research and development tax credit carryforwards of approximately $23.3 million which begin to expire in 2029. As of December 31, 2021, we also had state research and development and investment tax credit carryforwards of approximately $18.0 million which begin to expire in 2030.

Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an "ownership change," generally defined as a greater than 50% change by value in its equity ownership by certain stockholders over a three-year period, the corporation's ability to use its pre-ownership change net operating loss carryforwards and other pre-ownership change tax attributes, such as research tax credits, to offset its post- ownership change income or taxes may be limited. Similar provisions of state tax law may also apply to limit the use of our state net operating loss carryforwards and other state tax attributes. We have not performed an analysis to determine whether our past issuances of stock and other changes in our stock ownership may have resulted in one or more ownership changes. If it is determined that we have in the past experienced an ownership change, or if we undergo one or more ownership changes as a result of future transactions in our stock, which may be outside our control, then our ability to utilize our net operating loss carryforwards and other tax attributes may be materially limited. As a result, even if we earn taxable income, we may be unable to use a material portion of our net operating loss carryforwards and other tax attributes, which could adversely affect our future cash flows. There is also a risk that regulatory changes, such as suspensions on the use of net operating losses or other unforeseen reasons, may result in our existing net operating loss carryforwards expiring or otherwise becoming unavailable to offset future taxable income. For these reasons, we may not be able to utilize a material portion of our net operating loss carryforwards and other tax attributes even if we attain profitability.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reporting, which would harm our business and the trading price of our common stock.

As a public reporting company, we are subject to the rules and regulations established by the SEC and the New York Stock Exchange ("NYSE"). These rules and regulations require, among other things, that we establish and periodically evaluate procedures with respect to our internal control over financial reporting. Reporting obligations as a public company are likely to place a considerable strain on our financial and management systems, processes and controls, as well as on our personnel, including senior management. In addition, as a public company, we are required to document and test our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act of 2002 so that our management can certify as to the effectiveness of our internal control over financial reporting. Management's initial certification under Section 404 of the Sarbanes-Oxley Act of 2002 will be required with our Annual Report on Form 10-K for the year ending December 31, 2022. In support of such certifications, we are required to document and make significant changes and enhancements, including potentially hiring additional personnel, to our internal control over financial reporting. Likewise, our independent registered public accounting firm is not required to attest to the effectiveness of our internal control over financial reporting until our first annual report is required to be filed with the SEC following the date we are no longer an emerging growth company. At such time as we are required to obtain auditor attestation, if we then have a material weakness, we would receive an adverse opinion regarding our internal control over financial reporting from our independent registered accounting firm.

To achieve compliance with Section 404 within the prescribed period, we will need to continue to dedicate internal resources, including hiring additional financial and accounting personnel and potentially engaging outside consultants. During our evaluation of our internal control, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal control over financial reporting is effective. We have identified material weaknesses in our internal control environment in the past and cannot provide assurances that there will not be material weaknesses or significant deficiencies in our internal control over financial reporting in the future. Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, or results of operations. If we are unable to conclude that our internal control over financial reporting is effective or if our independent registered public accounting firm determines we have a material weakness or significant deficiency in our internal control over financial reporting, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of shares of our common stock could decline, and we could be subject to sanctions or investigations by NYSE, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

We have identified material weaknesses in our internal control over financial reporting in the past. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis. If we are unable to remediate these material weaknesses, or if we identify additional material weaknesses in the future or otherwise fail to maintain an effective system of internal controls, we may not be able to accurately or timely report our financial condition or results of operations, which may adversely affect investor confidence in us and, as a result, our stock price.

Our cash and cash equivalents could be adversely affected if the financial institutions in which we hold our cash and cash equivalents fail.

We regularly maintain cash balances at third-party financial institutions in excess of the Federal Deposit Insurance Corporation insurance limit. While we monitor the cash balances in our operating accounts on a daily basis and adjust the balances as appropriate, these balances could be impacted, and there could be a material adverse effect on our business, if one or more of the financial institutions with which we deposit cash fails or is subject to other adverse conditions in the financial or credit markets. To date, we have experienced no loss or lack of access to our invested cash or cash equivalents; however, we can provide no assurance that access to our invested cash and cash equivalents will not be impacted by adverse conditions in the financial and credit markets.

Risks Related to Governmental Regulation and Litigation

Failure to comply with federal, state, local and international laws and regulations could adversely affect our business and our financial condition.

A variety of federal, state, local and international laws and regulations govern certain aspects of our business. For example, we maintain a registration from the U.S. Drug Enforcement Administration ("DEA") for the research of certain controlled substances and permits from the Boston Public Health Commission to conduct work with recombinant DNA. Some of our programs or products made or developed using our engineered cells and/or biomanufacturing processes are subject to regulations, including those promulgated by the FDA, DEA, EPA or USDA. Products utilized in our COVID-19 testing services are subject to regulations promulgated by the FDA, the Centers for Medicare and Medicaid Services, and certain state governments. In addition, we are subject to laws relating to, among other things, anti-bribery, insider trading, sourcing of biological materials and data privacy. The legal and regulatory requirements that apply to our business may be interpreted and applied in a manner that is inconsistent from one jurisdiction to another or may conflict with other rules or our practices. As a result, our practices may not comply, or may not comply in the future with all such laws, regulations, requirements and obligations. Any failure, or perceived failure, by us to comply with any federal, state, local or international laws, regulations, industry self-regulatory principles, industry standards or codes of conduct, regulatory guidance, orders to which we may be subject or other legal obligations could adversely affect our reputation, brand and business, and may result in claims, proceedings or actions against us by governmental entities or others or other liabilities or require us to change our operations. We may also be contractually required to indemnify and hold harmless third parties from the costs or consequences of non-compliance with any laws, regulations or other legal obligations.

We may also become subject to increasing regulation in the future as we expand our business. We have limited experience operating a business located outside of Massachusetts. As we continue to expand our operations and offerings domestically and globally, we will have to expend significant management and financial resources to maintain compliant practices in those locations. Non-compliance could lead to litigation, which would require substantial management and financial resources.

We may incur significant costs complying with environmental, health and safety laws and regulations, and failure to comply with these laws and regulations could expose us to significant liabilities.

We use hazardous chemical and biological materials in our business and are subject to a variety of federal, state, local and international laws and regulations governing, among other matters, the use, generation, manufacture, transportation, storage, handling, disposal of, and human exposure to these materials, including regulation by governmental regulatory agencies, such as the Occupational Safety and Health Administration and the EPA. We have incurred, and will continue to incur, capital and operating expenditures and other costs in the ordinary course of our business in complying with these laws and regulations.

Although we have implemented safety procedures for storing, handling and disposing of these materials and waste products in an effort to comply with these laws and regulations, we cannot be sure that our safety measures will be compliant or capable of eliminating the risk of injury or contamination from the generation, manufacturing, use, storage, transportation, handling, disposal of and human exposure to hazardous materials and/or flammable chemicals. Failure to comply with environmental, health and safety laws could subject us to liability and resulting damages. There can be no assurance that violations of environmental, health and safety laws will not occur as a result of human error, accident, equipment failure, contamination, intentional misconduct or other causes. Compliance with applicable environmental laws and regulations may be expensive, and the failure to comply with past, present or future laws could result in the imposition of fines, regulatory oversight costs, third party property damage, product liability and personal injury claims, investigation and remediation costs, the suspension of production or a cessation of operations, and our liability may exceed our total assets. Liability under environmental laws can be imposed for the full amount of damages without regard to comparative fault for the investigation and cleanup of contamination and impacts to human health and for damages to natural resources. Contamination at properties we may own and operate and at properties to which we send hazardous materials, may result in liability for us under environmental laws and regulations.

Our business and operations may be affected by other new environmental, health and safety laws and regulations, which may require us to change our operations, or result in greater compliance costs and increasing risks and penalties associated with violations, which could impair our research, development or production efforts and harm our business.

If we fail to comply with healthcare and other governmental regulations, we could face substantial penalties and our business, financial condition and results of operations could be adversely affected.

Our business activities may be subject to regulation and enforcement by the FDA, U.S. Department of Justice, HHS, Office of Inspector General, and other federal and state governmental authorities. Although our offerings are not currently billed to any third-party payor, including any commercial payor or government healthcare program, we may, in the future, submit claims for our COVID-19 testing services to third-party payors, including government healthcare programs. If we submit claims to third-party payors, such activity will expand the scope of federal and state healthcare laws applicable to us.

Federal and state healthcare laws and regulations that may affect our ability to conduct business include, without limitation:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, lease, order, or arranging for or recommending the purchase, lease or order of, any item or service, for which payment may be made, in whole or in part, under federal healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the federal physician self-referral prohibition, commonly known as the Stark Law, which prohibits a physician, in the absence of an applicable exception, from making a referral for certain designated health services covered by the Medicare or Medicaid program, including clinical laboratory services, if the physician or an immediate family member of the physician has a financial relationship with the entity providing the designated health services. The Stark Law also prohibits the entity furnishing the designated health services from billing, presenting or causing to be presented a claim for the designated health services furnished pursuant to the prohibited referral;

- the federal civil false claims laws, including without limitation the federal False Claims Act (which can be enforced through "qui tam," or whistleblower actions, by private citizens on behalf of the federal government), and civil monetary penalties laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, false or fraudulent claims for payment of government funds, or knowingly making, using or causing to be made or used, a false record or statement material to an obligation to pay money to the government or knowingly and improperly avoiding, decreasing or concealing an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the federal Anti-Kickback Statute or Stark Law constitutes a false or fraudulent claim for purposes of the civil False Claims Act;

- the Eliminating Kickbacks in Recovery Act ("EKRA"), which created a new federal crime for knowingly and willfully: (1) soliciting or receiving any remuneration in return for referring a patient to a recovery home, clinical treatment facility, or laboratory; or (2) paying or offering any remuneration to induce such a referral or in exchange for an individual using the services of a recovery home, clinical treatment facility, or laboratory. Unlike the Anti-Kickback Statute, EKRA is not limited to services reimbursable under a government health care program, but instead extends to all services reimbursed by "health care benefit programs";

- the healthcare fraud statutes under the Health Information Technology for Economic and Clinical Health Act ("HIPAA"), which impose criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement, in connection with the delivery of, or payment for healthcare benefits, items or services by a healthcare benefit program, which includes both government and privately funded benefits programs. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- federal consumer protection and unfair competition laws, which broadly regulate platform activities and activities that potentially harm consumers; and

- state law equivalents of each of the above federal laws, such as anti-kickback, self-referral, and fee-splitting, and false claims laws which may apply to items or services reimbursed by any third-party payor, including commercial insurers and self-pay patients.

Because of the breadth of these laws and the narrowness of available statutory and regulatory exemptions, exceptions, and safe harbors, it is possible that some of our activities could be subject to challenge under one or more of such laws. We may face claims and proceedings by private parties, and claims, investigations and other proceedings by governmental authorities, relating to allegations that our business practices do not comply with current or future laws or regulations involving applicable fraud and abuse or other healthcare laws and regulations, and it is possible that courts or governmental authorities may conclude that we or any of our partners have not complied with them, or that we may find it necessary or appropriate to settle any such claims or other proceedings. Any action brought against us for violation of these or other laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. If our operations are found to be in violation of any federal or state laws described above or any other current or future fraud and abuse or other healthcare laws and regulations that apply to us, we may be subject to claims and proceedings by private parties, investigations and other proceedings by governmental authorities, as well as penalties, including significant criminal, civil and administrative penalties, damages and fines, disgorgement, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of noncompliance with these laws or regulations, imprisonment for individuals and exclusion from participation in government programs, such as Medicare and Medicaid, as well as contractual damages and reputational harm. We could also be required to curtail or cease our operations. In addition, if any customers, healthcare professionals we engage, laboratory partners or other entities with whom we do business are found not to be in compliance with applicable laws, they may be subject to the same criminal, civil or administrative sanctions, including exclusion from government-funded healthcare programs. Any of the foregoing could seriously harm our business and financial results.

We may become subject to the comprehensive laws and rules governing billing and payment, noncompliance with which could result in non-payment or recoupment of overpayments for our services or other sanctions.

We may, in the future, submit claims for our COVID-19 testing services to third-party payors. Payors typically have differing and complex billing and documentation requirements. If we fail to comply with these payor-specific requirements, we may not be paid for our services or payment may be substantially delayed or reduced. Numerous state and federal laws would also apply to our claims for payment, including but not limited to (i) "coordination of benefits" rules that dictate which payor must be billed first when a patient has coverage from multiple payors, (ii) requirements that overpayments be refunded within a specified period of time, (iii) "reassignment" rules governing the ability to bill and collect professional fees on behalf of other providers, (iv) requirements that electronic claims for payment be submitted using certain standardized transaction codes and formats, and (v) laws requiring all health and financial information of patients to be maintained in a manner that complies with stringent security and privacy standards.

Audits, inquiries and investigations from government agencies and health network partners can occur from time to time in the ordinary course of our business, and could result in costs to us and a diversion of management's time and attention. New regulations and heightened enforcement activity also could negatively affect our cost of doing business and our risk of becoming the subject of an audit or investigation. If we bill for our service in the future, our failure to comply with rules related to billing or adverse findings from audits by government and private payors could result in, among other penalties, non-payment for services rendered or recoupments or refunds of amounts previously paid for such services. We cannot predict whether any future audits, inquiries or investigations, or the public disclosure of such matters, likely would negatively impact our business, financial condition, results of operations, cash flows and the trading price of our securities. See also "*Risk Factors—Risks Related to Governmental Regulation and Litigation—If we fail to comply with healthcare and other governmental regulations, we could face substantial penalties and our business, financial condition and results of operations could be adversely affected*."

We and our laboratory partners are subject to a variety of laboratory testing standards, compliance with which is an expensive and time-consuming process, and any failure to comply could result in substantial penalties and disruptions to our business.

We and the third-party laboratories that we partner with are subject to the Clinical Laboratory Improvement Amendments of 1988 ("CLIA"). CLIA is a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. CLIA requires virtually all laboratories to be

certified by the federal government and mandates compliance with various operational, personnel, facilities administration, quality and proficiency testing requirements depending on the level of complexity for which the laboratory is certified. CLIA certification is also a prerequisite to be eligible to bill state and federal healthcare programs, as well as many private third-party payors, for laboratory testing services. Our partner laboratories hold CLIA certifications for high complexity testing, which mandate compliance with various operational, personnel, facilities administration, quality and proficiency testing requirements depending on the level of complexity for which the laboratory is certified. In addition, we hold a CLIA high complexity testing certification and perform certain CLIA-waived tests on behalf of our clients, which subjects us directly to certain CLIA requirements. Sanctions for failure to comply with CLIA requirements may include suspension, revocation, or limitation of a laboratory's CLIA certificate, as well as the imposition of significant fines or criminal penalties. Any sanction imposed under CLIA, its implementing regulations, or state or foreign laws or regulations governing licensure, or our partner laboratories' failure to renew a CLIA certificate, a state or foreign license, or accreditation, could have a material adverse effect on our business.

In addition, our partner laboratories and our laboratories holding CLIA Certificates of Waiver are subject to state laws and regulations governing laboratory licensure. Some states have enacted state licensure laws that are more stringent than CLIA. Our ability to successfully deploy COVID-19 testing at large scale may be adversely impacted if our partner laboratories do not maintain the required regulatory licensure and operate in accordance with CLIA standards. In certain markets such as California, New York, and Pennsylvania, we or our partner laboratories may also need to obtain and maintain additional licensure from such states. It is uncertain that our partner laboratories will be granted such licensure and, in such case, we cannot offer testing to patients located in those states, which could limit our ability to offer testing on a wide scale.

It is possible that additional states may enact laboratory licensure requirements in the future, which could further limit our ability to expand our services.

We rely on third-party laboratories in the conduct of our biosecurity business offering. If any of our partners cease working with us, or face supply chain disruptions or other difficulties, our business could be harmed. Specifically, if any of our partners were to lose or fail to obtain or renew their CLIA certifications or state laboratory licenses, whether as a result of a revocation, suspension or limitation, such laboratories would no longer be able to run the COVID-19 tests we offer to our customers, and our ability to successfully deploy a COVID-19 pooled sample testing program nationwide may be adversely impacted.

The testing industry is subject to complex and costly regulation and if government regulations are interpreted or enforced in a manner adverse to us, we may be subject to enforcement actions, penalties, exclusion, and other material limitations on our operations.

We offer COVID-19 testing services by partnering with third-party laboratories, diagnostic test manufacturers and manufacturers of collection kits, which are subject to extensive and frequently changing federal, state and local laws and regulations governing various aspects of our business, including significant governmental certification and licensing regulations. New laws, regulations and judicial decisions, or new interpretations of existing laws, regulations and decisions, may also limit our potential revenues, and we may need to revise our R&D or commercialization programs. The costs of defending claims associated with violations, as well as any sanctions imposed, could significantly adversely affect our financial performance.

We are required to comply with federal and state genetic testing and privacy laws. We have measures in place to collect clinical data and genetic and other biological samples, and disclose test results, from subjects who have provided appropriate informed consents. However, informed consents could be challenged in the future, and those informed consents could prove invalid, unlawful or otherwise inadequate for our purposes. Any legal challenges could consume our management and financial resources.

Current regulations governing the testing services we offer are shifting and in some cases unclear. In addition, our laboratory partners may be unsuccessful in validating, or obtaining or maintaining authorizations for, the tests we rely on to provide our COVID-19 testing services. If any third-party manufacturers or laboratories offering tests that we use in our testing services are deemed by the FDA or other regulatory authorities to have violated applicable law or if the tests or test components are marketed, processed or distributed in violation of applicable law, we may be subject to enforcement action or litigation, or we may be required to find alternative tests to support our testing services, which could increase our costs and prevent us from successfully commercializing our COVID-19 testing services.

In addition, we are required to comply with applicable FDA regulations with respect to our distribution of certain COVID-19 diagnostic test kits and collection kits, including, for certain kits, compliance with applicable terms and conditions of an EUA. Such conditions may include requirements related to collection of information on the performance of the product, reporting of adverse events, recordkeeping requirements, and labeling and promotional activities. To the extent that we market or promote third-party tests or test kits outside of the uses authorized for these products or in a false or misleading manner, the tests or collection kits could be considered misbranded or adulterated and in violation of applicable law.

Advertising for any of the tests or collection kits we distribute or the testing services we offer is also subject to regulation by the Federal Trade Commission ("FTC"), under the Federal Trade Commission Act ("FTC Act"). The FTC may take enforcement action for advertising claims that are not adequately substantiated or that are false or misleading. Violations of applicable FDA requirements could result in enforcement actions, such as warning or "untitled" letters, revocation of EUAs, seizures, injunctions, civil penalties and criminal prosecutions and fines, and violation of the FTC Act could result in injunctions and other associated remedies, all of which could have a material adverse effect on our business. Most states also have similar regulatory and enforcement authority for laboratory testing and distribution of related collection kits. For example, many state laws require us to hold a specific form of license to distribute COVID-19 diagnostic test kits and collection kits into such states. These requirements vary from one state to another and frequently change. Complying with state laws and regulations may subject us to similar risks and delays as those we could experience under federal regulation.

We are subject to federal and state laws and regulations governing the protection, use, and disclosure of health information and other types of personal information, and our failure to comply with those laws and regulations or to adequately secure the information we hold could result in significant liability or reputational harm.

Numerous state and federal laws, regulations, standards and other legal obligations, including consumer protection laws and regulations, which govern the collection, dissemination, use, access to, confidentiality, security and processing of personal information, including health-related information, could apply to our operations or the operations of our partners. For example, HIPAA imposes privacy, security and breach notification obligations on certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, as well as their business associates that perform certain services that involve creating, receiving, maintaining or transmitting individually identifiable health information for or on behalf of such covered entities, and their covered subcontractors. HIPAA requires covered entities and business associates to develop and maintain policies with respect to the protection of, use and disclosure of protected health information ("PHI"), including the adoption of administrative, physical and technical safeguards to protect such information, and certain notification requirements in the event of a breach of unsecured PHI. If in the future we engage in certain types of standard electronic transactions involving payors, including billing the Medicare or Medicaid programs or commercial health plans, we will be subject to HIPAA as a "covered entity." We are currently subject to HIPAA as a "business associate" because we perform certain services involving the use or disclosure of PHI on behalf of covered entity customers with respect to our COVID-19 testing service offerings. Implementation of the infrastructure necessary to meet HIPAA standards requires substantial investment. Being subject to HIPAA as a covered entity or business associate exposes us to significant fines and penalties, including criminal fines and penalties.

Additionally, under HIPAA, covered entities must report breaches of unsecured PHI to affected individuals without unreasonable delay, not to exceed 60 days following discovery of the breach by a covered entity or its agents. Notification also must be made to the HHS Office for Civil Rights and, in certain circumstances involving large breaches, to the media. Business associates must report breaches of unsecured PHI to covered entities within 60 days of discovery of the breach by the business associate or its agents. A non-permitted use or disclosure of PHI is presumed to be a breach under HIPAA unless the Covered Entity or Business Associate establishes that there is a low probability the information has been compromised consistent with requirements enumerated in HIPAA.

Entities that are found to be in violation of HIPAA as the result of a breach of unsecured PHI, a complaint about privacy practices or an audit by HHS, may be subject to significant civil, criminal and administrative fines and penalties and/or additional reporting and oversight obligations if required to enter into a resolution agreement and corrective action plan with HHS to settle allegations of HIPAA non-compliance. HIPAA also authorizes state attorneys general to file suit on behalf of their residents. Courts may award damages, costs and attorneys' fees related to violations of HIPAA in such cases. While HIPAA does not create a private right of action allowing individuals to sue us in civil court for violations of HIPAA, its standards have been used as the basis for duty of care in state civil suits such as those for negligence or recklessness in the misuse or breach of PHI.

Even when HIPAA or a state law does not apply, according to the FTC, violating consumers' privacy rights or failing to take appropriate steps to keep consumers' personal information secure may constitute unfair and/or deceptive acts or practices in violation of Section 5(a) of the FTC Act. The FTC expects a company's data security measures to be reasonable and appropriate in light of the sensitivity and volume of consumer information it holds, the size and complexity of its business, and the cost of available tools to improve security and reduce vulnerabilities.

Several states have enacted privacy laws governing the use and disclosure of health information, such as the California Confidentiality of Medical Information Act; these laws are not preempted by HIPAA to the extent they are more stringent than HIPAA. Such laws and regulations will be subject to interpretation by various courts and other governmental authorities, thus creating potentially complex compliance issues for us and our partners. Further, in recent years, there have been a number of well-publicized data breaches involving the improper dissemination of personal information of individuals both within and outside of the healthcare industry. Laws in all 50 states require businesses to provide notice to individuals whose personally identifiable information has been disclosed as a result of a data breach. The laws are not consistent, and compliance in the event of a widespread data breach is costly. States are also constantly amending existing laws, and creating new data privacy and security laws, requiring attention to frequently changing regulatory requirements. For example, the California Consumer Privacy Act of 2018 ("CCPA") went into effect on January 1, 2020. The CCPA creates new transparency requirements and grants California residents several new rights with respect to their personal information. Failure to comply with the CCPA may result in, among other things, significant civil penalties and injunctive relief, or potential statutory or actual damages. On November 3, 2020, California voters passed a ballot initiative for the California Privacy Rights Act ("CPRA"), which will significantly expand the CCPA. Most CPRA provisions will take effect on January 1, 2023, though the obligations will apply to any personal information collected after January 1, 2022. The CPRA will impose additional data protection obligations on covered businesses, including additional consumer rights processes, limitations on data uses, new audit requirements for higher risk data, and opt outs for certain uses of sensitive data. It will also create a new California data protection agency authorized to issue substantive regulations and could result in increased privacy and information security enforcement. The majority of the provisions will go into effect on January 1, 2023, and additional compliance investment and potential business process changes may be required. Similar laws have been proposed or passed in other states, including the Virginia Consumer Data Protection Act, which will take effect on January 1, 2023. We will need to invest substantial resources in putting in place policies and procedures to comply with these evolving state laws.

As our operations and business grow, we may become subject to or affected by new or additional data protection laws and regulations and face increased scrutiny or attention from regulatory authorities. For example, the European Union General Data Protection Regulation ("GDPR"), which went into effect in May 2018, imposes strict requirements for processing the personal data of individuals within the European Economic Area. Companies that must comply with the GDPR face increased compliance obligations and risk, including more robust regulatory enforcement of data protection requirements and potential fines for noncompliance of up to €20 million or 4% of the annual global revenues of the noncompliant company, whichever is greater. Among other requirements, the GDPR regulates transfers of personal data subject to the GDPR to third countries that have not been found to provide adequate protection to such personal data, including the United States, and the efficacy and longevity of current transfer mechanisms between the EU and the United States remains uncertain. For example, in 2016, the EU and United States agreed to a transfer framework for data transferred from the EU to the United States, called the Privacy Shield, but the Privacy Shield was invalidated in July 2020 by the Court of Justice of the European Union. Further, from January 1, 2021, companies have to comply with the GDPR and also the United Kingdom GDPR (the "UK GDPR"), which, together with the amended UK Data Protection Act 2018, retains the GDPR in UK national law. The UK GDPR mirrors the fines under the GDPR, i.e., fines up to the greater of €20 million (£17.5 million) or 4% of global turnover. The relationship between the United Kingdom and the European Union in relation to certain aspects of data protection law remains unclear, and it is unclear how United Kingdom data protection laws and regulations will develop in the medium to longer term. On June 28, 2021, the European Commission adopted an adequacy decision in favor of the United Kingdom, enabling data transfers from EU member states to the United Kingdom without additional safeguards. However, the United Kingdom adequacy decision will automatically expire in June 2025 unless the European Commission renews or extends that decision and remains under review by the Commission during this period. These changes may lead to additional costs and increase our overall risk exposure.

Although we work to comply with applicable laws, regulations and standards, contractual obligations and other legal obligations, these requirements are evolving and may be modified, interpreted and applied in an inconsistent manner from one jurisdiction to another, and may conflict with one another or other legal obligations with which Ginkgo must comply. Recently, there has been an increase in public awareness of privacy issues in the wake of revelations about the data-collection activities of various government agencies and

in the number of private privacy-related lawsuits filed against companies. Any failure or perceived failure by us or our employees, representatives, contractors, consultants, collaborators, or other third parties to comply with such requirements or adequately address privacy and security concerns, even if unfounded, could result in additional cost and liability to us, damage our reputation, and adversely affect our business and results of operations.

We have pursued in the past and may pursue additional U.S. Government contracting and subcontracting opportunities in the future and as a U.S. Government contractor and subcontractor, we are subject to a number of procurement rules and regulations.

We have entered into agreements with governmental entities and contractors in the past to serve as a U.S. government contractor or subcontractor and may do so again in the future. U.S. government procurement contractors and subcontractors must comply with specific procurement regulations and other requirements. These requirements, although customary in U.S. government contracts, could impact our performance and compliance costs, including by limiting or delaying our ability to share information with business partners, customers and investors. The U.S. government has in the past and may in the future demand contract terms that are less favorable than standard arrangements with private sector customers and may have statutory, contractual, or other legal rights to terminate contracts with us for convenience or for other reasons. Generally, U.S. government contracts contain provisions permitting unilateral termination or modification, in whole or in part, at the government's convenience. Under general principles of government contracting law, if the government terminates a contract for convenience, the government contractor may recover only its incurred or committed costs, settlement expenses and profit on work completed prior to the termination. If the government terminates a contract for default, the government contractor is entitled to recover costs incurred and associated profits on accepted items only and may be liable for excess costs incurred by the government in procuring undelivered items from another source. Any termination for default may also adversely affect our ability to contract with other government customers, as well as our reputation, business, financial condition and results of operations. In addition, changes in U.S. government budgetary priorities could lead to changes in the procurement environment, affecting availability of U.S. government contracting, subcontracting or funding opportunities, which could lead to modification, reduction or termination of our U.S. government contracts or subcontracts. If and to the extent such changes occur, they could impact our results and potential growth opportunities.

Furthermore, our U.S. government contracts grant the government the right to use technologies developed by us under the government contract or the right to share data related to our technologies, for or on behalf of the government. Under our government contracts, we may not be able to limit third parties, including our competitors, from accessing certain of these technology or data rights, including intellectual property, in providing products and services to the government.

In addition, failure by us, our employees, representatives, contractors, partners, agents, intermediaries, other customers or other third parties to comply with these regulations and requirements could result in reductions of the value of contracts, contract modifications or termination, claims for damages, refund obligations, the assessment of civil or criminal penalties and fines, loss of rights in our intellectual property and temporary suspension or permanent debarment from government contracting, all of which could negatively impact our results of operations and financial condition. Any such damages, penalties, disruptions or limitations in our ability to do business with the public sector could result in reduced sales of our products, reputational damage, penalties and other sanctions, any of which could harm our business, reputation and results of operations.

We are engaged in certain research activities involving controlled substances, including cannabinoids and other chemical intermediates, the making, use, sale, importation, exportation, and distribution of which may be subject to significant regulation by the DEA and other regulatory agencies.

We are engaged in certain research activities involving the development of microbes designed to generate cannabinoids, their precursors and other chemical intermediaries, some of which may be regulated as controlled substances in the United States. Controlled substances are subject to state, federal, and foreign laws and regulations regarding their manufacture, use, sale, importation, exportation, and distribution. Among other things, controlled substances are regulated under the federal Controlled Substances Act of 1970 and implementing regulations of the DEA. The DEA regulates controlled substances as Schedule I, II, III, IV or V substances. Schedule I substances by definition have no established medicinal use and may generally not be marketed or sold in the United States. Schedule I substances are subject to the most stringent controls and Schedule V the least controls of the five schedules, based on their relative risk of abuse.

Cannabinoids are naturally occurring compounds found in the cannabis plant. The cannabis plant and its derivatives are highly regulated by the DEA and the USDA. Specifically, marihuana, which is defined as all parts of the plant *Cannabis sativa L.*, whether growing or not, the seeds thereof, the resin extracted therefrom, and every compound, manufacture, salt, derivative, mixture, or preparation, is classified as a Schedule I controlled substance. However, the term does not include "hemp," which means the cannabis plant and any part of that plant, including the seeds and all derivatives, extracts, cannabinoids, isomers, acids, salts, and salts of isomers, whether growing or not, with a delta-9 tetrahydrocannabinol ("THC") concentration of not more than 0.3% on a dry weight basis. Thus, depending on the THC concentration of the product, the product may or may not be regulated as a controlled substance. The DEA has historically regulated synthetic cannabinoids similarly to naturally-derived cannabinoids. Consequently, even though our cannabinoids that could be produced from microbes may not be derived from the cannabis plant, the DEA may consider them to be controlled substances subject to stringent regulatory controls.

Regulations associated with controlled substances govern manufacturing, labeling, packaging, testing, dispensing, production and procurement quotas, recordkeeping, reporting, handling, shipment and disposal. These regulations include required security measures, such as background checks on employees and physical control of inventory and increase the personnel needs and the expense associated with development and commercialization of products or product candidates including controlled substances. Regulators conduct periodic inspections of entities involved in handling, manufacturing, or otherwise distributing controlled substances, and have broad enforcement authorities. If we are found to be non-compliant with applicable controlled substance registrations and related requirements, we may need to modify its business activities and/or stop handling or producing the products regulated as controlled substances, and could be subject to enforcement action, significant fines or penalties, and/or adverse publicity, among other consequences.

Various states also independently regulate controlled substances. Though state-controlled substances laws often mirror federal law, because the states are separate jurisdictions, they may separately schedule substances, as well. The failure to comply with applicable regulatory requirements could lead to enforcement actions and sanctions from the states in addition to those from the DEA or otherwise arising under federal law.

Changes in government regulations may materially and adversely affect our sales and results of operations.

The markets where we provide our services are heavily influenced by foreign, federal, state and local government regulations and policies. The U.S. or foreign governments may take administrative, legislative, or regulatory action that could materially interfere with our customer's ability to sell products derived from engineered cells in certain countries and/or to certain customers. The uncertainty regarding future standards and policies may also affect our ability to develop our programs or to license engineered cells to customers and to initiate new programs with our customers, which could have a material adverse effect on our business, financial condition and results of operations.

Changes in U.S. trade policy more generally could trigger retaliatory actions by affected countries, which could impose restrictions on our ability to do business in or with affected countries or prohibit, reduce or discourage purchases of our services by foreign customers, leading to increased program costs, increased costs of developing or manufacturing our customers' products and higher prices for their products in foreign markets. Changes in, and responses to, U.S. trade policy could reduce the competitiveness of our services or our customers' products, cause our services to be less in demand and our sales to decline and adversely impact our ability to compete, which could materially and adversely impact our business, financial condition and results of operations.

We are subject to certain U.S. and foreign anti-corruption, anti-bribery and anti-money laundering laws and regulations. We can face serious consequences for violations.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended (the "FCPA"), the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the U.K. Bribery Act and possibly other anti-corruption, anti-bribery and anti-money laundering laws and regulations in the jurisdictions in which we do business, both domestic and abroad. Anti-corruption and anti-bribery laws have been enforced aggressively in recent years. The FCPA and other anti-corruption laws generally prohibit companies, their employees, agents, representatives, business partners and third-party intermediaries from corruptly promising, authorizing, offering, or providing, directly or indirectly, anything of value to government officials, political parties, or candidates for public office for the purpose of obtaining or retaining business or securing an improper business advantage. The UK Bribery Act and

other anti-corruption laws also prohibit commercial bribery not involving government officials, and requesting or accepting bribes; and anti-money laundering laws prohibit engaging in certain transactions involving criminally-derived property or the proceeds of criminal activity.

We and our third-party business partners, representatives and agents may have direct or indirect interactions with officials and employees of government agencies or state-owned or -affiliated universities or other entities (for example, to obtain necessary permits, licenses, patent registrations and other regulatory approvals), which increases our risks under the FCPA and other anti-corruption laws. We also engage contractors, consultants and other third parties from time to time to conduct business development activities abroad. We may be held liable for the corrupt or other illegal activities of our employees or third parties even if we do not explicitly authorize such activities. We have increased and, in the future, expect our non-U.S. activities to increase over time, which may also increase our exposure under these laws.

The FCPA also requires that we keep accurate books and records and maintain a system of adequate internal controls. While we have controls to address compliance with such laws, and will continue to review and enhance our compliance program, we cannot assure you that our employees, agents, representatives, business partners or third-party intermediaries will always comply with our policies and applicable law, for which we may be ultimately held responsible.

Any allegations or violation of the FCPA or other applicable anti-bribery, anti-corruption laws and anti-money laundering laws may result in whistleblower complaints, sanctions, settlements, investigations, prosecution, enforcement actions, substantial criminal fines and civil penalties, disgorgement of profits, imprisonment, debarment, tax reassessments, breach of contract and fraud litigation, loss of export privileges, suspension or debarment from U.S. government contracts, adverse media coverage, reputational harm and other consequences, all of which may have an adverse effect on our reputation, business, financial condition, results of operations and prospects. Responding to an investigation or action can also result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees.

Significant disruptions to our and our service providers' information technology systems or data security incidents could result in significant financial, legal, regulatory, business and reputational harm to us.

We are increasingly dependent on information technology systems and infrastructure, including services licensed, leased or purchased from third parties such as cloud computing infrastructure and operating systems, to operate its business. In the ordinary course of business, we collect, store, process and transmit large amounts of sensitive information, including intellectual property, proprietary business information, personal information and other confidential information. It is critical that we do so in a secure manner to maintain the confidentiality, integrity and availability of such sensitive information. We have also outsourced elements of our operations (including elements of its information technology infrastructure) to third parties, and as a result, we manage a number of third-party vendors who may have access to our networks or our confidential information. While we take measures to safeguard and protect this information, threats to network and data security are increasingly diverse and sophisticated. As a result of the COVID-19 pandemic, we may also face increased cybersecurity risks due to our reliance on internet technology and the number of our employees working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities. Despite our efforts, training and processes to prevent security breaches and incidents, our information technology systems, servers, and those of third parties that we use in our operations are vulnerable to cybersecurity risks, including cyberattacks such as viruses and worms, phishing attacks and other forms of social engineering, denial-of-service attacks, ransomware attacks, physical or electronic break-ins, third-party or employee theft or misuse, and other negligent actions, errors or malfeasance by employees or other third parties, and similar disruptions from unauthorized tampering with its servers and computer systems or those of third parties that we use in its operations, which could lead to interruptions, delays, loss or corruption of critical data, unauthorized access to or acquisition of health-related and other personal information. In addition, we may be the target of email scams and other social engineering attacks that attempt to acquire personal information or company assets or access to our systems. Despite our efforts to create security barriers to such threats, we may not be able to entirely mitigate these risks. Our third-party service providers face similar risks. Any cyberattack that attempts to obtain our data or assets, including data that we maintain on behalf of its customers, disrupt its service, or otherwise access its systems, or those of third parties we use, or any other security breach or incident, could adversely affect our business, financial condition and operating results, be expensive to remedy, and damage our reputation. We and our third-party service providers may face difficulties or delays in identifying or otherwise responding to any attacks or actual or potential security breaches or security incidents. We may incur significant costs and operational consequences of investigating, remediating, eliminating and putting in place

additional tools and devices designed to prevent actual or perceived security breaches and other security incidents, including in response to any actual or perceived incident we may suffer, and substantial costs to comply with any notification or other legal obligations resulting from any security breaches or other security incidents. In addition, any such breaches or incidents, or the perception that they have occurred, may result in negative publicity, and could have an adverse effect on our business, financial condition, and operating results.

Although we maintain insurance coverage that may cover certain liabilities in connection with security breaches and other security incidents, we cannot be certain our insurance coverage will be adequate for liabilities actually incurred, that insurance will continue to be available to us on commercially reasonable terms (if at all) or that any insurer will not deny coverage as to any future claim.

Governmental trade controls, including export and import controls, sanctions, customs requirements and related regimes, could subject us to liability or loss of contracting privileges or limit our ability to compete in certain markets.

Our programs and technologies are subject to U.S. and non-U.S. export controls. Export authorizations may be required for biotechnology products, technologies, or services to be exported outside of the United States, to a foreign person, or outside of a foreign jurisdiction. Our current or future programs or technologies are, and may in the future, be subject to the Export Administration Regulations ("EAR"). If a program, technology, or service meets certain criteria for control under the EAR, then that engineered cell, production process, resulting product, technology, or service would be exportable outside the United States or to a foreign person or from one foreign jurisdiction to another foreign jurisdiction only if we obtain the applicable export license or other applicable authorization including qualifying for a license exception, if required. Compliance with the U.S. and foreign export laws and regulations and other applicable regulatory requirements regarding the sales, shipment and use of our engineering cells, bioprocesses and other technology may affect our ability to work with foreign partners, affect the speed at which we can introduce new products into non-U.S. markets, or limit our ability to sell programs or services or license technologies into some countries.

Additionally, certain materials that we use in our programs are subject to U.S. import controls. We currently have, and may in the course of business need to procure, certain import authorizations, for example, related to plant pests, chemicals, biological agents and other controlled materials, including from the USDA, EPA and CDC. Compliance with applicable regulatory requirements regarding the import of such materials may limit our access to materials critical to our development activities or affect the speed at which we can advance new programs.

Our activities are also subject to the economic sanctions laws and regulations of the United States and other jurisdictions. Such controls prohibit certain transactions, potentially including financial transactions and the transfer of products, technologies and services, to sanctioned countries, governments and persons, without a license or other appropriate authorization. U.S. sanctions policy changes could affect our or our customers' ability to interact, directly and indirectly, with targeted companies or companies in sanctioned countries.

While we take precautions to comply with U.S. and non-U.S. export control, import control and economic sanctions laws and regulations, we cannot guarantee that such precautions will prevent violations of such laws, including transfers to unauthorized persons or destinations, and including inadvertent violations as a result of a misclassification of a product, technology or service under export control laws. Violations could result in our business being subject to government investigations, denial of export or import privileges, significant fines or penalties, denial of government contracts and reputational harm. Any limitation on our ability to export our engineered cells, production processes, resulting products, technology, or services, or import materials critical to our programs would likely adversely affect our business and financial condition.

Changes in U.S. and foreign tax laws could have a material adverse effect on our business, cash flow, results of operations or financial conditions.

We are subject to tax laws, regulations and policies of the U.S. federal, state and local governments. Changes in tax laws, as well as other factors, could cause us to experience fluctuations in our tax obligations and otherwise adversely affect our tax positions and/or our tax liabilities. For example, the results of the upcoming 2022 congressional elections in the United States could result in significant changes in tax law that could adversely impact our effective tax rate. In addition, the Organisation for Economic Co-operation and Development has published proposals covering various international tax-related issues, including country-by-country reporting, permanent establishment rules, transfer pricing and tax treaties. Future tax reform resulting from these developments may

result in changes that could adversely affect our effective tax rate or result in higher cash tax liabilities. There can be no assurance that our tax payments, tax credits, or incentives will not be adversely affected by these or other initiatives.

We may become subject to lawsuits or indemnity claims in the ordinary course of business, which could materially and adversely affect our business and results of operations.

From time to time, we may in the ordinary course of business be named as a defendant in lawsuits, indemnity claims and other legal proceedings. These actions may seek, among other things, compensation for alleged product liability, personal injury, employment discrimination, breach of contract, property damage and other losses or injunctive or declaratory relief.

The marketing, sale and use of our services engineered cells, production processes and resulting products could lead to the filing of product liability claims were someone to allege that our services, engineered cells, production processes or resulting products failed to perform as designed or intended or caused injury or other harms. A product liability claim could result in substantial damages and be costly and time-consuming for us to defend.

Regardless of merit or eventual outcome, product liability claims may result in:

- decreased demand for programs and resulting products;
- loss of revenue;
- substantial monetary payments;
- significant time and costs to defend related litigation;
- the inability to commercialize any products from our programs; and
- injury to our reputation and significant negative media attention.

In the event that such actions, claims or proceedings are ultimately resolved unfavorably to us at amounts exceeding our accrued liability, or at material amounts, the outcome could materially and adversely affect our business and results of operations. In addition, payments of significant amounts, even if reserved, could adversely affect our liquidity position. We maintain product liability insurance, but this insurance may not fully protect us from the financial impact of defending against product liability claims. Any product liability claim brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any product liability lawsuit could cause current collaborators to terminate existing agreements or potential collaborators to seek other companies, any of which could impact our business and results of operations.

Our business could be adversely affected by legal challenges to our telehealth partner's business model.

Certain of our COVID-19 biosecurity offerings rely significantly on healthcare provider orders for testing that are placed on the basis of telemedicine encounters. The ability to conduct telehealth services in a particular state is directly dependent upon the applicable laws governing remote healthcare, the practice of medicine and healthcare delivery in general in such location which are subject to changing political, regulatory and other influences. With respect to telehealth services, state medical boards continue to implement new rules or interpret existing rules in a manner that may limit or restrict the ability of the centers to conduct their business as it has been conducted in the past. Additionally, during the COVID-19 public health emergency, many states enacted waivers and adopted other temporary measures that lifted certain restrictions on out-of-state providers and relaxed licensure requirements to allow greater access to telehealth services during the public health emergency period. At this time, we cannot predict whether these waivers or temporary measures will remain in place after the end of the public health emergency period. Accordingly, we must monitor compliance with laws in every jurisdiction in which we operate, and we cannot provide assurance that government authorities may nonetheless challenge our activities and arrangements with our telehealth partner and consider them non-compliant. Additionally, it is possible that the laws and rules governing the practice of medicine, including remote healthcare, in one or more jurisdictions may change in a manner deleterious to our business. If a successful legal challenge or an adverse change in the relevant laws were to occur, and we are unable to adapt our business model accordingly, our operations as well as the operations of our telehealth partner in the

affected jurisdictions would be disrupted, which could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to our Common Stock, Organizational Structure and Governance

We are not, and do not intend to become, regulated as an "investment company" under the Investment Company Act, and if we were deemed an "investment company" under the Investment Company Act, applicable restrictions could make it impractical for us to continue our business as contemplated and could have a material adverse effect on our business.

An entity generally will be deemed to be an "investment company" for purposes of the Investment Company Act if:

- it is an "orthodox" investment company because it is or holds itself out as being engaged primarily, or proposes to engage primarily, in the business of investing, reinvesting or trading in securities; or

- it is an inadvertent investment company because, absent an applicable exemption, (i) it owns or proposes to acquire investment securities having a value exceeding 40% of the value of its total assets (exclusive of U.S. government securities and cash items) on an unconsolidated basis, or (ii) it owns or proposes to acquire investment securities having a value exceeding 45% of the value of its total assets (exclusive of U.S. government securities and cash items) and/or more than 45% of its income is derived from investment securities on a consolidated basis with its wholly owned subsidiaries.

We believe that we are engaged primarily in the business of providing cell engineering services to customers from across a variety of industries and not in the business of investing, reinvesting or trading in securities. We hold ourselves out as a synthetic biology company and do not propose to engage primarily in the business of investing, reinvesting or trading in securities. Accordingly, we do not believe that we are an "orthodox" investment company as defined in Section 3(a)(1)(A) of the Investment Company Act of 1940, as amended (the "Investment Company Act") and described in the first bullet point above. Furthermore, we believe that less than 40% of our total assets (exclusive of U.S. government securities and cash items) on an unconsolidated basis will be composed of assets that could be considered investment securities. Accordingly, we do not believe that we are an inadvertent investment company by virtue of the 40% tests in Section 3(a)(1)(C) of the Investment Company Act as described in the second bullet point above. In addition, we believe that we are not an investment company under Section 3(b)(1) of the Investment Company Act because we are primarily engaged in a non-investment company business.

The Investment Company Act and the rules thereunder contain detailed parameters for the organization and operation of investment companies. Among other things, the Investment Company Act and the rules thereunder limit or prohibit transactions with affiliates, impose limitations on the issuance of debt and equity securities, generally prohibit the issuance of options and impose certain governance requirements. We intend to conduct our operations so that we will not be deemed to be an investment company under the Investment Company Act or otherwise conduct our business in a manner that does not subject us to the registration and other requirements of the Investment Company Act. In order to ensure that we are not deemed to be an investment company, we may be limited in the assets that we may continue to own and, further, may need to dispose of or acquire certain assets at such times or on such terms as may be less favorable to us than in the absence of such requirement. If anything were to happen which would cause us to be deemed to be an investment company under the Investment Company Act (such as significant changes in the value of our programs or a change in circumstance that results in a reclassification of our interests in our programs for purposes of the Investment Company Act), the requirements imposed by the Investment Company Act could make it impractical for us to continue our business as currently conducted, which would materially adversely affect our business, financial condition and results of operations. In addition, if we were to become inadvertently subject to the Investment Company Act, any violation of the Investment Company Act could subject us to material adverse consequences, including potentially significant regulatory penalties and the possibility that certain of our contracts could be deemed unenforceable.

Only our employees and directors are entitled to hold shares of Class B common stock (including shares of Class B common stock granted or otherwise issued to our employees and directors in the future), which shares have ten votes per share. This limits or precludes other stockholders' ability to influence the outcome of matters submitted to stockholders for approval, including the election of directors, the approval of certain employee compensation plans, the adoption of certain amendments to our organizational documents and the approval of any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.

Shares of our Class B common stock have ten votes per share, whereas shares of our Class A common stock have one vote per share and shares of our Class C common stock have no voting rights (except as otherwise expressly provided in our amended and restated certificate of incorporation (the "Charter") or required by applicable law). As of March 31, 2022, our directors and executive officers hold in the aggregate approximately 49.5% of the total voting power of our outstanding capital stock, and our directors, founders and executive officers hold in the aggregate approximately 69.1% of the total voting power of our outstanding capital stock. Accordingly, holders of shares of Class B common stock are able to significantly influence the outcome of matters submitted to our stockholders for approval, including the election of directors, the approval of certain employee compensation plans, the adoption of amendments to our organizational documents and the approval of any merger, consolidation, sale of all or substantially all of our assets or other major corporate transaction requiring stockholder approval. This concentrated voting power limits or precludes other stockholders' ability to influence the outcome of these matters. Holders of Class B common stock may have interests that differ from holders of Class A common stock and may vote in a way with which holders of Class A common stock disagree and which may be adverse to the interests of holders of Class A common stock. This concentrated voting power is likely to have the effect of limiting the likelihood of an unsolicited merger proposal, unsolicited tender offer or proxy contest for the removal of directors. As a result, our governance structure and Charter may have the effect of depriving our stockholders of an opportunity to sell their shares at a premium over prevailing market prices and make it more difficult to replace our directors and management. Furthermore, this concentrated voting power could discourage a potential investor from acquiring Class A common stock due to the limited voting power of such stock relative to Class B common stock, which could also adversely affect the trading price of Class A common stock.

Our multi-class stock structure is intended to preserve our existing founder-led governance structure, to promote employee retention and engagement, to facilitate continued innovation and the risk-taking that it requires, to permit us to continue to prioritize our long-term goals rather than short-term results, to enhance the likelihood of continued stability in the composition of our board of directors and its policies, and to discourage certain types of transactions that may involve an actual or threatened acquisition of the company, all of which we believe are essential to the long-term success of our company and to long-term stockholder value. We expect to maintain this concentrated voting power among our founders and employees for the foreseeable future, including by issuing additional shares of Class B common stock to our employees pursuant to our equity compensation plans.

Future transfers of shares of Class B common stock to persons other than Ginkgo directors and employees, or trusts or legal entities through which the right to vote the shares of Class B common stock held thereby is exercised exclusively by one or more of Ginkgo's directors or employees (any such director, employee, trust or legal entity, an "Eligible Holder"), or the holder of shares of Class B common stock ceasing to be an Eligible Holder, will generally result in those shares converting to shares of Class A common stock on a one-to-one basis, subject to certain exceptions and unless a majority of the independent directors of our board of directors determine that such transfer or event will not result in such automatic conversion. Each share of Class B common stock is also convertible at any time at the option of the holder into one share of Class A common stock. The conversion of Class B common stock to Class A common stock over time will have the effect of increasing the relative voting power of those holders of Class B common stock who retain their shares of Class B common stock in the long term. As a result, the relative voting power of holders of Class A common stock is expected to remain limited for a significant period of time, and it is possible that one or more of the persons or entities holding Class B common stock could gain significant voting control as other holders of Class B common stock sell or otherwise convert their shares into Class A common stock. In addition, the conversion of Class B common stock to Class A common stock would dilute holders of Class A common stock in terms of voting power within the Class A common stock. Because holders of Class C common stock have no voting rights (except as otherwise expressly provided in the Charter or required by applicable law), the holders of Class B common stock may be able to significantly influence the outcome of matters submitted to our stockholders for approval for a longer period of time than would be the case if we issued Class A common stock rather than Class C common stock in such transactions.

Our share price may change significantly over time, and you may not be able to resell our common stock at or above the price you paid or at all, and you could lose all or part of your investment as a result.

The trading price of our Class A common stock has been in the past and is likely to continue to be volatile. Such volatility may be, in part, attributable to:

- future sales of our common stock or other securities by us or our existing stockholders, or the perception of such future sales;
- results of operations of the company or our competitors that vary from the expectations of securities analysts and investors;

- changes in expectations as to our future financial performance and growth, including assessments of our business, prospects, financial estimates and investment recommendations by securities analysts, investors and short sellers;
- additions or departures of key management personnel or members of our board of directors;
- announcements by us or our competitors of significant contracts, new products, acquisitions, joint marketing relationships, joint ventures, other strategic relationships or capital commitments;
- announcements relating to actual or potential civil and non-civil litigation, as well as governmental or regulatory investigations or inquiries;
- guidance that we provide to the public, any changes in this guidance or our failure to meet this guidance;
- changes in the perception of our offerings or the synthetic biology industry more general including changes in regulatory conditions;
- the development and sustainability of an active trading market for our common stock;
- changes in accounting principles;
- changes in general economic or market conditions or trends in our industry or markets;
- other events or factors, including those resulting from natural disasters, pandemics, epidemics, war (including Russia's invasion of Ukraine), acts of terrorism or responses to these events.

These factors among others may materially adversely affect the market price of our Class A common stock, regardless of our actual operating performance. In addition, price volatility may be greater if the public float and trading volume of our common stock are low.

In the past, following periods of market volatility, stockholders have instituted securities class action litigation. If we were involved in securities litigation, it could have a substantial cost and divert resources and the attention of executive management from our business regardless of the outcome of such litigation.

Future sales, or the perception of future sales, by us or our stockholders in the public market could cause the market price for our securities to decline.

The sale of our securities in the public market, or the perception that such sales could occur, could harm the prevailing market price of our securities. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

As of the consummation of the Business Combination, we had a total of approximately 1,959 million shares of common stock outstanding on a fully-diluted basis, consisting of approximately 1,333 million shares of Class A common stock and approximately 626 million shares of Class B common stock. All shares issued in the merger are freely tradable without registration under the Securities Act, and without restriction by persons other than our "affiliates" (as defined under Rule 144 of the Securities Act, "Rule 144"), including our directors, executive officers and other affiliates. Of these shares, approximately 631 million shares of common stock outstanding on a fully-diluted basis are subject to a one-year lock-up, which is scheduled to expire on September 16, 2022. In addition to the above, there are up to approximately 206 million shares of common stock that may be earned if the trading price is greater than or equal to the earnout price threshold in the table below for any point in a trading day during 20 trading days in a 30 consecutive trading day period, of which approximately 51.5 million shares were earned as of March 31, 2021. The vast majority of the shares that are part of the earnout will not be subject to lock-up once the earnout conditions are met.

Earnout Price Threshold		Number of Shares Earned
$ 12.50	(earnout condition has been met)	Approximately 51.5 million
$ 15.00		Approximately 51.5 million
$ 17.50		Approximately 51.5 million
$ 20.00		Approximately 51.5 million

In addition, the shares of our common stock reserved for future issuance under our equity incentive plans will become eligible for sale in the public market once those shares are issued, subject to provisions relating to various vesting agreements and, in some cases, limitations on volume and manner of sale applicable to affiliates under Rule 144, as applicable. Our compensation committee of our board of directors may determine the exact number of shares to be reserved for future issuance under our equity incentive plans at its discretion. We are expected to file one or more registration statements on Form S-8 under the Securities Act to register shares of Class A common stock or securities convertible into or exchangeable for shares of Class A common stock issued pursuant to our equity incentive plans. Any such Form S-8 registration statements will automatically become effective upon filing. Accordingly, shares registered under such registration statements will be available for sale in the open market.

Short sellers may engage in manipulative activity intended to drive down the market price of our Class A common stock, which could also result in related regulatory and governmental scrutiny, among other effects.

Short selling is the practice of selling securities that the seller does not own but rather has borrowed or intends to borrow from a third party with the intention of later buying lower priced identical securities to return to the lender. Accordingly, it is in the interest of a short seller of our Class A common stock for the price to decline. At any time, short sellers may publish, or arrange for the publication of, opinions or characterizations that are intended to create negative market momentum. Issuers, like us, whose securities have historically had limited trading history or volumes and/or have been susceptible to relatively high volatility levels can be vulnerable to such short seller attacks. Short selling reports can cause increased volatility in an issuer's stock price, and result in regulatory and governmental inquiries. On October 6, 2021, such a report was published about us. Shortly after, we received a preliminary and informal inquiry from the U.S. Department of Justice related to such report. Any related inquiry or formal investigation from a governmental organization or other regulatory body, including any inquiry from the SEC, could result in a material diversion of our management's time and could have a material adverse effect on our business and results of operations.

Our Charter authorizes a large number of shares of Class B common stock for issuance in the future. The future issuance of shares of Class B common stock may have the effect of further concentrating voting power with our employees and other Class B stockholders, and could have an adverse effect on the trading price of Class A common stock.

Under our Charter, we are authorized to issue 4,500,000,000 shares of Class B common stock, which are entitled to ten votes per share. We currently intend to issue additional shares of Class B common stock in the future to existing and newly hired employees pursuant to our equity compensation plans. Our authorized but unissued shares of Class B common stock are available for issuance to Eligible Holders with the approval of our board of directors without stockholder approval, except as may be required by the Listing Rules of the NYSE. In addition, our authorized but unissued shares of Class B common stock are available for issuance to persons other than Eligible Holders only with the approval of a majority of our directors elected by the holders of Class B common stock, voting separately as a class. If we issue additional shares of Class B common stock in the future, holders of shares of Class A common stock, which are entitled to one vote per share, will experience disproportionate voting power dilution relative to economic dilution, and the holders of Class B common stock may be able to significantly influence the outcome of matters submitted to our stockholders for approval for a longer period of time than would be the case if we issued shares of Class A common stock.

See *"Risk Factors—Risks Relating to our Organizational Structure and Governance—Only our employees and directors are entitled to hold shares of Class B common stock (including shares of Class B common stock granted or otherwise issued to our employees and directors in the future), which shares have ten votes per share. This limits or precludes other stockholders' ability to influence the outcome of matters submitted to stockholders for approval, including the election of directors, the approval of certain employee compensation plans, the adoption of amendments to our organizational documents and the approval of any merger, consolidation, sale of all or substantially all of our assets or other major corporate transaction requiring stockholder approval."*

Under our Charter, we are authorized to issue 800,000,000 shares of Class C common stock, which have no voting rights (except as otherwise expressly provided in the Charter or required by applicable law). Outstanding Class C common stock may have the effect of extending voting power in Class B common stock, and may discourage potential acquisitions of our business and could have an adverse effect on the trading price of Class A common stock.

Under our Charter, we are authorized to issue 800,000,000 shares of Class C common stock, which have no voting rights (except as required by law). Class C common stock may be used for a variety of corporate purposes, including financings, acquisitions and investments. Our authorized but unissued shares of Class C common stock are available for issuance with the approval of our board of

directors without stockholder approval, except as may be required by the Listing Rules of the NYSE. Because the Class C common stock carries no voting rights (except as otherwise expressly provided in the Charter or required by applicable law), is not convertible into any other capital stock, and is not listed for trading on an exchange or registered for sale with the SEC, shares of Class C common stock may be less liquid and less attractive to any future recipients of these shares than shares of Class A common stock, although we may seek to list the Class C common stock for trading and register shares of Class C common stock for sale in the future. In addition, because our Class C common stock has no voting rights (except as otherwise expressly provided in the Charter or required by applicable law), the holders of Class B common stock may be able to significantly influence the outcome of matters submitted to our stockholders for approval for a longer period of time than would be the case if we issued Class A common stock rather than Class C common stock in such transactions. In addition, further issuances of Class C common stock would have a dilutive effect on the economic interests of Class A common stock and Class B common stock. Any such issuance could also cause the trading price of Class A common stock to decline.

We cannot predict the effect the multi-class structure of our common stock may have on the trading price of our Class A common stock.

The holding of low-voting stock, such as Class A common stock, may not be permitted by the investment policies of certain institutional investors or may be less attractive to the portfolio managers of certain institutional investors. In addition, certain index providers have announced restrictions on including companies with multiple-class share structures in certain of their indices. In July 2017, FTSE Russell and S&P Dow Jones announced that they would cease to allow most newly public companies with dual- or multi-class capital structures to be included in their indices. Affected indices include the Russell 2000 and the S&P 500, S&P MidCap 400 and S&P SmallCap 600, which together make up the S&P Composite 1500. Under the announced policies, our multi-class capital structure would make our Class A common stock ineligible for inclusion in certain indices, and as a result, mutual funds, exchange-traded funds and other investment vehicles that attempt to passively track those indices would not invest in our common stock. These policies may depress our valuation compared to those of other similar companies that are included. Because of our multi-class stock structure, our Class A common stock will likely continue to be excluded from certain of these indices, and we cannot assure you that other stock indices will not take similar actions. Given the sustained flow of investment funds into passive strategies that seek to track certain indices, exclusion from stock indices would likely preclude investment by many of these funds in our Class A common stock and could make shares of our Class A common stock less attractive to other investors. As a result, the trading price of shares of our Class A common stock could be adversely affected.

Our focus on the long-term best interests of our company and our consideration of all of our stakeholders, including our stockholders, workforce, customers, suppliers, academic researchers, governments, communities and other stakeholders that we may identify from time to time, may conflict with short-term or medium-term financial interests and business performance, which may adversely impact the value of our common stock.

We believe that focusing on the long-term best interests of our company and our consideration of all of our stakeholders, including our stockholders, workforce, customers, suppliers, academic researchers, governments, communities and other stakeholders we may identify from time to time, is essential to the long-term success of our company and to long-term stockholder value. Therefore, we have made decisions, and may in the future make decisions, that we believe are in the long-term best interests of our company and our stockholders, even if such decisions may negatively impact the short- or medium-term performance of our business, results of operations, and financial condition or the short- or medium-term performance of our Class A common stock. Our commitment to pursuing long-term value for the company and its stockholders, potentially at the expense of short- or medium-term performance, may materially adversely affect the trading price of our Class A common stock, including by making owning our Class A common stock less appealing to investors who are focused on returns over a shorter time horizon. Our decisions and actions in pursuit of long-term success and long-term stockholder value, which may include our multi-class stock structure, making investments in R&D and our employees, and investing in and introducing new products and services, may not result in the long-term benefits that we expect, in which case our business, results of operations and financial condition, as well as the trading price of our Class A common stock, could be materially adversely affected.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

None.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

None.

Item 5. Other Information.

None.

Item 6. Exhibits.

Exhibit Number	Description
3.1	Certificate of Incorporation of Ginkgo Bioworks Holdings, Inc. (incorporated by reference to Exhibit 3.1 of the Company's Current Report on Form 8-K filed with the SEC on September 20, 2021).
3.2	Amendment to Certificate of Incorporation of Ginkgo Bioworks Holdings, Inc. (incorporated by reference to Exhibit 3.2 of the Company's Current Report on Form 8-K filed with the SEC on September 20, 2021).
3.3	Bylaws of Ginkgo Bioworks Holdings, Inc. (incorporated by reference to Exhibit 3.3 of the Company's Current Report on Form 8-K filed with the SEC on September 20, 2021).
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2*	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

* Filed herewith.

SIGNATURES

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

Ginkgo Bioworks Holdings, Inc.

Date: May 16, 2022

By: /s/ Jason Kelly
Name: Jason Kelly
Title: Chief Executive Officer (Principal Executive Officer)

Date: May 16, 2022

By: /s/ Mark Dmytruk
Name: Mark Dmytruk
Title: Chief Financial Officer (Principal Financial Officer)

Date: May 16, 2022

By: /s/ Marie Fallon
Name: Marie Fallon
Title: Chief Accounting Officer (Principal Accounting Officer)

Exhibit 31.1

CERTIFICATION PURSUANT TO RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934, AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Jason Kelly, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Ginkgo Bioworks Holdings, 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)) 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) [Paragraph omitted pursuant to SEC Release Nos. 33-8238/34-47986 and 33-8392/34-49313];

   (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 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: May 16, 2022

By: /s/ Jason Kelly

Jason Kelly

Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934, AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Mark Dmytruk, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Ginkgo Bioworks Holdings, 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)) 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) [Paragraph omitted pursuant to SEC Release Nos. 33-8238/34-47986 and 33-8392/34-49313];

   (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 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: May 16, 2022

By: /s/ Mark Dmytruk

Mark Dmytruk

Chief Financial Officer
(Principal Financial 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 filing of the Quarterly Report on Form 10-Q of Ginkgo Bioworks Holdings, Inc. (the "Company") for the quarterly period ended March 31, 2022 with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) 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.

Date: May 16, 2022

By: /s/ Jason Kelly

Jason Kelly

Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

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 filing of the Quarterly Report on Form 10-Q of Ginkgo Bioworks Holdings, Inc. (the "Company") for the quarterly period ended March 31, 2022 with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) 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.

Date: May 16, 2022

By: /s/ Mark Dmytruk

Mark Dmytruk

Chief Financial Officer
(Principal Financial Officer)