Howard Hughes Medical Institute

Consolidated Financial Statements
for the years ended August 31, 2022 and 2021
and Report of Independent Auditors Thereon

Report of Independent Auditors

To the Trustees of Howard Hughes Medical Institute:

Opinion

We have audited the accompanying consolidated financial statements of Howard Hughes Medical Institute and its subsidiaries (the "Institute"), which comprise the consolidated statements of financial position as of August 31, 2022 and 2021, and the related consolidated statements of activities and of cash flows for the years then ended, including the related notes (collectively referred to as the "consolidated financial statements").

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the Institute as of August 31, 2022 and 2021, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (US GAAS). Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are required to be independent of the Institute and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for one year after the date the consolidated financial statements are issued.

Auditors' Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with US GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the consolidated financial statements.

In performing an audit in accordance with US GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the consolidated financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Institute's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

PricewaterhouseCoopers LLP

Washington, DC
November 17, 2022

HOWARD HUGHES MEDICAL INSTITUTE

Consolidated Statements of Financial Position
August 31, 2022 and 2021

(In thousands)

Assets	2022	2021
Cash and cash equivalents	$ 582,889	$ 687,981
Due from brokers	21,258	144,401
Securities pledged as collateral	298,278	299,523
Securities lending collateral	22,282	59,905
Investment receivables	130,996	75,431
Investments and derivative assets	23,714,579	27,067,118
Land, buildings, laboratory space, and equipment, net	840,670	765,037
Right-of-use assets, net	178,477	138,227
Other assets	87,964	105,484
Total assets	$ 25,877,393	$ 29,343,107
Liabilities		
Accounts payable and accrued liabilities	$ 150,387	$ 134,501
Investment payables	65,198	52,431
Investments and derivative liabilities	97,411	405,123
Obligation to return securities lending collateral	22,282	59,905
Repurchase obligations	301,644	300,781
Grant commitments	36,751	59,667
Post-retirement/employment obligations, net	172,581	281,893
Capital financing		
Note payable	40,376	40,376
Financing lease obligations	—	357
Net bonds payable	772,890	770,950
Operating lease liabilities	178,204	138,188
Total liabilities	1,837,724	2,244,172
Net assets	24,039,669	27,098,935
Total liabilities and net assets	$ 25,877,393	$ 29,343,107

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

HOWARD HUGHES MEDICAL INSTITUTE

Consolidated Statements of Activities
For the Years Ended August 31, 2022 and 2021

(In thousands)

Revenue	2022	2021
Net investment return	$ (2,333,411)	$ 6,659,678
Intellectual property and other income	30,375	26,362
Total revenue and investment return	(2,303,036)	6,686,040
Expenses		
Program activities		
Medical research	677,551	660,250
Science education and other scientific programs	60,960	63,526
General and administrative	115,062	103,590
Deferred tax benefit, net	—	3,527
Total expenses	853,573	830,893
Change in net assets from operating activities	(3,156,609)	5,855,147
Other changes		
Other components of net periodic benefit cost	97,343	11,887
Total change in net assets	(3,059,266)	5,867,034
Net assets, beginning of year	27,098,935	21,231,901
Net assets, end of year	$ 24,039,669	$ 27,098,935

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

HOWARD HUGHES MEDICAL INSTITUTE

Consolidated Statements of Cash Flows
For the Years Ended August 31, 2022 and 2021

(In thousands)	2022	2021
Change in net assets	$ (3,059,266)	$ 5,867,034
Adjustments to reconcile change in net assets to net cash used for operating activities		
Depreciation and amortization	104,523	103,337
Amortization of operating lease right-of-use assets	47,462	44,918
Postretirement changes other than net periodic benefit cost	15,565	15,566
Loss on disposal of assets	4,458	3,820
Income earned from stock dividends	(2,873)	(5,766)
Deferred tax provision	—	3,527
Net realized and change in unrealized gains on investments and derivative contracts	2,460,539	(6,583,796)
Change in receivables and other assets	(99,656)	(96,895)
Change in due from brokers	123,143	(25,770)
Change in securities pledged as collateral	1,245	304,369
Change in operating/investment payables and accrued liabilities	14,152	(29,686)
Change in grant commitments	(22,915)	(22,696)
Change in post-retirement/employment obligations	(124,877)	(73,662)
Net cash used for operating activities	(538,500)	(495,700)
Cash flows from investing activities		
Building and equipment purchases	(161,557)	(93,439)
Proceeds from sales, maturities of investments, securities sold short and derivative contracts	15,657,751	13,500,917
Purchases of investments, derivative contracts and purchases to cover securities sold short	(15,063,292)	(13,186,369)
Addition (redemption) of securities lending collateral investments	37,624	(15,510)
Net cash provided by investing activities	470,526	205,599

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

HOWARD HUGHES MEDICAL INSTITUTE

Consolidated Statements of Cash Flows
For the Years Ended August 31, 2022 and 2021

(In thousands)	2022	2021
Cash flows from financing activities		
Principal payments under financing lease obligations	(357)	(5,534)
Net proceeds (repayments) from repurchase obligations	863	(304,217)
(Repayments) proceeds of securities lending program	(37,624)	15,510
Net cash used for financing activities	(37,118)	(294,241)
Net decrease in cash	(105,092)	(584,342)
Cash, cash equivalents, and restricted cash, beginning of year	687,981	1,272,323
Cash, cash equivalents, and restricted cash, end of year	$ 582,889	$ 687,981
Supplemental disclosure of non-cash investing and financing activities		
Accruals for equipment and construction costs included in *Accounts payable and accrued liabilities*	$ 8,590	$ 2,608
Operating lease assets and related liabilities	87,784	30,722
Total cash, cash equivalents, and restricted cash		
Cash	$ 115,512	$ 168,127
Cash equivalents	467,377	519,854
Restricted cash	—	—
Total cash, cash equivalents, and restricted cash	$ 582,889	$ 687,981

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

1. ORGANIZATION

Howard Hughes Medical Institute ("HHMI" or the "Institute") was established for the purpose of promoting knowledge within the basic sciences, principally medical research and education, and the effective application of this knowledge for the benefit of humanity. The Institute conducts basic biomedical research at its Janelia Research Campus ("Campus") located in Loudoun County, Virginia, and at universities, hospitals, and other not-for-profit research institutions ("host institutions") throughout the U.S. under the terms of collaboration agreements.

In addition to its basic research activities, the Institute funds grants to both institutions and individuals in support of a wide range of science and research-related initiatives, including precollege and undergraduate science education, pre- and post-doctoral research fellowships, and international research activities. Most of the Institute's grant awards to individuals are fellowships administered by the awardee's institution for the benefit of the awardee.

For many years, the Institute has created science education resources for use by classroom teachers and has distributed these broadly without charge. The Institute also supports a science film initiative, which develops, produces, and disseminates science programming through broadcast television and other media channels. Film footage produced through this initiative may also be used to expand and enhance the science education resources designed for classroom use.

The Institute's investments are its principal source of financial support. The Institute's long-range investment goal is to manage the investments in a prudent manner that will support the Institute's programs in perpetuity. Most of the Institute's spending is on programs that involve long-term commitments: the Institute's medical research program at host institutions and Janelia Research Campus, in which it makes multi-year employment, budget, and other spending commitments to its Investigators and other HHMI laboratory heads, and the Institute's grant programs in which the Institute makes multi-year grant commitments for science education and to support research by scientists in the early stages of their academic careers. These attributes of the Institute's mode of operation present the need to balance longer-term investment growth, stabilize investment returns, and maintain liquidity.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The consolidated financial statements include the accounts of the Institute's wholly owned subsidiaries, which are used primarily in connection with investment activities. All intra-company transactions and accounts have been eliminated.

Basis of Presentation

The consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP"). These principles require management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported revenues and expenses during the reporting period. Actual results could differ from those estimates.

Cash and Cash Equivalents

Cash and cash equivalents are recorded at amortized cost, which approximates fair value and include both U.S. and non-U.S. currency and short-term interest-bearing marketable instruments with original maturities of 90 days or less from the initial purchase date. The purchases and sales of cash equivalents are not presented on the Consolidated Statements of Cash Flows. These balances are held at the Institute's custodians, prime brokers, clearing agents, and banking institutions for investment and working capital purposes.

The total cash and cash equivalents maintained at various institutions exceeds the amount guaranteed by federal agencies and, therefore, bears some risk. The Institute has not experienced any loss due to this risk. Interest earned on cash and cash equivalents is recognized in *Net investment return* within the Consolidated Statements of Activities.

Foreign Currency Translation
Securities and cash denominated in foreign currencies are translated into U.S. dollar equivalents using year-end spot foreign currency exchange rates. Investment payables and receivables are valued using either spot or interpolated forward rates as applicable based on the expected settlement date. Purchases and sales of financial instruments, and their related income and expenses, are translated at the rate of exchange on the respective date of such transactions. The Institute includes realized gains/(losses) and unrealized appreciation/(depreciation) on investments and derivative financial instruments resulting from foreign currency changes in *Net investment return* on the Consolidated Statements of Activities. The Institute does not isolate that portion of the results of operations resulting from changes in foreign exchange rates on securities and derivative contracts from the fluctuations arising from changes in market price of securities and derivative contracts held. Such fluctuations are included in *Net investment return*. The Institute may be exposed to risks that the exchange rate of the U.S. dollar relative to other currencies may change in a manner that has an adverse effect on the reported value of that portion of the Institute's assets or liabilities that is denominated in currencies other than the U.S. dollar.

Restricted Funds
The Institute generally does not accept donations or other contributions, but has made several exceptions, including accepting a very limited number of grants from other not-for-profit organizations to support specific research activities at the Janelia Research Campus, and accepting funding from a few other not-for-profit organizations that are collaborating with the Institute on grant programs. These grants entail restrictions on how the funds may be used. As a result, there are restrictions on net assets, which the Institute considers immaterial to its financial statements.

Intellectual Property
The Institute receives licensing fees and royalty income in connection with the commercialization of intellectual property created by its scientists. Licensing fees and royalty income are recorded as revenue in the Consolidated Statements of Activities as performance obligations are satisfied under the terms of the contracts.

In addition, the Institute may indirectly have equity interests in startup companies formed to commercialize inventions created by its Investigators. Such equity interests are held in the host institution's name for the benefit of HHMI until the host institution disposes of that interest. As a result, recognition of value related to such equity interests is recorded only upon notification to HHMI by the host institution that its equity interest has been sold, and the Institute's share of the proceeds has been determined. No value for such equity interests is carried on the Consolidated Statements of Financial Position.

The Institute may in the future directly hold equity or other interests in some startup companies formed to commercialize inventions created by its group leaders or other researchers at the Janelia Research Campus. In this event, the equity or other interests would be managed by the Institute's Investment Department and appropriately recorded in the consolidated financial statements.

Investments
Investments are presented at fair value in accordance with GAAP. When available, investments are valued based on quoted market prices. In cases where market quotations are not available, management relies on appraisals, assumptions, and other methods to estimate fair value. For

certain alternative investments, management uses Net Asset Value ("NAV") as the practical expedient to determine fair value. The Institute's investment valuation policies are discussed in detail in Note 4.

Net realized and the change in unrealized gains and losses are calculated using the average cost of investments and are recognized in *Net investment return* in the Consolidated Statements of Activities. Investment income, including interest, is accrued as earned. Dividend income is recorded on the ex-dividend date.

Derivatives, such as futures, options, swap contracts, and foreign currency forward contracts are recorded at fair value with the resulting gain or loss recognized in the *Net investment return* financial statement line item.

Land, Buildings, Laboratory Space, and Equipment

Costs of constructing and renovating laboratory space occupied by Investigators or other HHMI laboratory heads are currently capitalized and amortized over the lesser of 5 years or the remaining appointment term of the Investigator or other HHMI laboratory head for whom renovations are being made. Buildings, building improvements, and equipment having a useful life of more than one year are capitalized. Interest paid on construction debt is capitalized as a component of the building cost. Repair and maintenance costs are expensed as incurred.

Depreciation is computed using the straight-line method over the estimated useful lives as follows:

Classification	Estimated Useful Life (years)
Equipment and furniture	5
Leasehold improvements	5-10
Land improvements	20
Buildings	35

Upon the sale or retirement of land, buildings, laboratory space, or equipment, the related cost and accumulated depreciation are removed from the Consolidated Statements of Financial Position and the resulting gains or losses are reflected in the Consolidated Statements of Activities.

Operating Leases

The Institute appoints and employs selected faculty members ("Investigators") at host institutions and employs other personnel to conduct or facilitate the conduct of research at the site. The Institute determines the amount of laboratory and office space needed for its research, and under a collaboration agreement, makes direct payments to host institutions for the occupancy of space and certain host-provided services.

The Institute has determined that under GAAP, its occupancy arrangement with host institutions must be treated as operating leases. Consistent with this determination, at commencement of an Investigator's term, the Institute measures and recognizes a right-of-use ("ROU") asset, representing the Institute's right to use the underlying asset (laboratory and office space), and a lease liability, representing the Institute's obligation to make occupancy payments under the terms of the collaboration agreement with the Investigator's host institution. For purposes of recognizing ROU assets and lease liabilities associated with the Institute's occupancy arrangements, the Institute elected the practical expedient to not recognize a ROU asset or lease liability for short-term occupancy arrangements, which are those with a term of twelve months or less.

The term of the collaboration agreement with the host institution is not defined as a fixed number of years; rather, at each host site the term extends for as long as the Institute continues to support an Investigator at that host site. In accordance with GAAP, the Institute determined that the lease term should correspond to the term of the Investigator, which is currently seven years plus a two-year phase-out period, if the Investigator's term is not renewed, with the phase-out occurring immediately subsequent to the expiring term. The Institute may renew Investigator appointments for additional terms with no limitation on the number of renewals. The Institute determined it is not reasonably certain it will renew the terms of any specific existing Investigators upon expiration of their current term, and therefore, renewal and termination options are not considered in determining a lease term.

The Institute has elected as a practical expedient not to separate non-lease components (e.g., utilities, janitorial service and maintenance) from lease components and applied this approach consistently to all host institutions. The Institute considers lease payments to include future cash payments from the Institute to the host institution directly associated with the occupancy of laboratory and office space during the remaining terms of the Investigators, inclusive of anticipated consumer price index adjustments.

The rates implicit within the Institute's occupancy arrangement are generally not determinable, and therefore, the Institute's collateralized borrowing rate is used to determine the present value of occupancy (lease) payments. The collateralized borrowing rate is subsequently reassessed if there is a modification to the occupancy-related provisions of the collaboration agreement.

Grant Commitments

The Institute awards domestic and international grants for periods generally ranging from one to five years. The Institute in its discretion may defer an award, if requested by the awardee. Deferred awards continue to be unconditional commitments for which there are no additional contingencies and are included in the grant commitment liability as of August 31, 2022. For multi-year awards, grant commitments are recorded as expenses in the Consolidated Statements of Activities in the year the grant commitment is made, and the present value of the grant commitment liability is reflected in the Consolidated Statements of Financial Position. The discount rate used to arrive at the present value of future payments is based on the rates for U.S. Treasury Notes with maturities in the years in which the payments will be made.

Insurance

The Institute generally self-insures for property and casualty risks. Third party insurance is purchased from time to time in response to specific needs.

Income Taxes

The Institute is a public charity and qualifies as a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code and equivalent state provisions, except with regard to unrelated business income which is taxable at corporate income tax rates. The Institute has estimated a provision for income taxes related to expected future unrelated business taxable income and net operating loss carryforwards expected to be utilized in future years.

Income taxes are reported under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, the Institute determines deferred tax assets and liabilities based on the differences between the financial statement and tax bases of assets and liabilities by using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

Deferred tax assets are recognized to the extent that these assets are more likely than not to be realized. In making such a determination, the Institute considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. The Institute records a valuation allowance against deferred tax assets to the extent that the Institute estimates that they are 50% or less likely to be realized. The Institute assesses the valuation allowance annually and any changes to the valuation allowance are recorded as a component of the provision for income taxes in the year recognized.

In accordance with the guidance on accounting for uncertainty in income taxes, management regularly evaluates its tax positions and does not believe the Institute has any uncertain tax positions that result in a material impact on the Institute's consolidated financial position or change in total net assets. The Institute is subject to routine audits by taxing jurisdictions. The Institute believes it is no longer subject to income tax examinations for fiscal years prior to the year ended August 31, 2018.

Reclassifications

Certain prior year amounts have been reclassified in order to conform to the current year's presentation. Prior year disclosure of alternative investments for which the Institute uses NAV as the practical expedient has been updated for changes in the sub-categories of those investments.

Recent Accounting Pronouncements

Standard effective in future years:

In March 2020, the FASB issued ASU 2020-04, Reference Rate Reform (Topic 848), *Facilitation of the Effects of Reference Rate Reform on Financial Reporting*, an update that provides optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions affected by reference rate reform if certain criteria are met. The amendments in this update apply only to contracts, hedging relationships, and other transactions that reference LIBOR or another reference rate expected to be discontinued because of reference rate reform. This accounting standards update is intended to ease the process of migrating away from LIBOR to new reference rates. The standard was effective upon issuance and generally can be applied through December 31, 2024. The Institute is evaluating the impact of the new standard to its consolidated financial statements and disclosures.

In June 2016, the FASB issued ASU 2016-13, Financial Instruments – Credit Losses (Topic 326), *Measurement of Credit Losses on Financial Instruments*. This standard requires a financial asset (or group of financial assets) measured at amortized cost basis to be presented at the net amount expected to be collected. The allowance for credit losses is a valuation account that is deducted from the amortized cost basis of the financial asset(s) to present the net carrying value at the amount expected to be collected on the financial asset. The Consolidated Statements of Activities reflect the measurement of credit losses for newly recognized financial assets, as well as the expected increases or decreases of expected credit losses that have taken place during the period. The measurement of expected credit losses is based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. Management's judgment must be used in determining the relevant information and estimation methods that are appropriate for the Institute's circumstances. The standard also adds qualitative and quantitative disclosures that provide additional information about the amounts recorded in the consolidated financial statements. The FASB approved a delay in the proposed effective date in October 2019 making the standard effective for fiscal years beginning after December 15, 2022. The Institute's management is evaluating the impact this will have on the consolidated financial statements beginning in fiscal year 2024.

3. LIQUIDITY AND AVAILABILITY OF RESOURCES

The Institute's financial assets available within one year of the date of the Consolidated Statements of Financial Position for general expenditures, construction costs, liabilities, and other obligations as they come due are as follows:

(In thousands)

	August 31, 2022	August 31, 2021
Total assets	$ 25,877,393	$ 29,343,107
Less:		
Investments not available for redemption within one year	(13,228,750)	(14,100,721)
Right-of-use assets	(178,477)	(138,227)
Prepaid expenses and other assets	(86,859)	(104,503)
Land, buildings, laboratory space, and equipment, net	(840,670)	(765,037)
Financial and other assets available to meet cash needs for general expenditures within one year	$ 11,542,637	$ 14,234,619

As part of the Institute's liquidity management, it has a policy to manage the endowment in a manner that will fund the programs and supporting functions in perpetuity and balance long-term growth with the need for stability of investment returns and liquidity. The Institute's investment approach for the endowment is governed by a risk-based asset framework that seeks to assure the sum of the parts is consistent with the Institute's long-term spending goals and tolerance for risk. The endowment's asset allocation framework consists of five Asset Classes: Private Equity, Public Equity, Independent Return, Real Assets, and Bonds & Net Cash, each with its own risk and return profile. The Institute's long-term investment goal for the endowment is to maximize investment returns without materially exceeding the risk inherent in its strategic benchmark, which consists of a portfolio invested 70% in the broad stock market and 30% in the bond market. As of August 31, 2022 and 2021, respectively, the Institute had approximately $11.5 billion and $14.2 billion of financial assets available within one year to meet cash needs for general expenditures, construction costs, liabilities, and other obligations as they come due. No financial assets are subject to restrictions that make them unavailable for general expenditure within one year of the date of the Consolidated Statements of Financial Position.

4. INVESTMENTS

The Institute elected to apply the fair value option of ASC 825, "Financial Instruments," to its portfolio of investments. As such, Investments, as shown on the Consolidated Statements of Financial Position, are presented at fair value in accordance with GAAP. The investment categories, valuation methodology, fair value hierarchy, and related commitments for fiscal years August 31, 2022 and 2021, are discussed below.

Investment Categories and Valuation Policy
Investments are categorized by asset class and valued as described below:

Equity investments primarily consist of direct ownership of public and private companies in the form of common stock. Investments in listed securities on exchanges are typically valued based on last quoted market prices on the last trading date of the principal market on or before August 31. Investments in private companies are valued based on the best available information in the circumstance and may require significant management judgment. The majority of the Institute's equity investments are publicly traded.

Fixed income securities primarily consist of actively traded debt instruments including U.S. Treasury Notes/Bonds/Bills, and private placement debt. Fixed income securities, excluding U.S. Treasury Bills, are valued by independent pricing sources, broker dealers or pricing models that factor in, where applicable, recently executed transactions, interest rates, bond or credit default spreads and volatility. The U.S. Treasury Bills are recorded at amortized cost, which approximates fair value. External investment managers primarily value certain private placement debt that is directly linked with equity ownership in alternative investments. These values are adjusted, if applicable, by management as described under *Valuation Methodology*. The U.S. Treasury issues the majority of the Institute's fixed income investments.

Preferred securities primarily consist of direct ownership of public and private companies in the form of preferred stock. Investments in publicly traded companies are valued based on readily available market quotations obtained from independent pricing sources. Investments in private companies with an available OTC market are valued using quotes from broker dealers or pricing models that factor in, where applicable, recently executed transactions, interest rates, bond or credit default spreads and volatility. Investments in private companies with no OTC market are valued based on the best available information in the circumstance and may require significant management judgment.

Convertible securities primarily consist of direct ownership of public and private companies in the form of preferred stock or bonds that contain a conversion covenant, usually into common stock. Investments in publicly traded companies are valued based on readily available market quotations obtained from independent pricing sources. Investments in private companies with an available OTC market are valued using quotes from broker dealers or pricing models that factor in, where applicable, recently executed transactions, interest rates, bond or credit default spreads and volatility. Investments in private companies with no OTC market are valued based on the best available information in the circumstance and may require significant management judgment.

Alternative investments represent interests in funds, limited partnerships, and other pooled vehicles. The Institute classifies these investments in the following sub-categories:

- *Private equity investments* include buyout, growth equity, venture capital, and other private equity-like investments. These investments are typically held to the term of the investment and have limited liquidity. Distributions from these investments are primarily received through liquidation of the underlying assets.

- *Independent return investments* include strategies that seek high absolute returns which are typically independent of broad market trends. Strategies in the asset class could include long/short strategies, market arbitrage strategies, fixed income with superior risk-adjusted returns, structured finance and distressed opportunities, among others. In most cases, these investments are redeemable at periodic intervals, however, in some cases these investments are held to the term of the investment and have liquidity from distributions that are primarily received through liquidation of the underlying assets.
- *Public equity investments* include equity funds that invest in primarily long public securities traded on major stock exchanges. In most cases, these investments are redeemable at periodic intervals.
- *Real asset investments* include both equity/debt private and public investments in real estate, infrastructure, commodity reserves and/or related infrastructure, energy-related, and other investments that are often secured by tangible assets with pricing power that will participate with inflation. Private real asset investments are typically held to the term of the investment and have limited liquidity, with distributions primarily received through liquidation of the underlying assets. Public real asset investments are typically redeemable at periodic intervals.

The Institute has an active co-investment program. Investments held through this program are classified in one of the above alternative categories if they are structured as limited partnerships or other similar pass-through vehicles. If the Institute owns the co-investment directly, the investment is categorized as a private company investment in equity, fixed income, preferred securities, or convertible securities, as applicable.

The fair value of alternative investments is primarily based on the NAV reported or calculated by the respective external investment managers and is adjusted, if applicable, as described under *Valuation Methodology*. Private company co-investments and funds that do not report NAV are valued based on the best available information in the circumstance and may require significant management judgment.

Derivatives are used by the Institute to manage its exposure to certain risks relating to ongoing business and investment operations. Derivatives may include futures contracts, OTC foreign currency forward contracts, options, contracts for difference, participatory contracts, and various swap contracts. The fair value of derivative investments is determined based on the type of derivative. Listed futures and options, and foreign currency forward contracts are valued by independent pricing sources. Contracts for difference and participatory notes are equity market access products and are typically valued based on changes in price of the underlying equity, adjusted for any financing costs. Swaps and other OTC derivatives are valued by the calculation agent of the contract, which is usually the counterparty to the contract, or by independent pricing sources where available, based on the terms of the contract and other observable inputs.

Short positions are used by the Institute in anticipation of a decline in the market value of an investment. In a physical short sale, the Institute is required to pay the lender any dividends or interest, which accrues during the period of the loan. The Institute is then obligated to return the security borrowed by purchasing it at market price at the time of replacement. The price of the security at replacement may differ from the price at which the security was sold. The Institute will incur a loss if the price of the security increases between the date of the short sale and the date of the cover of the short sale. This loss may be unlimited. The Institute will realize a gain if the security declines in price between those dates. The amount of any gain will be decreased, and the amount of any loss increased, by the amount of any premium, dividends or interest the Institute may be required to pay in connection with a short sale.

Valuation Methodology

Valuation techniques applied to the Institute's investments can include a combination of both observable and unobservable inputs. The Institute's investments in equities, fixed income securities, preferred securities and convertible securities are valued based on quoted market prices in active markets on a trade-date basis or by independent pricing sources, whenever available. Where such inputs do not exist, fair value measurements are based on the best available information such as broker quotes, models or other valuation methodologies that require varying degrees of judgment.

NAV is used as a practical expedient in determining fair value for investments which (a) do not have a readily determinable fair value and (b) are an investment company as defined under ASC 946, *Financial Services – Investment Companies*, or have attributes of an investment company.

The Institute's external investment managers, administrators, and general partners in accordance with their policies as described in their respective financial statements and offering memoranda report the NAV. For certain investments, the most recent NAV reported is adjusted for cash flows and significant known valuation changes, if any, of its related portfolio through August 31, 2022 and 2021, respectively. Management reviews the valuation policies and financial reporting of managers and performs due diligence, as applicable, to obtain an understanding of the valuation processes used by the third party for suitability and appropriateness for use in the Institute's financial statements. Management believes the Institute's allocated share of the carrying amount of these alternative investments is a reasonable estimate of fair value. The majority of the Institute's alternative investments qualify for use of NAV as a practical expedient in accordance with ASC 820 – *Fair Values Measurements and Disclosures*.

For the remaining alternative investments, the Institute considers various factors to estimate fair value including the timing of the transaction, market factors, comparable transactions, company performance and company projections. The selection of an appropriate valuation technique may be affected by the availability and general reliability of relevant inputs. These fair value estimates are subject to the review and approval of the Institute's Valuation Committee.

The Institute's Valuation Committee is comprised of the Chief Investment Officer, the Managing Director - Head of Investment Operations, the Director, Investment Operations, and the Director, Investment Fund Services. The Institute's overall valuation methodology and its application is subject to review and oversight by the Valuation Committee, who meet quarterly to review and assess the valuation techniques applied and to consider new methodologies or recommend changes as appropriate. Once selected for an investment, valuation techniques are consistently applied. The Valuation Committee has sole authority to make overrides to the current valuation methodology or technique for a specific investment. A change in a valuation technique or its application will be made only if the change results in a measurement that management believes is more representative of fair value in the circumstance. The Institute did not change its valuation methodology for its years ended August 31, 2022 and 2021. Although the Valuation Committee believes its valuation methods are appropriate and consistent, these methods may produce a fair value estimate that may not be indicative of the ultimate net realizable value, or reflective of future fair values and such differences could be material.

Fair Value Hierarchy

The fair value hierarchy, as required by ASC 820, prioritizes the use of market-based information over entity-specific information and establishes a three-level hierarchy for fair value measurement based on the transparency of information, such as the pricing source used in the valuation of an asset or liability as of the measurement date. It consists of observable and unobservable inputs at three levels. Observable inputs are based on market data obtained from sources independent of the reporting entity; unobservable inputs are based on the best information available in the circumstances.

- Level 1 inputs consist of quoted prices in active markets for identical assets or liabilities.

- Level 2 inputs are from sources other than quoted prices that are observable for an asset or liability, either directly or indirectly. Level 2 inputs include quoted prices for similar assets or liabilities in active markets, interest rates and yield curves observable at commonly quoted intervals, volatilities, prepayment speeds, loss severities, credit risks, default rates, and market corroborated inputs that are derived principally from or corroborated by observable market data by correlation or other means.

- Level 3 inputs are unobservable inputs for the asset or liability. They are used to measure fair value when observable inputs are not available, including situations in which there is little, if any, market activity for the asset or liability at the measurement date.

The asset or liability's fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

The following tables present the financial instruments carried at fair value as of August 31, 2022 and 2021:

August 31, 2022
(In thousands)

	Quoted Market Prices (Level 1)	Other Observable Inputs (Level 2)	Unobservable Inputs (Level 3)	Total Fair Value
Assets				
Cash equivalents [1]	$ —	$ 467,377	$ —	$ 467,377
Securities pledged as collateral	—	298,278	—	298,278
Investments:				
Equity	1,140,440	733	65,415	1,206,588
Fixed income securities	—	3,548,216	3,742	3,551,958
Preferred securities	7,396	832	38,213	46,441
Alternative investments	—	—	170,727	170,727
Derivatives	281	15,526	—	15,807
Sub-total of investments	1,148,117	3,565,307	278,097	4,991,521
Alternative investments measured under the NAV-practical expedient				18,723,058
Total investments	1,148,117	3,565,307	278,097	23,714,579
Total	1,148,117	4,330,962	278,097	24,480,234
Deferred compensation plan assets	54,983	—	9,517	64,500
Total assets at fair value	$ 1,203,100	$ 4,330,962	$ 287,614	$ 24,544,734
Liabilities				
Investments and derivatives:				
Derivatives	$ 391	$ 97,020	$ —	$ 97,411
Repurchase obligations	—	301,644	—	301,644
Total liabilities at fair value	$ 391	$ 398,664	$ —	$ 399,055

[1] Cash equivalents are comprised of U.S. Treasury Bills and repurchase agreements with original maturities of 90 days or less.

August 31, 2021
(In thousands)

	Quoted Market Prices (Level 1)	Other Observable Inputs (Level 2)	Unobservable Inputs (Level 3)	Total Fair Value
Assets				
Cash equivalents [1]	$ —	$ 519,854	$ —	$ 519,854
Securities pledged as collateral	—	299,523	—	299,523
Investments:				
Equity	2,734,761	—	65,309	2,800,070
Fixed income securities	—	2,819,119	16,431	2,835,550
Preferred securities	14,131	8,890	20,767	43,788
Convertible securities	—	7,630	—	7,630
Alternative investments	—	—	244,668	244,668
Derivatives	10,476	7,938	—	18,414
Sub-total of investments	2,759,368	2,843,577	347,175	5,950,120
Alternative investments measured under the NAV-practical expedient				21,116,998
Total investments	2,759,368	2,843,577	347,175	27,067,118
Total	2,759,368	3,662,954	347,175	27,886,495
Deferred compensation plan assets	62,751	—	8,644	71,395
Total assets at fair value	$ 2,822,119	$ 3,662,954	$ 355,819	$ 27,957,890
Liabilities				
Investments and derivatives:				
Equity short positions	$ 169,243	$ —	$ —	$ 169,243
Fixed income short positions	11,831	—	—	11,831
Derivatives	28,473	195,576	—	224,049
Repurchase obligations	—	300,781	—	300,781
Total liabilities at fair value	$ 209,547	$ 496,357	$ —	$ 705,904

[1] Cash equivalents are comprised of U.S. Treasury Bills and repurchase agreements with original maturities of 90 days or less.

The following tables present the activity for instruments classified within Level 3 of the fair value hierarchy for the years ended August 31, 2022 and 2021, respectively:

For the year ended August 31, 2022
(In thousands)

	Fair value measurements using significant unobservable inputs (Level 3) on a recurring basis						
		Investments					
	Deferred Compensation Funds	Equity	Fixed Income Securities	Preferred Securities	Alternative Investments	Sub-total of Investments	Totals
As of September 1, 2021	$ 8,644	$ 65,309	$ 16,431	$ 20,767	$ 244,668	$ 347,175	$ 355,819
Purchases	604	3,544	—	—	3,851	7,395	7,999
Sales	—	(7,894)	(13,393)	(2,320)	(56,252)	(79,859)	(79,859)
Total gains (losses)							
Net realized gains (losses)	—	2,501	1,066	(194)	11,639	15,012	15,012
Change in unrealized gains (losses)	269	1,955	(362)	(1,749)	(33,179)	(33,335)	(33,066)
Transfers in [1]	—	—	—	21,709	—	21,709	21,709
Transfers out	—	—	—	—	—	—	—
As of August 31, 2022	$ 9,517	$ 65,415	$ 3,742	$ 38,213	$ 170,727	$ 278,097	$ 287,614
Change in unrealized gains (losses) included in *Net investment return* for assets held at fiscal year end	$ 269	$ 6,631	$ (681)	$ (1,091)	$ (33,178)	$ (28,319)	$ (28,050)

[1] Transferred from Level 2 to Level 3 because there was a lack of observable market data.

For the year ended August 31, 2021
(In thousands)

	Fair value measurements using significant unobservable inputs (Level 3) on a recurring basis						
		Investments					
	Deferred Compensation Funds	Equity	Fixed Income Securities	Preferred Securities	Alternative Investments	Sub-total of Investments	Totals
As of September 1, 2020	$ 7,946	$ 73,878	$ 16,059	$ 17,832	$ 197,612	$ 305,381	$ 313,327
Purchases	453	5,090	—	—	5,274	10,364	10,817
Sales	—	(20,087)	—	—	(30,187)	(50,274)	(50,274)
Total gains (losses)							
Net realized gains (losses)	—	(1,386)	—	—	(3,745)	(5,131)	(5,131)
Change in unrealized gains (losses)	245	7,814	372	2,935	68,694	79,815	80,060
Transfers in [1]	—	—	—	—	7,020	7,020	7,020
Transfers out	—	—	—	—	—	—	—
As of August 31, 2021	$ 8,644	$ 65,309	$ 16,431	$ 20,767	$ 244,668	$ 347,175	$ 355,819
Change in unrealized gains (losses) included in *Net investment return* for assets held at fiscal year end	$ 246	$ 2,876	$ 372	$ 2,935	$ 70,631	$ 76,814	$ 77,060

[1] Transferred from Level 0 to Level 3 because there was a lack of observable market data.

The Level 3 tables above exclude those investments valued using NAV as the practical expedient as outlined in ASU 2015-07, *Fair Value Measurement (Topic 820): Disclosures for Investments in Certain Entities that Calculate NAV per Share (or its Equivalent)*. Management continuously reviews and evaluates financial reporting investment levels and modifies them as necessary.

Level 3 Valuation Techniques and Unobservable Inputs

The following table summarizes the unobservable inputs and assumptions used for items categorized in Level 3 of the fair value hierarchy as of August 31, 2022 and 2021, respectively. For each investment category and respective valuation technique, the range of the inputs is dependent on the nature and characteristics of the investment. The range of inputs listed below represent values as of the measurement date; however, these inputs may change over time, which may have a material effect on the valuation of these types of investments in the future.

August 31, 2022
(In thousands)

Asset Class	Fair Value 2022	Valuation Techniques	Unobservable Inputs	Range of Inputs
Deferred compensation funds	$ 9,517			
		Discounted cash flow	Risk-adjusted discount rate	2.8% - 3.9%
Equity	65,415			
		Discounted cash flow	Discounted rate	14.0% - 15.0%
		Market multiple	Multiple of called capital	1.7x - 2.9x
			Multiple of invested capital	1.6x
			Multiple of money	2.6x
		Multiple technique	EBITDA multiple	11.7x
		Market comparable	Share buyback price	5.1x
			Appraised value	Third party
Fixed income securities	3,742			
		Income approach	Interest rate	10.5% - 12.2%
Preferred securities	38,213			
		Market multiple	Multiple of money	2.6x
			Multiple of called capital	0.9x
		Multiple technique	Revenue multiple	2.0x - 3.8x
			EBITDA multiple	8.2x - 15.5x
		Market comparable	Appraised value	Third party
		Option pricing model	Risk-free interest rate	0.3% - 1.5%
			Volatility	62.7% - 128.4%
Alternative investments	170,727			
		Discounted cash flows	Weighted average cost of capital	21.2x
			Exit value multiple	21.0x
			Control premium	$0.20
			Discount rate	10.0% -15.0%
		Market multiple	Multiple of invested capital	0.8x - 2.1x
		Multiple technique	Revenue multiple	5.5x
			EBITDA multiple	6.6x - 21.0x
		Market comparable	Appraised value	Third party
Total	$ 287,614			

August 31, 2021
(In thousands)

Asset Class	Fair Value 2021	Valuation Techniques	Unobservable Inputs	Range of Inputs
Deferred compensation funds	$ 8,644			
		Discounted cash flow	Risk-adjusted discount rate	2.5% - 4.5%
Equity	65,309			
		Discounted cash flow	Discounted rate	13.0% - 15.0%
		Income approach	multiple	10.1x - 19.9x
		Market multiple	Multiple of called capital	1.3x
			Multiple of invested capital	1.9x
			Multiple of money	2.6x
			Gross multiple of invested capital	1x
		Multiple technique	EBITDA multiple	8.7x
		Market comparable	Appraised value	Third party
Fixed income securities	16,431			
		Income approach	Interest rate	0.0% - 12.2%
Preferred securities	20,767			
		Market multiple	Market multiple valuation	4.0x - 9.0x
			Multiple of money	2.6x
			Multiple of called capital	0.8x
		Market comparable	Appraised value	Third party
Alternative investments	244,668			
		Discounted cash flows	Weighted average cost of capital	15.5%
			Exit value multiple	16.0x
			Control premium	20.0%
			Discounted rate	10.0% - 15.0%
		Market multiple	Multiple of invested capital	1.0x - 1.5x
		Multiple technique	Revenue multiple	4.5x - 5.3x
			Cost basis multiple	4.0x
			EBITDA multiple	9.0x - 16.0x
			Market multiple valuation	4.0x - 9.0x
		Market comparable	Appraised value	Third party
Total	$ 355,819			

Alternative Investments at NAV

The following tables summarize investments for which the Institute uses NAV as the practical expedient and the respective unfunded commitments and redemption terms as of August 31, 2022 and 2021, respectively:

August 31, 2022
(In thousands)

	Fair Value 2022	Unfunded Commitment	Redemption Terms & Restrictions
Private equity	$ 6,593,875	$ 2,601,070	Not redeemable and held for the life of the investment.
	167,188	86,099	Investments with revolving lockup provisions, or initial lockup provisions with semiannual gates, are redeemable with advance notice of 120-180 days prior to the next lockup expiration date or redemption date as applicable. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
Independent return	3,776,252	—	Investments are redeemable on a periodic basis with advance notice of 5-180 days. Lockup provisions may include one-time or revolving terms ranging from 1-3 years. Investments may include fund or investor level gates ranging from 12.5% to 50% that limit the redemption amounts available at each redemption date. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
	1,018,907	1,009,379	Not redeemable and held for the life of the investment.
Public equity	5,022,847	96,799	Investments are redeemable on a periodic basis with advance notice of 30-180 days. Lockup provisions may include one-time or revolving terms ranging from 1-5 years. Investments may include fund or investor level gates ranging from 12.5% to 50% that limit the redemption amounts available at each redemption date. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
	270,602	—	Not redeemable and held for the life of the investment.
Real assets	1,697,312	775,632	Not redeemable and held for the life of the investment.
	176,075	—	Investments with expired one-time lockup or no lockup provisions are redeemable on a periodic basis with advance notice of 30 days. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks.
Total alternative investments	$ 18,723,058	$ 4,568,979	

August 31, 2021

(In thousands)

	Fair Value 2021	Unfunded Commitment	Redemption Terms & Restrictions
Private equity	$ 6,509,997	$ 2,471,294	Not redeemable and held for the life of the investment.
	161,567	36,276	Investments with revolving lockup provisions, or initial lockup provisions with semiannual gates, are redeemable with advance notice of 120-180 days prior to the next lockup expiration date or redemption date as applicable. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
Independent return	4,570,097	—	Investments are redeemable on a periodic basis with advance notice of 5-180 days. Lockup provisions may include one-time or revolving terms ranging from 1-3 years. Investments may include fund or investor level gates ranging from 12.5% to 50% that limit the redemption amounts available at each redemption date. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
	1,300,753	1,145,278	Not redeemable and held for the life of the investment.
Public equity	6,645,159	315,241	Investments are redeemable on a periodic basis with advance notice of 5-180 days. Lockup provisions may include one-time or revolving terms ranging from 1-3 years. Investments may include fund or investor level gates ranging from 12.5% to 50% that limit the redemption amounts available at each redemption date. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks. Where applicable, proceeds for private investments included in a redemption are not paid until the underlying private investments are liquidated.
	272,367	—	Not redeemable and held for the life of the investment.
Real assets	1,530,037	813,136	Not redeemable and held for the life of the investment.
	127,021	—	Investments with expired one-time lockup or no lockup provisions are redeemable on a periodic basis with advance notice of 30 days. Redemption proceeds are generally payable within 30 days of the redemption date. Redemptions may be subject to audit holdbacks.
Total alternative investments	$ 21,116,998	$ 4,781,225	

As noted above, the Institute has made contractual commitments to fund various investments. The Institute has unfunded commitments totaling approximately $4.6 billion and $4.8 billion to fund investments in non-public entities as of August 31, 2022 and 2021, respectively. Not included in the tables above are unfunded commitments of approximately $27.2 million and $35.0 million as of August 31, 2022 and 2021, respectively, related to investments valued using a method other than NAV. The Institute expects these commitments to be called over the next 1 to 7 years.

Obligations under Master Repurchase Agreements

The Institute has entered into repurchase obligations as part of its overall investment strategy to manage its operational needs, lend fixed income securities and/or provide for leverage in fixed income trading. These repurchase agreements and related collateral, which consist of U.S. Treasury notes and bonds with maturity dates that range up to four years, are reflected in the Consolidated Statements of Financial Position as *Repurchase obligations* and *Securities pledged as collateral*, respectively. The Institute had the obligation to repurchase $301.6 million of marketable securities for which the Institute had provided collateral of $298.3 million to its counterparties as of August 31, 2022.

Obligations under Security Lending Agreements

The Institute may lend its securities to approved borrowers to earn additional income. A lending agent in accordance with a securities lending agreement administers the Institute's securities lending activities. Security loans generally do not have stated maturity dates, and the Institute may recall a security at any time. The Institute receives collateral in the form of cash, government debt securities, corporate debt securities, equity securities, and other types of securities as agreed to in the securities lending agreement. Collateral for loans of domestic securities and foreign securities that are denominated and payable in dollars are collateralized at a minimum of 102% and other foreign securities are collateralized at a minimum of 105% of the value of the securities on loan. Collateral is maintained over the life of the loan in an amount not less than the value of loaned securities; any additional collateral required due to changes in security values is delivered to the Institute the next business day. Cash collateral is invested in accordance with investment guidelines defined by the securities lending agreement. Additionally, the lending agent indemnifies the Institute against losses resulting from borrower default and against losses resulting from the investment of cash collateral in repurchase transactions resulting from counterparty default. Although risk is mitigated by the collateral and indemnification, the Institute could experience a delay in recovering its securities and a possible loss of income or value if the borrower fails to return the securities, collateral investments decline in value, and the lending agent fails to perform. Securities lending revenue consists of earnings on invested collateral and borrowing fees, net of any rebates to the borrower, compensation to the lending agent, and other administrative costs. In accordance with GAAP, cash collateral and investments made with cash collateral are reflected in the accompanying financial statements, but collateral received in the form of securities is not. The value of cash collateral was $22.3 million and $59.9 million as of August 31, 2022 and 2021, respectively. The market value of loaned securities was $93.0 million and $204.7 million as of August 31, 2022 and 2021, respectively, and are included in the Consolidated Statements of Financial Position in *Investments and derivative assets*. The market value of cash and non-cash collateral was $118.1 million and $220.5 million as of August 31, 2022 and 2021, respectively. Income from securities lending activities totaled approximately $0.2 million and $0.5 million for August 31, 2022 and 2021, respectively, and is included in *Net investment return*.

5. DERIVATIVES

The Institute invests in derivative financial instruments to control market risks, manage its portfolio exposure, reduce investment implementation costs, and enhance returns. Derivatives are recorded at fair value with the resulting gain or loss recognized in the Consolidated Statements of Activities. The Institute seeks to transact with counterparties that are operating under master netting agreements for derivative trades. These agreements may allow the Institute to offset amounts owed by the counterparty with amounts payable to the same counterparty. These agreements may permit net settlement of multiple transactions with that counterparty. As a result of investing in derivative financial instruments, the Institute is exposed to potential credit-related losses in the event of nonperformance by counterparties. The Institute limits its exposure by evaluating the creditworthiness of potential counterparties before investing.

Swap, OTC option, forward contracts and other OTC derivative contracts expose the Institute to credit risk arising from the potential inability of counterparties to perform under the terms of the contracts. The notional amounts of these contracts do not represent the Institute's risk of loss due to counterparty nonperformance. The Institute's exposure to credit risk associated with counterparty nonperformance for these contracts is limited to the fair value of such contracts and any related collateral placed with the counterparty, after enforcing any master netting agreements with counterparties that allow the Institute to offset amounts owed by the counterparty with amounts payable to the same counterparty. As of August 31, 2022, the aggregate fair value of all derivative contracts by counterparty after applying netting arrangements and before including the effects of collateral that are in a net asset position is insignificant, thus the Institute's credit exposure to each counterparty is considered immaterial.

Derivatives contracts are subject to various risks similar to non-derivative instruments. For non-exchange traded derivatives under standard derivatives agreements, the Institute may be required to post collateral for initial margin and also variation margin in the event of a net liability position exceeding certain amounts with the counterparty. Additionally, the counterparty may, upon providing notice and allowing for any applicable cure period, terminate derivatives contracts if the Institute fails to maintain sufficient asset coverage for its contracts or its net assets decline by stated percentages. The Institute posted collateral as of August 31, 2022 and 2021, of approximately $21.3 million and $144.4 million, respectively, in the normal course of business and these amounts are included in *Due from brokers* on the Consolidated Statements of Financial Position. The Institute received no collateral related to derivatives contracts as of August 31, 2022 and 2021.

The following tables present derivatives held as of August 31, 2022 and 2021, respectively, by their primary underlying risk exposure. These derivatives are not designated as hedging instruments under ASC 815, Derivatives and Hedging.

(In thousands)

	As of August 31, 2022		For the Year Ended August 31, 2022	
Primary Risk Exposure	Gross Derivative Assets	Gross Derivative Liabilities	Net Realized Gains/(Losses)	Change in Unrealized Gains/(Losses)
Equity Instruments				
Equity futures	$ —	$ —	$ 13,406	$ 17,997
Equity swaps	—	—	2,997	(305)
Contracts for difference	—	—	8,302	(1,038)
Total equity instruments	—	—	24,705	16,654
Fixed income instruments				
Fixed income futures	281	391	5,480	(109)
Option on interest rate	—	—	152	526
Interest rate swaps	4,417	68,897	—	117,793
Total fixed income instruments	4,698	69,288	5,632	118,210
Currency instruments				
Currency exchange	11,109	28,123	(33,325)	(10,030)
Total currency instruments	11,109	28,123	(33,325)	(10,030)
Total	$ 15,807	$ 97,411	$ (2,988)	$ 124,834

The above derivative assets and liabilities are included in *Investments and derivative assets* and *Investments and derivative liabilities*, respectively, on the Consolidated Statements of Financial Position. Net realized gains/(losses) and Change in unrealized gains/(losses) are included in *Net investment return* on the Consolidated Statements of Activities.

(In thousands)

	As of August 31, 2021		For the Year Ended August 31, 2021	
Primary Risk Exposure	Gross Derivative Assets	Gross Derivative Liabilities	Net Realized Gains/(Losses)	Change in Unrealized Gains/(Losses)
Equity Instruments				
Equity futures	$ 10,476	$ 28,473	$ (169,408)	$ (8,875)
Equity swaps	346	42	(9,057)	(878)
Contracts for difference	2,712	1,674	(15,354)	1,633
Total equity instruments	13,534	30,189	(193,819)	(8,120)
Fixed income instruments				
Fixed income futures	—	—	(1,093)	(484)
Option on interest rate	278	—	—	(526)
Interest rate swaps	—	182,273	—	55,291
Total fixed income instruments	278	182,273	(1,093)	54,281
Currency instruments				
Currency exchange	4,602	11,587	27,486	(30,636)
Total currency instruments	4,602	11,587	27,486	(30,636)
Total	$ 18,414	$ 224,049	$ (167,426)	$ 15,525

The above derivative assets and liabilities are included in *Investments and derivative assets* and *Investments and derivative liabilities*, respectively, on the Consolidated Statements of Financial Position. Net realized gains/(losses) and Change in unrealized gains/(losses) are included in *Net investment return* on the Consolidated Statements of Activities.

The following tables reflect the Institute's net exposure to various counterparties subject to master netting agreements, where applicable, as of August 31, 2022 and 2021, respectively:

As of August 31, 2022
(In thousands)

	Gross Assets	Gross Liabilities	Net	Collateral Posted (Received)	Net Exposure
Counterparty A	$ 720	$ 15,051	$ (14,331)	$ —	$ (14,331)
Counterparty F	6,491	41,917	(35,426)	—	(35,426)
Counterparty G	3,509	15,524	(12,015)	—	(12,015)
Counterparty H	—	24,009	(24,009)	21,258	(2,751)
Counterparty J	4,417	515	3,902	—	3,902
Counterparty K	389	3	386	—	386
Counterparty L	281	391	(110)	—	(110)
Counterparty M	—	1	(1)	—	(1)
Total	$ 15,807	$ 97,411	$ (81,604)	$ 21,258	$ (60,346)

The above derivative assets and liabilities are included in *Investments and derivative assets* and *Investments and derivative liabilities*, respectively, on the Consolidated Statements of Financial Position. Securities and cash collateral are included in *Due from Brokers* on the Consolidated Statements of Financial Position.

As of August 31, 2021
(In thousands)

	Gross Assets	Gross Liabilities	Net	Collateral Posted (Received)	Net Exposure
Counterparty A	$ 2,790	$ 35,337	$ (32,547)	$ —	$ (32,547)
Counterparty B	2	—	2	—	2
Counterparty E	1,255	524	731	10,080	10,811
Counterparty F	3,429	85,077	(81,648)	26,390	(55,258)
Counterparty G	4	263	(259)	—	(259)
Counterparty H	—	53,446	(53,446)	47,905	(5,541)
Counterparty I	346	42	304	2,526	2,830
Counterparty J	—	20,497	(20,497)	—	(20,497)
Counterparty K	112	390	(278)	—	(278)
Counterparty L	10,476	28,473	(17,997)	57,500	39,503
Total	$ 18,414	$ 224,049	$ (205,635)	$ 144,401	$ (61,234)

The above derivative assets and liabilities are included in *Investments and derivative assets* and *Investments and derivative liabilities*, respectively, on the Consolidated Statements of Financial Position. Securities and cash collateral are included in *Due from Brokers* on the Consolidated Statements of Financial Position.

Derivative notional amounts and values as of August 31, 2022 and 2021 are indicative of the Institute's exposure to derivatives for the years then ended.

Foreign Exchange Forward Contracts
Foreign exchange forward contracts are over-the-counter contractual agreements primarily used to sell or buy certain amounts of foreign currencies to hedge foreign currency risk or for speculating for investment returns in the foreign currency market. The notional value of open forward contract purchases and sales totaled approximately $458.8 million and $221.4 million, respectively, as of August 31, 2022, and $449.5 million and $218.7 million, respectively, as of August 31, 2021.

Futures
Futures contracts are commitments to purchase or sell a financial instrument at a stated time and price in the future. They are generally used to increase or decrease exposure to a specific market or investment product. These contracts are settled daily to reflect the changes in their market values.

As of August 31, 2022 and 2021, the Institute had entered into various futures contracts with notional exposures as follows:

(In thousands)

	2022		2021	
	Buy	Sell	Buy	Sell
Fixed income	$ 58,844	$ (187,777)	$ —	$ —
Equity	—	—	—	(849,284)
Total	$ 58,844	$ (187,777)	$ —	$ (849,284)

Contracts for Difference
Contracts for difference are agreements between a buyer and a seller to exchange the difference between the opening value of a share, currency, commodity, index or other tradable financial instrument and its closing value at the end of the contract. Contracts for difference are used by the Institute for gaining financial exposure to an underlying security or index without the need to own the underlying shares. As of August 31, 2022 and 2021, the Institute had entered into various contracts for difference with notional exposures at fair values as follows:

(In thousands)

	2022		2021	
	Buy	Sell	Buy	Sell
Equity indexes	$ —	$ —	$ 77,204	$ (161,439)

Equity Swaps
Equity swaps are exchanges of cash flows in which at least one of the sides is an equity instrument, index, or basket of equities. An equity instrument is a measure of the performance of an individual stock or a basket of stocks. There were no equity swaps as of August 31, 2022. The notional amount of the equity swaps was $7.7 million as of August 31, 2021.

Debt-related Interest Rate Swaps
An interest rate swap is a derivative in which one party exchanges a stream of interest payments with another party's stream of cash flows. The Institute uses interest rate swap agreements to manage fixed or floating assets and liabilities. Under the terms of the current agreements, the Institute pays a fixed interest rate, determined at inception, and receives a variable rate on the underlying notional principal amount. Refer to Note 9 for information related to interest rates and interest expense on the bonds payable, note payable, and interest rate swaps.

The following tables present the debt-related interest rate swaps including the notional amounts, fair values as of August 31, 2022 and 2021, respectively, and unrealized gains and losses for the years then ended:

August 31, 2022
(In thousands)

		As of August 31, 2022		For the Year Ended August 31, 2022	
Debt-related interest rate swaps:	Termination Date	Notional Amount	Gross Derivative (Assets)/ Liabilities [1]	Change in Unrealized Gains [2]	Fixed Rate [3]
Janelia Research Campus Apartment B	June 1, 2043	$ 33,130	$ 515	$ 6,310	2.10%
Janelia Research Campus Apartment A	October 1, 2039	23,000	2,120	4,397	2.75%
Headquarters and conference center	November 1, 2036	76,500	12,300	14,265	3.48%
Headquarters and conference center expansion	March 1, 2038	83,500	12,618	16,290	3.30%
Janelia Research Campus	February 15, 2038	75,000	10,272	14,374	3.19%
	March 1, 2033	150,000	(4,417)	18,087	1.68%
	March 1, 2033	125,000	14,753	19,025	3.38%
	March 1, 2033	100,000	11,709	15,173	3.36%
	October 1, 2039	50,000	4,610	9,558	2.75%
Janelia Commercial Property	May 21, 2022	40,376	—	314	1.14%
Total			$ 64,480	$ 117,793	

[1] Gross derivative liabilities are included in *Investments and derivative liabilities* on the Consolidated Statements of Financial Position. Gross derivative assets are included in *Investments and derivative assets* on the Consolidated Statement of Financial Position.

[2] Unrealized gains on derivatives are included in *Net investment return* on the Consolidated Statements of Activities.

[3] The variable interest rate is reset on a weekly basis except for the note payable which is reset monthly.

August 31, 2021
(In thousands)

		As of August 31, 2021		For the Year Ended August 31, 2021	
Debt-related interest rate swaps:	Termination Date	Notional Amount	Gross Derivative (Assets)/ Liabilities [1]	Change in Unrealized Gains [2]	Fixed Rate [3]
Janelia Research Campus Apartment B	June 1, 2043	$ 33,130	$ 6,827	$ 3,030	2.10%
Janelia Research Campus Apartment A	October 1, 2039	23,000	6,517	2,069	2.75%
Headquarters and conference center	November 1, 2036	76,500	26,565	6,982	3.48%
Headquarters and conference center expansion	March 1, 2038	83,500	28,908	7,633	3.30%
Janelia Research Campus	February 15, 2038	75,000	24,646	6,730	3.19%
	March 1, 2033	150,000	13,670	7,828	1.68%
	March 1, 2033	125,000	33,777	8,730	3.38%
	March 1, 2033	100,000	26,882	7,397	3.36%
	October 1, 2039	50,000	14,167	4,498	2.75%
Janelia Commercial Property	May 21, 2022	40,376	314	394	1.14%
Total			$ 182,273	$ 55,291	

[1] Gross derivative liabilities are included in *Investments and derivative liabilities* on the Consolidated Statements of Financial Position. Gross derivative assets are included in *Investments and derivative assets* on the Consolidated Statement of Financial Position.

[2] Unrealized gains on derivatives are included in *Net investment return* on the Consolidated Statements of Activities.

[3] The variable interest rate is reset on a weekly basis except for the note payable which is reset monthly.

6. INVESTMENT RECEIVABLES AND PAYABLES

Investment Receivables and Payables
The following table presents the Institute's investment receivables and payables as of August 31, 2022 and 2021, respectively:

(In thousands)

	2022		2021	
	Receivables	Payables	Receivables	Payables
Securities pending settlement	$ 98,410	$ 46,018	$ 65,094	$ 42,365
Interest and dividends	12,586	—	10,337	—
Management fees	—	18,181	—	9,639
Other	20,000	999	—	427
Total	$ 130,996	$ 65,198	$ 75,431	$ 52,431

7. LAND, BUILDINGS, LABORATORY SPACE, AND EQUIPMENT

The following table presents the cost and accumulated depreciation and amortization of the Institute's investment in land, buildings, laboratory space, and equipment as of August 31, 2022 and 2021, respectively:

(In thousands)

	2022	2021
Land	$ 92,139	$ 92,139
Building/land improvements	874,086	860,021
Laboratory space and leasehold improvements	346,718	347,553
Equipment, furniture and fixtures	750,943	636,279
	2,063,886	1,935,992
Less: Accumulated depreciation and amortization	(1,285,406)	(1,229,850)
	778,480	706,142
Construction in progress	62,190	58,895
Total	$ 840,670	$ 765,037

Depreciation expense was approximately $92.4 million and $85.7 million for the years ended August 31, 2022 and 2021, respectively.

8. LEASES

In accordance with GAAP, the Institute treats its occupancy arrangements for laboratory and office space for its Investigators at host institutions as operating leases. These leases have remaining terms of less than one year to seven years. The period which is subject to an option to extend or terminate occupancy arrangement is not included in the lease term as it is not reasonably certain the Institute will renew the terms or terminate any specific existing Investigators upon expiration of their term.

Operating leases of the Institute as of August 31, 2022 and 2021, respectively, are as follows:

(In thousands)	2022	2021
ROU asset balance	$ 178,477	$ 138,227
Short-term liability balance	$ 47,918	$ 43,110
Long-term liability balance	130,286	95,078
Total liability balance	$ 178,204	$ 138,188
Operating lease cost included in *Medical research* on the Consolidated Statements of Activities	$ 49,827	$ 47,419
Cash paid for amounts included in the measurement of operating lease liabilities:		
Operating cash flows used in operating leases	$ 50,062	$ 47,396
Right-of-use assets obtained in exchange for new operating lease liabilities	$ 87,784	$ 30,722

(In thousands)

Maturities of operating lease liabilities as of August 31, 2022

Fiscal Year	Payments	
2023	$	50,082
2024		43,118
2025		37,004
2026		22,358
2027		15,551
Thereafter		15,964
Total undiscounted lease liability		184,077
Imputed Interest		(5,873)
Total discounted lease liability	$	178,204

The impact of lease costs related to finance leases and short-term leases was not material for the year ended August 31, 2022.

	2022	2021
Weighted-average remaining lease term (years)	4.54	3.82
Weighted-average discount rate	1.44%	1.62%

9. BOND AND NOTE PAYABLES

Tax-exempt bonds payable

On June 6, 2019, the Institute issued $51.8 million of tax-exempt capital appreciation bonds through the Economic Development Authority of Loudoun County, Virginia to finance the construction of a 101-unit apartment building at the Janelia Research Campus that is used by scientists and others engaged in research and administration at the Campus. The capital appreciation bonds represent bonds issued at a deep discount, which accrete or compound in value from the date of issuance to the date of maturity. The capital appreciation bonds are presented at their maturity value less the unaccreted appreciation. Unaccreted appreciation represents the difference between the maturity value of the debt and the face value and is accreted as interest expense over the life of the bonds. The maturity value of $141.8 million less the unaccreted appreciation of $84.1 million was $57.7 million as of August 31, 2022. The bonds accrue interest at a fixed rate of 3.38%, a yield to maturity of 3.38%, and a maturity date of July 1, 2049.

On May 15, 2013, the Institute issued $33.1 million of tax-exempt bonds through the Industrial Development Authority of Loudoun County, Virginia (“IDA”) to finance the construction of an 86-unit apartment building at the Janelia Research Campus that is used by scientists and others engaged in research and administration at the Campus. The bonds carry a variable interest rate determined on a weekly basis and mature on June 1, 2043. The average variable interest rate on the bond was 0.42% and 0.06% for the years ended August 31, 2022 and 2021, respectively. The net composite interest rate on the bonds and interest rate swap for the years ended August 31, 2022 and 2021 was 2.06% and 2.06%, respectively.

On October 2, 2009, the Institute issued $23.0 million of tax-exempt bonds through the IDA to finance the construction of a 60-unit apartment building at the Janelia Research Campus that is used by scientists and others engaged in research and administration at the Campus. The bonds carry a variable interest rate determined on a weekly basis and mature on October 1, 2039. The average variable interest rate on the bond was 0.45% and 0.07% for the years ended August 31, 2022 and 2021, respectively. The net composite interest rate on the bonds and interest rate swap for the years ended August 31, 2022 and 2021 was 2.74% and 2.73%, respectively.

On May 15, 2008, the Institute issued $76.5 million of bonds through the Maryland Economic Development Corporation ("MEDCO") to refund $76.5 million of outstanding bonds issued on November 8, 1990, to finance the construction of the Institute's headquarters and conference center complex. The bonds carry a variable interest rate determined on a weekly basis and mature on May 15, 2043. The average variable interest rate on the bond was 0.45% and 0.07% for the years ended August 31, 2022 and 2021, respectively. The net composite interest rate on the bonds and interest rate swap for the years ended August 31, 2022 and 2021 was 3.46% and 3.45%, respectively.

On February 21, 2008, the Institute issued $83.5 million in tax-exempt bonds through MEDCO to finance the expansion of the Institute's existing headquarters and conference facilities. The bonds carry a variable interest rate determined on a weekly basis and mature on February 15, 2043. The average variable interest rate on the bond was 0.43% and 0.07% for the years ended August 31, 2022 and 2021, respectively. The net composite interest rate on the bonds and interest rate swap for the years ended August 31, 2022 and 2021 was 3.27% and 3.28%, respectively.

On February 27, 2003, the Institute issued $500.0 million in tax-exempt bonds through the IDA to finance construction of the Janelia Research Campus. The bonds carry a variable interest rate determined on a weekly basis and mature on February 15, 2038. The average variable interest rate on the bonds was 0.69% and 0.35% for the years ended August 31, 2022 and 2021, respectively. The net composite interest rate on the bonds and interest rate swap for the years ended August 31, 2022 and 2021 was 2.77% and 2.77%, respectively.

Prior to the maturity of each of the variable rate tax-exempt bond issues, the Institute is obligated upon seven-day notice from a holder to redeem any or all bonds unless the remarketing agent is able to place the bonds with another party or hold them in their own portfolio. To date, no remarketing agents have failed to fulfill their obligations under their respective remarketing agreements. The Institute maintains sufficient cash and marketable securities to pay any bondholder redemption in part or in full the $716.1 million outstanding as of August 31, 2022.

<u>Note payable</u>
In June 2003, the Institute entered into a renewable promissory note to finance the commercially used land and buildings at the Janelia Research Campus that could not be financed with tax-exempt debt. In May 2020, the Institute replaced the existing promissory note with a new loan agreement with a different financing institution. In May 2022, the Institute renewed the current note, which has a principal balance of $40.4 million, carries monthly interest payments based on an adjusted term secured overnight financing rate (defined as SOFR plus 0.10%) plus applicable margin of 0.475%, and matures May 20, 2023. The net composite interest rate on the note and interest rate swap for the years ended August 31, 2022 and 2021 was 1.64% and 2.01%, respectively.

Interest Rate Swaps
All variable rate debt has been synthetically fixed using variable-to-fixed interest rate swaps. Refer to Note 5 for information related to the debt-related interest rate swaps.

The following tables present bonds and note payables with their respective composite interest rates and interest expense for the years ended August 31, 2022 and 2021, respectively:

August 31, 2022

(In thousands)	As of August 31, 2022		For the Year Ended August 31, 2022	
	Calendar Year of Maturity	Outstanding Principal	Average Composite Interest Rate[2]	Composite Interest Expense[3]
Tax-exempt bond payables:				
Janelia Research Campus Apartment C[1,4]	2049	$ 57,708	3.38%	$ 1,902
Janelia Research Campus Apartment B	2043	33,130	2.06%	684
Janelia Research Campus Apartment A	2039	23,000	2.74%	631
Headquarters and conference center	2043	76,500	3.46%	2,654
Headquarters and conference center expansion	2043	83,500	3.27%	2,733
Janelia Research Campus	2038	500,000	2.77%	13,747
Total bonds payable		773,838		22,351
Amortization of bond issuance costs				38
Unamortized bond issuance costs		(948)		
Net bonds payable		772,890		22,389
Note payable:				
Janelia commercial property	2023	40,376	1.64%	732
Total note payable		40,376		732
Total		$ 813,266		$ 23,121

[1] The Institute issued $51.8 million of capital appreciation bonds in June 2019 at a fixed rate of 3.38%. The outstanding principal balance as of August 31, 2022 was $57.7 million due to the accretion in value from the date of issuance to August 31, 2022.

[2] Net composite rate on the bond and the interest rate swap.

[3] Interest expense includes interest expense on the bond and the related interest rate swap.

[4] Life-to-date capitalized interest on the bond was approximately $2.7 million as of August 31, 2022.

August 31, 2021

(In thousands)	As of August 31, 2021		For the Year Ended August 31, 2021	
	Calendar Year of Maturity	Outstanding Principal	Average Composite Interest Rate[2]	Composite Interest Expense[3]
Tax-exempt bond payables:				
Janelia Research Campus Apartment C[1,4]	2049	$ 55,806	3.38%	$ 779
Janelia Research Campus Apartment B	2043	33,130	2.06%	687
Janelia Research Campus Apartment A	2039	23,000	2.73%	630
Headquarters and conference center	2043	76,500	3.45%	2,651
Headquarters and conference center expansion	2043	83,500	3.28%	2,749
Janelia Research Campus	2038	500,000	2.77%	13,796
Total bonds payable		771,936		21,292
Amortization of bond issuance costs				38
Unamortized bond issuance costs		(986)		
Net bonds payable		770,950		21,330
Note payable:				
Janelia commercial property	2022	40,376	2.01%	814
Total note payable		40,376		814
Total		$ 811,326		$ 22,144

[1] The Institute issued $51.8 million of capital appreciation bonds in June 2019 at a fixed rate of 3.38%. The outstanding principal balance as of August 31, 2021 was $55.8 million due to the accretion in value from the date of issuance to August 31, 2021.

[2] Net composite rate on the bond and the interest rate swap.

[3] Interest expense includes interest expense on the bond and the related interest rate swap.

[4] Reflects interest expense after $1.1 million of capitalized interest related to the construction of an apartment building, which was completed on March 31, 2021. Life-to-date capitalized interest on the bond was approximately $2.7 million as of August 31, 2021.

The following table presents interest expense in total for the years ended August 31, 2022 and 2021, respectively:

(In thousands)

Interest expense	2022	2021
Bonds and note	$ 5,521	$ 1,651
Net interest rate swaps	17,562	20,455
Sub-total	23,083	22,106
Amortization of bond issue costs	38	38
Total for bonds and note	23,121	22,144
Financing leases	2	97
Total	$ 23,123	$ 22,241

The following table presents total interest paid in cash for the bonds and note payable, interest rate swaps, and financing leases for the years ended August 31, 2022 and 2021, respectively:

(In thousands)

	2022	2021
Cash interest paid	$ 21,039	$ 21,408

The following table presents the future annual principal payments required for the bond and note payables as of August 31, 2022:

(In thousands)

Fiscal Year	Principal payments
2023	$ 40,376
2024	—
2025	—
2026	—
2027	—
Thereafter	773,838
Total	$ 814,214

10. FUNCTIONAL EXPENSES

The financial statements report certain categories of expenses that are attributable to more than one program or supporting function and require allocation on a reasonable basis that is consistently applied. These expenses are allocated to the programs (Medical research and Science education and other scientific programs) or supporting activities (General and administrative) of the Institute and include employee benefits, post-retirement/employment, and certain shared services. The basis for allocation of these expenses are compensation and estimates of time and effort. The majority of the Institute's expenses, including depreciation and interest, directly relate to the program or supporting function to which they are charged, and therefore are not allocated. General and administrative expenses include those expenses that are not directly identifiable with any other specific function but provide for the overall support and direction of the Institute.

Expense	**Allocation basis**
Employee Benefits	Salaries and wages
Post-retirement/employment	Salaries and wages
Certain Shared Services	Pre-defined rate per attendee or other cost driver

The following table presents functional expenses for the year ended August 31, 2022:

(In thousands)	Program Services			Supporting Activities	
	Medical Research	Science Education and Other Scientific Programs	Programs Subtotal	General and Administrative	August 31, 2022 Total Expenses
Salaries and wages	$ 249,316	$ 14,161	$ 263,477	$ 39,125	$ 302,602
Benefits	53,940	4,893	58,833	9,171	68,004
Post-retirement/ employment benefits	(3,202)	(177)	(3,379)	(501)	(3,880)
Grants	8,120	20,452	28,572	—	28,572
Supplies	90,287	607	90,894	1,296	92,190
Laboratory supplies	36,173	—	36,173	—	36,173
Professional services	35,711	7,749	43,460	21,691	65,151
Rent and occupancy	52,070	—	52,070	17	52,087
Property, equipment and maintenance	27,695	193	27,888	11,042	38,930
Facility maintenance and services	14,058	—	14,058	8,905	22,963
Utilities	4,670	—	4,670	993	5,663
Telecommunications	566	4	570	1,617	2,187
Travel and training	4,976	682	5,658	2,147	7,805
Television and film	—	8,765	8,765	—	8,765
Other	4,934	3,431	8,365	2,478	10,843
Depreciation	82,739	200	82,939	9,456	92,395
Interest	15,498	—	15,498	7,625	23,123
	677,551	60,960	738,511	115,062	853,573
Deferred tax benefit, net	—	—	—	—	—
Total functional expenses	$ 677,551	$ 60,960	$ 738,511	$ 115,062	$ 853,573

The following table presents functional expenses for the year ended August 31, 2021:

(In thousands)	Program Services			Supporting Activities	
	Medical Research	Science Education and Other Scientific Programs	Programs Subtotal	General and Administrative	August 31, 2021 Total Expenses
Salaries and wages	$ 242,372	$ 13,032	$ 255,404	$ 36,971	$ 292,375
Benefits	48,128	4,593	52,721	7,741	60,462
Post-retirement/ employment benefits	(2,118)	(114)	(2,232)	(311)	(2,543)
Grants	3,870	27,715	31,585	502	32,087
Supplies	79,222	556	79,778	877	80,655
Laboratory supplies	35,456	—	35,456	—	35,456
Professional services	33,089	8,062	41,151	17,670	58,821
Rent and occupancy	48,749	—	48,749	16	48,765
Property, equipment and maintenance	21,810	185	21,995	10,276	32,271
Facility maintenance and services	12,135	—	12,135	7,258	19,393
Utilities	4,495	—	4,495	927	5,422
Telecommunications	486	14	500	1,515	2,015
Travel and training	1,083	184	1,267	2,074	3,341
Television and film	—	5,799	5,799	—	5,799
Other	39,091	3,283	42,374	2,760	45,134
Depreciation	76,443	217	76,660	9,012	85,672
Interest	15,939	—	15,939	6,302	22,241
	660,250	63,526	723,776	103,590	827,366
Deferred tax benefit, net	—	—	—	3,527	3,527
Total functional expenses	$ 660,250	$ 63,526	$ 723,776	$ 107,117	$ 830,893

11. COMMITMENTS AND CONTINGENCIES

Grant Commitments

The following table presents the timing of the Institute's grant payments and the associated discount as of August 31, 2022:

(in thousands) Fiscal Year	Grant Payments	
FY2023	$	21,985
FY2024		11,793
FY2025		3,550
FY2026		543
Discount		(1,120)
Net Liability	$	36,751

Contractual Commitments

Contractual commitments pertaining to the construction of an administrative building and expansion of the existing vivarium at the Janelia Research Campus totaled approximately $9.7 million as of August 31, 2022. Contractual commitments pertaining to the construction of an apartment building at the Janelia Research Campus totaled approximately $0.1 million as of August 31, 2021. Proceeds from the issuance of bonds and other revenues are expected to provide the necessary funding for these commitments.

12. EMPLOYEE BENEFITS

Defined Contribution Retirement Plan

The Institute has a defined contribution plan under section 403(b) of the Internal Revenue Code. The Institute's plan contributions on behalf of its employees were $23.1 million and $22.0 million for the years ended August 31, 2022 and 2021, respectively.

Deferred Compensation Plan

The Institute has an unfunded deferred compensation plan in accordance with Section 457(b) of the Internal Revenue Code. The fair value of the assets and related liability to employees as of August 31, 2022 and 2021 was approximately $64.5 million and $71.4 million, respectively, and is reflected in the Consolidated Statements of Financial Position within *Other assets* and *Accounts payable and accrued liabilities*.

13. POSTRETIREMENT AND POSTEMPLOYMENT BENEFITS

The Institute maintains defined postretirement and postemployment benefit plans that provide eligible participants with medical, prescription drug, vision, dental, life insurance, and disability programs. The total net obligation for these benefits reflected in the Consolidated Statements of Financial Position was $172.6 million and $281.9 million as of August 31, 2022 and 2021, respectively.

Effective January 1, 2017, there were changes made to the postretirement benefit plan terms related to eligibility and retiree contribution requirements impacting both current and future retirees. The change in plan terms triggered a negative plan amendment and re-measurement as of September 30, 2016. The estimated prior service credit for the postretirement plan that will be amortized into expense over 6.5 years was approximately $102 million. The amortization period represents the remaining years of service to the full eligibility date and was approximately $15.6 million and $15.6 million for the years ended August 31, 2022 and 2021, respectively.

The following table presents the postretirement plan's unfunded status and the amount of the projected postretirement benefit plan costs for the years ended August 31, 2022 and 2021:

(In thousands)

	2022	2021
Accrued Benefit Liability:		
Benefit obligation at beginning of fiscal year	$ 319,740	$ 341,465
Service cost	9,835	10,879
Interest cost	8,361	8,772
Employee contributions	1,994	1,828
Benefits paid from the trust	(7,876)	(6,962)
Direct benefit payments	(13)	(13)
Net actuarial (gain) loss [1]	(121,141)	(36,229)
Benefit obligation at end of fiscal year	$ 210,900	$ 319,740
Change in fair value of plan assets:		
Fair value of plan assets, beginning of year	$ 38,393	$ 1,763
Actual return on plan assets	128	(4)
Employer contributions to plan	7,994	43,596
Employer direct benefit payments	(1,981)	(1,815)
Employee contributions	1,994	1,828
Benefits paid from the trust	(7,876)	(6,962)
Direct benefit payments	(13)	(13)
Fair value of plan assets, end of year	$ 38,639	$ 38,393
Reconciliation of funded status:		
Funded status	$ (172,261)	$ (281,347)
Current liabilities	—	—
Noncurrent liabilities	(172,261)	(281,347)
Net amount recognized in the Consolidated Statements of Financial Position	$ (172,261)	$ (281,347)

[1] The actuarial gain for the year ended August 31, 2022, for the postretirement benefit plan was primarily due to an increase in the discount rate from the prior measurement date and updates to claims cost and contribution assumptions used to calculate the obligation. The actuarial gain for the year ended August 31, 2021, for the postretirement benefit plan was primarily due to updated claims cost and contribution assumptions used to calculate the obligation.

(In thousands)

	2022	2021
Changes in plan assets and benefit obligations recognized in net assets:		
Net (gain) loss arising during the year	$ (121,083)	$ (36,216)
Amortization recognition of prior service credit	15,565	15,566
Amortization recognition of net gain (loss)	121,083	36,216
Total recognized in net assets	$ 15,565	$ 15,566
Components of net periodic benefit cost:		
Service cost	$ 9,835	$ 10,879
Interest cost	8,361	8,772
Expected return on plan assets	(186)	(9)
Amortization of prior service cost	(15,565)	(15,566)
Immediate recognition of net actuarial (gain) loss	(121,083)	(36,216)
Net periodic benefit cost recognized [1]	$ (118,638)	$ (32,140)
Amounts recorded in net assets not yet amortized as components of net periodic benefit cost:		
Prior service cost	$ (9,546)	$ (25,111)
Amount recognized as an increase in net assets	$ (9,546)	$ (25,111)

[1] The components of net periodic benefit cost other than the service cost component are included in *Other components of net periodic benefit cost* in the Consolidated Statements of Activities.

The following tables present the assumptions used in determining the benefit obligations and net periodic benefit cost as of August 31, 2022 and 2021, respectively.

	2022	2021
Weighted-average assumptions to determine benefit obligations:		
Discount rate	4.70%	2.65%
Health care cost trend rate		
Immediate trend rate	5.52%	5.65%
Ultimate trend rate	4.00%	4.00%
Year of ultimate trend rate	2047	2047
Assumptions to determine net periodic benefit cost:		
Discount rate	2.65%	2.60%
Health care cost trend rate		
Immediate trend rate	5.65%	5.74%
Ultimate trend rate	4.00%	4.50%
Year of ultimate trend rate	2047	2039
Expected return on assets	0.50%	0.50%

The net amount of projected benefit obligations and plan assets was $172.3 million and $281.3 million as of August 31, 2022 and 2021, respectively.

(In thousands)

Information for postretirement plan with a projected benefit obligation in excess of plan assets

	2022	2021
Projected benefit obligation	$ 210,900	$ 319,740
Fair value of plan assets	38,639	38,393

The postretirement benefits that are expected to be paid in each of the next five fiscal years, which reflects expected future service, and in the aggregate for the five fiscal years thereafter, are as follows:

(In thousands)

Fiscal Year	Expected Benefit Payments
2023	$ 8,048
2024	8,670
2025	9,313
2026	9,969
2027	10,700
2028 - 2032	63,305

Effective April 25, 2019, HHMI established a voluntary employee beneficiary association ("VEBA"), the Howard Hughes Medical Institute Retiree Welfare Benefit Plan Trust ("Trust"). The Trust is exclusively used to hold certain Institute contributions to be used for the payment of health benefits of certain of its retired employees and their spouses and dependents who are eligible for coverage. The Trust will be invested in a manner to meet the short-term liquidity demands relating to these obligations. The investment objectives are to preserve the principal of the Trust while obtaining a total rate of return commensurate with the level of assumed risk and liquidity requirements. Investments are limited to U.S. fixed income securities or funds of the same. The Institute's long-term strategic asset allocation guidelines given the Trust's long-term objectives and short-term constraints are summarized in the following table:

Asset Category	Policy Target	Target Range
Money Market / Liquidity Funds	10%	0% - 20%
Domestic Fixed Income Funds	90%	0% - 100%

The Institute's contribution on behalf of its retirees was $6.0 million and $43.6 million for the years ended August 31, 2022 and 2021, respectively. The Institute began paying some retiree plan benefits from the Trust starting in fiscal year 2020 and most benefits in fiscal year 2021.

The following tables summarize the fair value of the Trust as of August 31, 2022 and 2021, respectively:

August 31, 2022
(In thousands)

Asset Category	Percentage of Contribution	Quoted Market Prices (Level 1)	Total Fair Value
Funds	0%	$ —	$ —
Domestic Fixed Income Funds	0%	—	—
Cash and cash equivalents	100%	38,639	38,639
Total		$ 38,639	$ 38,639

August 31, 2021
(In thousands)

Asset Category	Percentage of Contribution	Quoted Market Prices (Level 1)	Total Fair Value
Funds	0%	$ —	$ —
Domestic Fixed Income Funds	0%	—	—
Cash and cash equivalents	100%	38,393	38,393
Total		$ 38,393	$ 38,393

Access to group sponsored benefits are continued for employees who qualify for the Institute’s long-term disability benefit for up to two years. This postemployment benefit cost was $(0.1) million and $0.4 million for the years ended August 31, 2022 and 2021, respectively.

14. INCOME TAXES

The provision for income taxes consists of the following for the years ended August 31, 2022 and 2021, respectively:

(In thousands)

	2022	2021
Deferred federal	$ —	$ (3,527)
Deferred state	—	—
Deferred tax benefit, net	$ —	$ (3,527)

Deferred income taxes, net consists of the following as of August 31, 2022 and 2021, respectively:

(In thousands)

	2022	2021
Total net operating loss carryforward	$ 97,499	$ 111,075
Less: Valuation allowance	(97,499)	(111,075)
Deferred income taxes	$ —	$ —

Under the provisions of the Tax Cuts and Jobs Act, net operating loss carryforwards generated prior to the 2018 tax year may be applied toward future taxable unrelated business income generated from any unrelated business activity and will continue to expire over a period of twenty years. As of August 31, 2022, the Institute had estimated federal and state net operating loss carryforwards generated prior to the 2018 tax year of approximately $503.1 million, which will expire at various dates from 2028 through 2038. These net loss carryforwards result in a deferred tax asset of $82.0 million. Management determined that it is more likely than not that the benefits of the net operating loss carryforwards will not be realized in the future, and accordingly the Institute has provided a full valuation allowance of $82.0 million related to these net operating loss carryforwards.

Net operating loss carryforwards generated in the 2018 tax year and future tax years may only be applied toward future taxable unrelated business income generated from the same business activity, are limited to 80% of the taxable unrelated business income generated in a single tax year, and no longer expire. As of August 31, 2022, the Institute had federal and state net operating loss carryforwards generated during and after the 2018 tax year totaling $99.0 million related to two unrelated business activities resulting in a deferred tax asset of $15.5 million. Management determined that it is more likely than not that the benefits of these net operating loss carryforwards will not be realized in the future, and accordingly the Institute has provided a full valuation allowance of $15.5 million related to these net operating loss carryforwards.

Net tax refunds due or received on income totaled approximately $0.1 million and $0.2 million for the years ended August 31, 2022 and 2021, respectively. Taxes paid on income totaled approximately $1.0 million and $0.2 million for the years ended August 31, 2022 and 2021, respectively.

15. MEDICAL RESEARCH ORGANIZATION

The Institute is classified as a medical research organization for federal income tax purposes under Section 170(b)(1)(A)(iii) of the Internal Revenue Code of 1986, as amended (the “Code”). The Institute is not a private foundation under Chapter 42 of the Code.

16. SUBSEQUENT EVENTS

Management performed an evaluation of subsequent events through November 17, 2022, which is the date that the financial statements were issued.

On September 15, 2022, the Institute issued $160.0 million of tax-exempt bonds through the Economic Development Authority of Loudoun County, Virginia to refinance taxable indebtedness of $40.4 million related to the Janelia Commercial Property and to finance the planning, designing, renovating, expanding, and constructing of research and operations support space at the Janelia Research Campus. The bonds carry a fixed interest rate of 4.0%, a yield to maturity of 4.11%, and a maturity date of October 1, 2052.