

Harvard University

**Report on Federal Awards in Accordance with the
Uniform Guidance**

June 30, 2019

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Part I

**Financial Statements and
Schedule of Expenditures of Federal Awards**



Report of Independent Auditors

To the Joint Committee on Inspection of the Governing Boards of Harvard University

Report on the Consolidated Financial Statements

We have audited the accompanying consolidated financial statements of Harvard University and its subsidiaries (the “University”), which comprise the consolidated balance sheet as of June 30, 2019, and the related consolidated statements of changes in net assets with general operating account detail, changes in net assets of the endowment and of cash flows for the year then ended, and the related notes to the financial statements.

Management’s Responsibility 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; this includes 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.

Auditors’ Responsibility

Our responsibility is to express an opinion on the consolidated financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the University’s preparation and fair presentation of the consolidated financial statements 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 University’s internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.



Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Harvard University and its subsidiaries as of June 30, 2019, and the changes in its net assets and its cash flows for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter

As discussed in Note 2 to the consolidated financial statements, the University changed the manner in which it presents net assets and reports certain aspects of its consolidated financial statements as a not-for-profit entity in 2019. Our opinion is not modified with respect to this matter.

Other Matters

We previously audited the consolidated statement of financial position as of June 30, 2018, and the related consolidated statements changes in net assets with general operating account detail, changes in net assets of the endowment and cash flows for the year then ended (the statement of changes in net assets with general operating account detail and the statement of changes in net assets of the endowment are not presented herein), and in our report dated October 25, 2018, we expressed an unmodified opinion on those consolidated financial statements. In our opinion, the information set forth in the accompanying summarized financial information as of June 30, 2018 and for the year then ended is consistent, in all material respects, with the audited consolidated financial statements from which it has been derived.

Other Information

Our audit was conducted for the purpose of forming an opinion on the consolidated financial statements as a whole. The accompanying schedule of expenditures of federal awards for the year ended June 30, 2019 is presented for purposes of additional analysis as required by Title 2 U.S. *Code of Federal Regulations* Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance) and is not a required part of the consolidated financial statements. The information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the consolidated financial statements. The information has been subjected to the auditing procedures applied in the audit of the consolidated financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the consolidated financial statements or to the consolidated financial statements themselves, and other additional procedures, in accordance with auditing standards generally accepted in the United States of America. In our opinion, the schedule of expenditures of federal awards is fairly stated, in all material respects, in relation to the consolidated financial statements taken as a whole.



Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated October 24, 2019 on our consideration of the University's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts and grant agreements and other matters for the year ended June 30, 2019. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing and not to provide an opinion on the effectiveness of internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the University's internal control over financial reporting and compliance.

PricewaterhouseCoopers LLP

October 24, 2019

BALANCE SHEETS

with summarized financial information as of June 30, 2018

In thousands of dollars	June 30	
	2019	2018
ASSETS:		
Cash	\$ 158,640	\$ 144,982
Receivables, net (Note 4)	296,321	301,258
Prepayments and deferred charges	266,719	130,925
Notes receivable, net (Note 5)	373,623	381,795
Pledges receivable, net (Note 6)	2,765,827	1,837,792
Fixed assets, net (Note 7)	8,271,711	7,732,172
Interests in trusts held by others (Note 3)	420,371	408,968
Securities pledged to counterparties, at fair value (Note 3)	49,971	162,790
Investment portfolio, at fair value (Note 3)	46,723,970	45,647,599
TOTAL ASSETS	\$ 59,327,153	\$ 56,748,281
LIABILITIES:		
Accounts payable	\$ 398,134	\$ 359,847
Deferred revenue and other liabilities	1,517,022	1,327,454
Other liabilities associated with the investment portfolio (Notes 3 and 10)	875,141	884,501
Liabilities due under split interest agreements (Note 9)	859,744	862,413
Bonds and notes payable (Note 10)	5,213,349	5,300,921
Accrued retirement obligations (Note 11)	1,120,544	983,552
Government loan advances (Note 5)	66,733	65,409
TOTAL LIABILITIES	10,050,667	9,784,097
NET ASSETS	49,276,486	46,964,184
TOTAL LIABILITIES AND NET ASSETS	\$ 59,327,153	\$ 56,748,281

	Without donor restrictions	With donor restrictions	June 30	
			2019	2018
NET ASSETS:				
General Operating Account (GOA) (Note 8)	\$ 4,890,118	\$ 2,883,299	\$ 7,773,417	\$ 7,171,297
Endowment (Note 8)	7,091,584	33,838,116	40,929,700	39,233,736
Split interest agreements (Note 9)		573,369	573,369	559,151
TOTAL NET ASSETS	\$ 11,981,702	\$ 37,294,784	\$ 49,276,486	\$ 46,964,184

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

STATEMENTS OF CHANGES IN NET ASSETS WITH GENERAL OPERATING ACCOUNT DETAIL

with summarized financial information for the year ended June 30, 2018

In thousands of dollars	Without Donor Restrictions	With Donor Restrictions	For the year ended June 30	
			2019	2018
OPERATING REVENUE:				
Student income (Notes 2 and 12)	\$ 1,200,838		\$ 1,200,838	\$ 1,122,065
Sponsored support (Note 13)				
Federal government – direct costs	448,832		448,832	453,084
Federal government – indirect costs	181,948		181,948	172,223
Non-federal sponsors – direct costs	88,620	\$ 178,637	267,257	251,997
Non-federal sponsors – indirect costs	21,532	17,821	39,353	36,932
Total sponsored support	740,932	196,458	937,390	914,236
Gifts for current use (Note 14)	190,610	281,503	472,113	466,546
Investment income:				
Endowment returns made available for operations (Note 8)	339,007	1,569,416	1,908,423	1,821,645
GOA returns made available for operations	180,634		180,634	176,230
Other investment income	34,289	4,845	39,134	25,873
Total investment income	553,930	1,574,261	2,128,191	2,023,748
Other revenue (Note 15)	772,038		772,038	688,724
Net assets released from restriction	1,987,573	(1,987,573)	0	0
TOTAL OPERATING REVENUE	5,445,921	64,649	5,510,570	5,215,319
OPERATING EXPENSES:				
Salaries and wages	2,038,478		2,038,478	1,943,836
Employee benefits (Note 11)	565,505		565,505	569,223
Services purchased	680,691		680,691	617,210
Space and occupancy	379,290		379,290	410,441
Depreciation (Note 7)	382,775		382,775	357,965
Supplies and equipment	270,623		270,623	268,200
Interest (Note 10)	181,633		181,633	187,883
Scholarships and other student awards (Note 12)	155,874		155,874	152,421
Other expenses (Note 16)	557,801		557,801	511,778
TOTAL OPERATING EXPENSES	5,212,670	0	5,212,670	5,018,957
NET OPERATING SURPLUS	233,251	64,649	297,900	196,362
NON-OPERATING ACTIVITIES:				
Income from GOA Investments	5,112		5,112	8,751
GOA realized and change in unrealized appreciation, net (Note 3)	261,944		261,944	475,207
GOA returns made available for operations	(180,634)		(180,634)	(176,230)
Change in pledge balances (Note 6)		352,553	352,553	28,562
Change in interests in trusts held by others		1,656	1,656	(740)
Gifts for facilities and loan funds (Note 14)		86,372	86,372	109,227
Change in retirement obligations (Note 11)	(126,744)		(126,744)	143,110
Other changes	(17,505)		(17,505)	1,871
Transfers between GOA and endowment (Note 8)	(103,802)	11,382	(92,420)	(83,207)
Transfers between GOA and split interest agreements (Note 9)		13,886	13,886	12,661
Non-operating net assets released from restrictions	226,112	(226,112)	0	0
TOTAL NON-OPERATING ACTIVITIES	64,483	239,737	304,220	519,212
GENERAL OPERATING ACCOUNT NET CHANGE DURING THE YEAR	297,734	304,386	602,120	715,574
Endowment net change during the year	331,683	1,364,281	1,695,964	2,137,262
Split interest agreements net change during the year (Note 9)		14,218	14,218	25,269
NET CHANGE DURING THE YEAR	629,417	1,682,885	2,312,302	2,878,105
Net assets, beginning of year	11,352,285	35,611,899	46,964,184	44,086,079
NET ASSETS, END OF YEAR	\$ 11,981,702	\$ 37,294,784	\$ 49,276,486	\$ 46,964,184

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

STATEMENTS OF CHANGES IN NET ASSETS OF THE ENDOWMENT

with summarized financial information for the year ended June 30, 2018

In thousands of dollars	Without Donor Restrictions	With Donor Restrictions	For the year ended June 30	
			2019	2018
Investment return (Note 3):				
Income from general investments	\$ 6,672	\$ 30,517	\$ 37,189	\$ 47,775
Realized and change in unrealized appreciation/(depreciation), net	413,975	1,875,524	2,289,499	3,284,706
Total investment return	420,647	1,906,041	2,326,688	3,332,481
Endowment returns made available for operations	(339,007)	(1,569,416)	(1,908,423)	(1,821,645)
Net investment return	81,640	336,625	418,265	1,510,836
Gifts for endowment (Note 14)	109,612	503,675	613,287	646,299
Transfers between endowment and the GOA (Note 8)	103,802	(11,382)	92,420	83,207
Capitalization of split interest agreements (Note 9)		15,213	15,213	25,707
Change in pledge balances (Note 6)		575,155	575,155	(139,309)
Change in interests in trusts held by others (Note 8)		9,747	9,747	12,547
Other changes	(3,947)	(24,176)	(28,123)	(2,025)
Net assets released from restrictions	40,576	(40,576)	0	0
NET CHANGE DURING THE YEAR	331,683	1,364,281	1,695,964	2,137,262
Net assets of the endowment, beginning of year	6,759,901	32,473,835	39,233,736	37,096,474
NET ASSETS OF THE ENDOWMENT, END OF YEAR	\$ 7,091,584	\$ 33,838,116	\$ 40,929,700	\$ 39,233,736

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

STATEMENTS OF CASH FLOWS

with summarized financial information for the year ended June 30, 2018

In thousands of dollars	For the year ended June 30	
	2019	2018
CASH FLOWS FROM OPERATING ACTIVITIES:		
Change in net assets	\$ 2,312,302	\$ 2,878,105
Adjustments to reconcile change in net assets to net cash (used in) operating activities:		
Depreciation	382,775	357,965
Amortization of premium and discount related to bonds and notes payable	(27,272)	(27,265)
Realized and change in unrealized (appreciation), net	(2,611,556)	(3,829,446)
Change in fair value of interest rate exchange agreements	11,928	(6,463)
Change in interests in trusts held by others	(11,403)	(11,807)
Change in liabilities due under split interest agreements	30,786	46,753
Gifts of donated securities	(92,158)	(179,131)
Proceeds from the sale of donated securities restricted for long term purposes	14,198	14,422
Gifts for restricted purposes	(518,827)	(528,138)
Loss on disposal of assets	41,239	8,281
Loss on sale of property		1,644
Change in accrued retirement obligations	136,992	(108,723)
Changes in operating assets and liabilities:		
Receivables, net	4,937	(39,417)
Prepayments and deferred charges	(135,794)	(224)
Pledges receivable, net	(928,035)	110,234
Accounts payable	77,182	(30,544)
Deferred revenue and other liabilities	189,568	397,015
NET CASH (USED IN) OPERATING ACTIVITIES	(1,123,138)	(946,739)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Loans made to students, faculty, and staff	(41,938)	(48,451)
Payments received on student, faculty, and staff loans	49,720	47,521
Change in other notes receivable	390	2,198
Proceeds from the sales and maturities of investments	15,001,898	15,309,908
Purchase of investments	(13,750,298)	(14,671,506)
Change associated with repurchase agreements	374,719	700,881
Additions to fixed assets	(994,830)	(937,744)
Proceeds from sale of property		1,293
NET CASH PROVIDED BY INVESTING ACTIVITIES	639,661	404,100
CASH FLOWS FROM FINANCING ACTIVITIES:		
Change in overdrafts included in accounts payable	(7,618)	6,356
Change in split interest liability from new contributions, income and payments to annuitants	(33,455)	(25,076)
Proceeds from issuance of debt	480,900	453,767
Debt repayments	(541,200)	(556,671)
Proceeds from the sales of gifts of restricted securities	77,960	164,709
Contributions restricted for long term investment	518,827	528,138
Affiliated entity contributions and distributions, net	397	(16,343)
Change in government loan advances	1,324	(7,155)
NET CASH PROVIDED BY FINANCING ACTIVITIES	497,135	547,725
NET CHANGE IN CASH	13,658	5,086
Cash, beginning of year	144,982	139,896
CASH, END OF YEAR	\$ 158,640	\$ 144,982
Supplemental disclosure of cash flow information:		
Accounts payable related to fixed asset additions	\$ 77,904	\$ 109,181
Cash paid for interest	\$ 209,923	\$ 215,166

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

1. UNIVERSITY ORGANIZATION

Harvard University (the “University”) is a private, not-for-profit institution of higher education with approximately 6,700 undergraduate and 13,400 graduate students. Established in 1636, the University includes the Faculty of Arts and Sciences, the John A. Paulson School of Engineering and Applied Sciences, the Division of Continuing Education, ten graduate and professional Schools, the Radcliffe Institute for Advanced Study, a variety of research museums and institutes, and an extensive library system to support the teaching and research activities of the Harvard community. The President and

Fellows of Harvard College (the “Corporation”), a governing board of the University, has oversight responsibility for all of the University’s financial affairs. The Corporation delegates substantial authority to the Schools and departments for the management of their resources and operations.

The University includes Harvard Management Company (HMC), a wholly owned subsidiary founded in 1974 to manage the University’s investment assets. HMC is governed by a Board of Directors that is appointed by the Corporation.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of presentation

The accompanying consolidated financial statements have been prepared on the accrual basis of accounting and include the accounts of the University and affiliated organizations controlled by the University. Significant inter-affiliate accounts and transactions have been eliminated.

Funds transferred to the University on behalf of specific beneficiaries (agency funds) are recorded as assets and liabilities in the *Balance Sheets* and are not included in the *Statement of Changes in Net Assets with General Operating Account Detail*.

The financial statements include certain prior year summarized comparative information in total, not by net asset classification. This information is not presented in sufficient detail to conform to generally accepted accounting principles (GAAP). Accordingly, such information should be read in conjunction with the University’s financial statements for the year ended June 30, 2018, from which the summarized information is derived. Certain prior year amounts have been reclassified to conform to current year presentation.

Net asset classifications

For the purposes of financial reporting, the University classifies resources into two net asset categories pursuant to any donor-imposed restrictions and applicable law. Accordingly, the net assets of the University are classified in the accompanying financial statements in the categories that follow:

WITHOUT DONOR RESTRICTIONS — Net assets not subject to donor-imposed restrictions. Funds invested in fixed assets and unrestricted endowment funds comprise 94% of the University’s net assets without donor-imposed restrictions as of June 30, 2019. In addition, this category includes gifts and endowment income balances where the donor restriction has been met, University-designated loan funds, and other current funds.

WITH DONOR RESTRICTIONS — Net assets subject to legal or donor-imposed restrictions that will be satisfied either by actions of the University, the passage of time, or both. These net assets include net assets subject to donor-imposed restrictions that are invested to provide a perpetual source of income to the University. Generally, donors of these assets require the University to maintain and invest the original contribution in perpetuity, but permit the use of some or all investment returns for general or specific purposes. The appreciation on these perpetual contributions must be reported as net assets with donor restrictions until appropriated for spending in accordance with Massachusetts law. Also included in this category are gifts donated for a particular purpose and amounts subject to time restrictions such as funds pledged for future payment.

Revenues from sources other than contributions are generally reported as increases in net assets without donor restrictions. Expenses are reported as decreases in net assets without donor restrictions. Gains and losses on investments are reported as increases or decreases in net assets without donor restrictions, unless their use is restricted by donor stipulations or by law. Investment

returns earned by restricted donor funds are initially classified as net assets with donor restrictions and then reclassified to net assets without donor restrictions when expenses are appropriated or incurred for their intended purpose. Expirations of donor restrictions on net assets are reported as reclassifications from net assets with donor restrictions to net assets without donor restrictions and appear as “Net assets released from restrictions” and “Non-operating net assets released from restrictions” in the *Statements of Changes in Net Assets*.

Liquidity and availability

As part of the University’s liquidity management, it has a policy to structure its financial assets to be available as its general expenditures, liabilities and other obligations come due. A significant portion of the University’s annual expenditures are funded by operating revenues in the current year including student income, sponsored support, endowment returns made available for operations, gifts for current use and other revenues.

The University’s financial assets available within one year of the balance sheet date for general expenditure, such as operating expenses, scheduled principal payments on debt, and capital construction costs not financed with debt, are as follows (in thousands):

	June 30, 2019
FINANCIAL ASSETS	
Cash	\$ 158,640
Receivables, net	296,321
Pledges receivables due in one year	221,587
Cash and short-term investments held separately by General Operating Account (GOA) ^{1,2}	1,013,861
Investment returns made available for operations in the following year ³	2,175,806
TOTAL FINANCIAL ASSETS AVAILABLE WITHIN ONE YEAR	\$ 3,866,215
LIQUIDITY RESOURCES	
Credit facility, undrawn balance	1,500,000
Taxable commercial paper, undrawn balance	2,000,000
TOTAL FINANCIAL ASSETS AND RESOURCES AVAILABLE WITHIN ONE YEAR	\$ 7,366,215

¹ The University has a policy of maintaining a cash reserve floor outside of the General Investment Account (GIA) of \$800 million.

² This is net of collateral on US government securities of \$22,166.

³ Within its investment pools as of June 30, 2019, the University holds \$2.1 billion in cash and cash equivalents and \$2.2 billion of unencumbered US government securities that could be liquidated in one day that could be used to fund this amount.

Endowment and GOA returns liquidated from investments and made available for operations over the course of the fiscal year are distributed to University department and program budgets to spend, subject to donor restrictions where applicable.

While the University has no intention of doing so, there are additional investments held by the University and the endowment that could be liquidated in the event of an unexpected disruption. While a portion of the endowment is subject to donor restrictions, there is \$7.1 billion in endowment funds without donor restrictions and \$3.7 billion of General Operating Account investments (GOA) that could be accessed with the approval of the Corporation and subject to the redemption provisions described in *Note 3*.

Revenue recognition

Revenue is recognized when control of promised goods or services is transferred to customers, in an amount that reflects the consideration the University expects to be entitled to in exchange for those goods or services.

Student income is derived from degree programs as well as executive and continuing education programs and includes tuition, fees, and board and lodging. Student income is recognized ratably over the academic period of the course or program offered based on time elapsed and scholarships awarded to students reduce the amount of revenue recognized. The University’s individual schools have various billing and academic cycles and the majority of our programs are completed within the fiscal year. Student income received in advance of services to be rendered are recorded as deferred revenue which totaled \$213.7 million and \$209.5 million, respectively, for the periods ended June 30, 2019 and 2018, which are primarily recognized in the subsequent fiscal year.

Total student income of \$1.2 billion and \$1.1 billion was recorded during the years ended June 30, 2019 and 2018, respectively. Student tuition, fees, board and lodging at published rates is summarized as follows for the years ended June 30, 2019 and 2018 (in thousands of dollars):

	2019	2018
Undergraduate program	\$ 339,475	\$ 327,171
Graduate and professional degree programs	605,833	585,797
Continuing education and executive programs	516,077	458,047
Board and lodging	196,822	190,495

Scholarships applied to student charges were \$457,369 and \$439,445 for the years ended June 30, 2019 and 2018, respectively.

Unconditional contributions including pledges are recognized immediately and classified as either net assets with donor restrictions or net assets without donor restrictions. Conditional contributions for which cash is received are accounted for as a liability within deferred revenue.

Sponsored support of \$937 million includes support from governmental and private sources. Certain sponsored arrangements are considered exchange arrangements, and revenue under these agreements is recognized based on the University's fulfillment of the contract, which is typically based on costs incurred or the achievement of milestones. Other sponsored support is considered contribution revenue, which is recognized when any donor-imposed conditions have been met, if applicable. Sponsored conditional contributions received, where the barrier to entitlement is not yet overcome are recorded as deferred revenues of \$51.2 million and \$52.2 million as of June 30, 2019 and 2018, respectively. As of June 30, 2019, the University also had \$1.3 billion awarded but not yet expended contributions related to sponsored programs where the condition had not yet been met. This is subject to federal appropriations. Funding received in advance of recognition is recorded as deferred revenue.

Other revenue of \$772.0 million includes several revenue streams considered exchange contracts with customers totalling \$648.7 million for fiscal year 2019. These revenues are recognized at the point in time goods or services are provided. Deferred revenues related to other income of \$109.0 million and \$111.6 million were recorded as of June 30, 2019 and 2018, which are primarily recognized in the subsequent fiscal year.

Measure of operations

Revenues earned, expenses incurred, and returns made available for operations for the purpose of teaching, conducting research, and the other programs and services of the University are the components of "Net operating surplus" in the *Statement of Changes in Net Assets with General Operating Account Detail*. The University's non-operating activity within the *Statement of Changes in Net Assets with General Operating Account Detail* includes contributions to the University's building construction and renovation funds, investment returns (net of amounts made available for operations), change in pledge balances, long-term benefit plan obligation funding changes, and other infrequent transactions.

Collections

The University's vast array of museums and libraries contains priceless works of art, historical treasures, literary works, and artifacts. These collections are protected and preserved for public exhibition, education, research, and the furtherance of public service. They are neither disposed of for financial gain nor encumbered in any manner. Accordingly, such collections are not recorded for financial statement purposes.

Insurance programs

The University, together with the Harvard-affiliated teaching hospitals, has formed a captive insurance company, Controlled Risk Insurance Company (CRICO), to provide limited professional liability, general liability, and medical malpractice insurance for its shareholders. The University self-insures a portion of its professional liability and general liability programs and maintains a reserve for incurred claims, including those related to Harvard Medical School activities not occurring in the affiliated teaching hospitals. CRICO provided malpractice coverage applies with no deductible for medical professionals practicing within Harvard's University Health Services department, the School of Dental Medicine, and the T.H. Chan School of Public Health. The University also maintains reserves for the self-insured portion of claims related to automobile liability, property damage, and workers' compensation; these programs are supplemented with commercial excess insurance above the University's self-insured limit. In addition, the University is self-insured for unemployment, the primary retiree health plan, and all health and dental plans for active employees. The University's claims liabilities are recognized as incurred, including claims that have been incurred but not reported, and are included in operating expenses.

Tax

The University is a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code.

On December 22, 2017, the Tax Cuts and Jobs Act (the "Act") was enacted. The Act impacts the University in several ways, including the addition of excise taxes on executive compensation and net investment income, as well as new rules for calculating unrelated business taxable income. The University recorded an estimated \$49.8 million of related tax expense based on reasonable estimates under the currently available regulatory guidance of the Act. Of the total tax expense, \$37.7 million reflects the estimated net investment income tax related to investments and \$12.1 million relates to estimated net investment income tax on operational revenues, changes to unrelated business taxable income and excise taxes on executive compensation. The University continues to evaluate the impact of the Act on current and future tax positions.

Use of estimates

The preparation of financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect reported amounts and disclosures. Actual results could differ from those estimates.

New accounting pronouncements

In 2019, the University adopted ASU 2016-14, *Presentation of Financial Statements for Not-for-Profit Entities*. This guidance is intended to improve the net asset classification requirements and the information presented in the financial statements and notes. The standard requires the University to reclassify its net assets (i.e., unrestricted, temporarily restricted, and permanently restricted) into two categories: net assets without donor restrictions and net assets with donor restrictions. In addition, underwater endowment funds are to be recognized as a reduction in net assets with donor restrictions and enhanced disclosures are required for board-designated amounts (*Note 8*), liquidity and availability of financial assets (*Note 2*), and expenses by both their natural and functional classification (*Note 17*).

As a result of adopting this standard, certain amounts as of June 30, 2018 were reclassified to conform to the presentation requirements as follows:

	ASU 2016-14 Classifications		Total Net Assets
	Without donor restrictions	With donor restrictions	
NET ASSETS CLASSIFICATIONS			
As previously presented:			
Unrestricted	\$11,349,637		\$11,349,637
Temporarily Restricted		\$26,660,015	26,660,015
Permanently Restricted		8,954,532	8,954,532
Net assets	\$ 11,349,637	\$35,614,547	\$46,964,184
Reclassifications to implement ASU 2016-14:			
Underwater endowments	2,648	(2,648)	0
Net assets, as restated	\$11,352,285	\$35,611,899	\$46,964,184

In May 2014, the Financial Accounting Standards Board (FASB) issued ASU 2014-09, *Revenue from Contracts with Customers (ASC 606)* which outlines a single comprehensive revenue model for entities to use in accounting for revenue arising from contracts with customers. The guidance supersedes most current revenue recognition guidance, including industry-specific guidance, and ensures that entities appropriately reflect the consideration to which they expect to be entitled in exchange for goods and services, by allocating transaction price to identified performance obligations, and recognizing that revenue as performance obligations are satisfied. The University adopted ASC 606 as of July 1, 2018 using the modified retrospective transition method—i.e., by recognizing the cumulative effect of initially applying ASC 606 as an adjustment to the opening balance of net

assets at July 1, 2018. The University elected to apply the standard only to contracts that are not completed as of that date therefore, the comparative information has not been adjusted and continues to be reported under the prior guidance. The guidance did not have a significant impact on the University's consolidated financial statements.

In June 2018, the FASB issued ASU 2018-08, *Clarifying the Scope and the Accounting Guidance for Contributions Received and Contributions Made*. The new guidance clarifies the definition of an exchange transaction and the criteria for evaluating whether contributions are unconditional or conditional. Effective July 1, 2018, the University adopted ASU 2018-08 simultaneously with adoption of the new revenue standard, using the modified prospective transition method. The guidance did not have a significant impact on the University's consolidated financial statements.

In August 2018, the FASB issued ASU 2018-13, *ASC 820 Fair Value Measurement*. The new guidance simplifies fair value measurement disclosures through the removal and modification of a number of investment related disclosure requirements. Certain disclosures are no longer required including amount of and reasons for transfers between Levels 1 and 2; policy for timing of transfers between levels and valuation processes for Level 3 investments. The ASU is effective for fiscal year 2021 for the University. The University early adopted the standard in fiscal year 2019.

In January 2016, the FASB issued ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*, which address certain aspects of recognition, measurement, presentation and disclosure of financial instruments. This guidance allows an entity to choose, investment-by-investment, to report an equity investment that neither has a readily determinable fair value, nor qualifies for the practical expedient for fair value estimation using net asset value (NAV), at its cost minus impairment (if any), plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investment of the same issue. Impairment of such investments must be assessed qualitatively at each reporting period. Entities must disclose their financial assets and liabilities by measurement category and form of asset either on the face of the statement of financial position or in the accompanying notes. The ASU is effective for fiscal year 2020 for the University. The provision to eliminate the requirement to disclose the fair value of financial instruments measured at cost (such as the fair value of debt) was early adopted by the University in fiscal

year 2016. The University is currently evaluating the impact of the remaining new guidance on the consolidated financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases*, which requires a lessee to recognize a right-of-use asset and a lease liability, initially measured at the present value of the lease payments, in its balance sheet. The guidance also expands the required quantitative and qualitative disclosures surrounding leases. The ASU is effective for fiscal year 2020 for the University. The University is evaluating the impact of the new guidance on the consolidated financial statements.

In November 2016, the FASB issued clarifying guidance on ASU 2016-18, *Restricted Cash (Topic 230): Statement of Cash Flows*. The amendments in the update require that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts

shown on the statement of cash flows. The amendments in the update do not provide a definition of restricted cash or restricted cash equivalents. The ASU is effective for fiscal year 2020 for the University. The University is evaluating the impact of the new guidance on the consolidated financial statements.

In March 2017, the FASB issued final guidance on ASU 2017-07, *Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*. Presently, net benefit cost is reported as an employee cost within operating income (or capitalized into assets where appropriate). The amendment requires the bifurcation of net benefit cost. The service cost component will be presented with other employee costs in operating income (or capitalized in assets). The other components will be reported separately outside of operations, and will not be eligible for capitalization. The ASU is effective for fiscal year 2020 for the University. The University is evaluating the impact of the new guidance on the consolidated financial statements.

3. INVESTMENTS

Investments are presented at fair value in accordance with GAAP and under the guidelines prescribed by the HMC investment valuation policy, which is reviewed and approved by the HMC Board of Directors on an annual basis.

The majority of the University's investments are managed by HMC in the GIA, a pooled investment account that consists primarily of endowment assets. Certain other investments such as cash, short-term investments, split interest agreements, and other assets, are managed separately from the GIA.

The University's investment holdings as reported on the *Balance Sheets* are summarized in the following table (in thousands of dollars):

	2019	2018
Investment portfolio assets		
Pooled general investment account assets	\$ 44,875,461	\$ 44,113,615
Other investments	1,848,509	1,533,984
Investment portfolio, at fair value	46,723,970	45,647,599
Securities pledged to counterparties, at fair value	49,971	162,790
TOTAL INVESTMENT ASSETS	46,773,941	45,810,389
Pooled general investment account liabilities	847,732	869,020
Interest rate exchange agreement	27,409	15,481
TOTAL OTHER LIABILITIES ASSOCIATED WITH THE INVESTMENT PORTFOLIO	875,141	884,501
TOTAL INVESTMENTS, NET	\$ 45,898,800	\$ 44,925,888

As of June 30, 2019 and 2018, University's net investments were comprised of the following components (in thousands of dollars):

	2019	2018
POOLED GENERAL INVESTMENT ACCOUNT		
Endowment ¹	\$ 38,843,726	\$ 37,731,389
General operating account	3,716,277	4,154,494
Split interest agreements	780,737	820,725
Other internally designated funds	736,960	700,777
TOTAL POOLED GENERAL INVESTMENT ACCOUNT NET ASSETS	\$ 44,077,700	\$ 43,407,385
OTHER INVESTMENTS OUTSIDE THE GENERAL INVESTMENT ACCOUNT		
General operating and other investments ²	1,168,724	917,664
Split interest agreements	652,376	600,839
TOTAL OTHER INVESTMENTS OUTSIDE THE GENERAL INVESTMENT ACCOUNT	\$ 1,821,100	\$ 1,518,503
TOTAL INVESTMENTS, NET	\$ 45,898,800	\$ 44,925,888

¹ Includes only the portion of the endowment invested in the GIA and excludes pledges, interests in trusts held by others, other non-GIA investments, and GIA interest and dividends net of all internal and external management fees and expenses.

² Consists primarily of repurchase agreements, US government securities, and money markets of \$1,036,080 and \$754,940 as of June 30, 2019 and 2018, respectively.

Investment return

A summary of the University's total return on investments for fiscal years 2019 and 2018 is presented below (in thousands of dollars):

	2019	2018
Return on pooled general investment account:		
Realized and change in unrealized appreciation, net	\$ 2,612,986	\$ 3,833,460
Interest, dividends, fees, and expenses, net	42,631	55,199
Total return on pooled general investment account ¹	2,655,617	3,888,659
Return on other investments:		
Realized and change in unrealized (depreciation), net	(1,430)	(4,014)
Interest, dividends, fees, and expenses, net	52,619	38,585
Total return on other investments	\$ 51,189	\$ 34,571
Realized and change in unrealized (depreciation)/appreciation on interest rate exchange agreement, net	(13,880)	4,010
TOTAL RETURN ON INVESTMENTS²	\$ 2,692,926	\$ 3,927,240

¹ Net of all internal and external management fees and expenses.

² Total return on investments is comprised of returns on the endowment, GOA, Split Interest Agreements and other.

Fair value hierarchy

The University's investments have been categorized based upon the fair value hierarchy in accordance with ASC 820, which prioritizes the inputs to valuation techniques used to measure fair value of investment assets and liabilities into three levels:

LEVEL 1 Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities;

LEVEL 2 Quoted prices in markets that are not considered to be active or financial instruments for which all significant inputs are observable, either directly or indirectly;

LEVEL 3 Prices or valuations that require inputs that are significant to the fair value measurement, unobservable, and/or require the University to develop its own assumptions.

Investments in externally managed funds where the University utilizes net asset values (as reported by external managers) as a practical expedient for fair value measurements are excluded from the fair value hierarchy.

The level of an asset or liability within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. The University endeavors to utilize all relevant and available information in measuring fair value.

The following is a summary of the levels within the fair value hierarchy for those investment assets and liabilities subject to fair value measurement as of June 30, 2019 and 2018 (in thousands of dollars):

	2019				2018	
	Level 1	Level 2	Level 3	NAV as Practical Expedient	Total	Total
ASSETS:¹						
Cash and short-term investments	\$ 1,335,905				\$ 1,335,905	\$ 1,407,841
Repurchase agreements		\$ 774,644			774,644	1,149,363
Domestic equity	526,046			\$ 3,067,435	3,593,481	4,990,487
Foreign equity	939,428			1,353,879	2,293,307	2,401,770
Global equity				1,660,465	1,660,465	2,008,253
Domestic fixed income	1,505,039				1,505,039	1,505,967
Foreign fixed income	25,597				25,597	25,141
Emerging market equity and debt	634,107			2,593,954	3,228,061	2,562,035
High yield	2,898		\$ 234,110		237,008	145,132
Hedge funds				14,592,876	14,592,876	12,814,216
Private equity			227,244	10,028,510	10,255,754	8,527,921
Natural resources	12,878		1,878,205	22,972	1,914,055	2,254,809
Real estate			48,644	3,561,775	3,610,419	4,005,056
Inflation-indexed bonds	871,832				871,832	847,163
Due from brokers	91	44,350	4,638		49,079	5,824
Other investments	6,558	3,626	7,609		17,793	12,022
INVESTMENT ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 5,860,379	\$ 822,620	\$ 2,400,450	\$ 36,881,866	\$ 45,965,315	\$ 44,663,000
Other investment assets not subject to fair value ²					808,626	1,147,389
TOTAL INVESTMENT ASSETS⁶					\$ 46,773,941	\$ 45,810,389
Interests in trusts held by others ³			420,371		420,371	408,968
NON-INVESTMENT ASSETS SUBJECT TO FAIR VALUE LEVELING			\$ 420,371		\$ 420,371	\$ 408,968
TOTAL ASSETS					\$ 47,194,312	\$ 46,219,357
LIABILITIES:¹						
Due to brokers ⁴		\$ 33,912			\$ 33,912	\$ 115,386
Other liabilities subject to fair value			\$ 288,372		288,372	223,601
INVESTMENT LIABILITIES SUBJECT TO FAIR VALUE LEVELING		\$ 33,912	\$ 288,372		\$ 322,284	\$ 338,987
Other investment liabilities not subject to fair value ⁵					552,857	545,514
TOTAL INVESTMENT LIABILITIES⁶					\$ 875,141	\$ 884,501
Liabilities due under split interest agreements ³		\$ 859,744			859,744	862,413
NON-INVESTMENT LIABILITIES SUBJECT TO FAIR VALUE LEVELING		\$ 859,744			\$ 859,744	\$ 862,413
TOTAL LIABILITIES					\$ 1,734,885	\$ 1,746,914

¹ Certain prior year amounts have been reclassified to conform to current year presentation.

² As of June 30, 2019, other assets not subject to fair value consists primarily of receivables for transactions that settled subsequent to the balance sheet date of \$599,651, before eliminating inter-company balances, and consolidated assets of \$159,745. As of June 30, 2018, other assets not subject to fair value consist primarily of receivables for transactions that settled subsequent to the balance sheet date of \$922,438, before eliminating inter-company balances, and consolidated assets of \$162,922.

³ Amounts excluded from investments and included separately on the University's Balance Sheets.

⁴ Includes fair value of an interest rate exchange agreement on the University's debt portfolio of \$27,409 and \$15,481 as of June 30, 2019 and 2018, respectively.

⁵ As of June 30, 2019 and 2018, other liabilities not subject to fair value include consolidated liabilities of \$199,693 and \$200,631, respectively.

⁶ As of June 30, 2019 and 2018, total investment assets, net equal \$45,898,800 and \$44,925,888, respectively.

The following is a rollforward of Level 3 investments for the year ended June 30, 2019 and the condensed June 30, 2018 rollforward of Level 3 investments (in thousands of dollars):

	Beginning balance as of July 1, 2018	Net realized gains/(losses)	Net change in unrealized appreciation (depreciation) ¹	Purchases/ contributions	Sales/ distributions	Transfers out of Level 3	Ending balance as of June 30, 2019
INVESTMENT ASSETS:							
High yield	\$ 133,027	\$ 1,368	\$ (642)	\$ 165,240	\$ (64,883)		\$ 234,110
Private equity	158,070	2,562	(3,187)	69,799			227,244
Natural resources	2,183,270	(78,604)	(141,475)	83,190	(168,176)		1,878,205
Real estate	230,214	2,848	(989)	86	(11,481)	\$ (172,034)	48,644
Due from brokers	4,640		(2)				4,638
Other investments	1,662		(53)	7,125	(1,125)		7,609
INVESTMENT ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 2,710,883	\$ (71,826)	\$ (146,348)	\$ 325,440	\$ (245,665)	\$ (172,034)	\$ 2,400,450
Interests in trusts held by others	408,968		11,403				420,371
NON-INVESTMENT ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 408,968		\$ 11,403				\$ 420,371
TOTAL ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 3,119,851	\$ (71,826)	\$ (134,945)	\$ 325,440	\$ (245,665)	\$ (172,034)	\$ 2,820,821
INVESTMENT LIABILITIES:							
Other liabilities subject to fair value	\$ 223,601		\$ (11,190)	\$ 82,854	\$ (6,893)		\$ 288,372
TOTAL LIABILITIES SUBJECT TO FAIR VALUE LEVELING	\$ 223,601	\$ 0	\$ (11,190)	\$ 82,854	\$ (6,893)	\$ 0	\$ 288,372
NET ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 2,896,250	\$ (71,826)	\$ (123,755)	\$ 242,586	\$ (238,772)	\$ (172,034)	\$ 2,532,449

¹ Total change in unrealized appreciation/(depreciation) relating to Level 3 investment assets and investment liabilities still held by the University at June 30, 2019 is \$(221,663) and is reflected in "Realized and change in unrealized appreciation/(depreciation), net" in the Statements of Changes in Net Assets.

	Beginning balance as of July 1, 2017	Net realized gains/(losses)	Net change in unrealized appreciation (depreciation) ¹	Purchases/ contributions	Sales/ distributions	Transfers into Level 3	Transfers out of Level 3	Ending balance as of June 30, 2018
PRIOR YEAR NET ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 8,267,471	\$ (945,127)	\$ 789,301	\$ 513,420	\$ (2,519,985)	\$ 0	\$ (3,208,830)	\$ 2,896,250

¹ Total change in unrealized appreciation/(depreciation) relating to Level 3 investment assets and investment liabilities still held by the University at June 30, 2018 is \$(183,672) and is reflected in "Realized and change in unrealized appreciation/(depreciation), net" in the Statements of Changes in Net Assets.

During fiscal year 2018, the University unwound its direct real estate investing platform and engaged an external investment manager to manage these assets in an investment vehicle, resulting in a transfer out of Level 3 of \$3.2 billion of investment assets.

Investment strategy and risk

The University utilizes a number of wholly-owned subsidiary entities to support its investment activities. The consolidated financial statements include all assets, liabilities, income, and expenses associated with these entities and intercompany accounts and transactions have been eliminated during consolidation.

The University's investment strategy incorporates a diversified asset allocation approach and maintains, within defined limits, exposure to the movements of the

global public and private equity, fixed income, real estate, and commodities markets. Exposure to these markets is achieved through direct investments in individual securities, investments in special purpose vehicles and/or through investments in vehicles advised by external managers.

Investments in global markets involve a multitude of risks such as price, interest rate, market, sovereign, currency, liquidity, and credit risks, amongst many others. Additionally, the University's direct investments in natural resources expose it to a unique set of risks, namely environmental, social, and geopolitical risks in some of the jurisdictions where these direct investments reside. The University manages exposure to these risks through established policies and procedures related to its ongoing investment diligence and operational due

diligence programs. The University also considers manager concentration risk. As of June 30, 2019, 22% of the GIA NAV was invested across 5 diversified fund managers. The University anticipates that the value and composition of its investments may, from time to time, fluctuate substantially in response to any or all of the risks described herein.

Liquidity

Cash and short-term investments are recorded at cost, which approximates fair value, and includes cash in bank accounts, institutional money market funds, and other temporary investments held for working capital purposes with original maturities of three months or less. Cash and short-term investments do not include cash balances held as collateral by the University. Cash and short-term investment balances designated for investment purposes are included in the "Investment portfolio, at fair value" in the *Balance Sheets*.

The University has various sources of liquidity at its disposal within its investment pools, including approximately \$2.1 billion in cash and cash equivalents (including money markets of \$1.3 billion and repurchase agreements of \$0.8 billion) at June 30, 2019. In addition, the University estimates that as of the balance sheet date, it could have liquidated additional unencumbered US government securities of \$2.2 billion within one business day (assuming typical settlement terms) to meet any immediate short-term needs of the University (unaudited).

Repurchase agreements

The University *Balance Sheets* display the assets generated by repurchase transactions. The University enters into these transactions under agreements containing master netting arrangements. The University requires the fair value of the collateral exchanged under these agreements to be equal to or in excess of the total amount of the agreement, including interest where applicable. At June 30, 2019 and 2018, the University had gross asset repurchase agreements of \$0.8 billion and \$1.1 billion, respectively, which were fully collateralized. The University does not offset repurchase agreements that are subject to master netting arrangements or similar arrangements on the University's *Balance Sheets*.

Dividend and interest income

Dividend income is recognized net of applicable withholding taxes on the ex-dividend date. Non-cash dividends are recorded at the fair value of the securities

received. Interest income and expense is recorded net of applicable withholding taxes, on an accrual basis. The University amortizes bond premiums and accretes bond discounts using the effective yield method and when cash collection is expected.

Traded securities

Instruments listed or traded on a securities exchange are valued at the last quoted price on the primary exchange where the security is traded. Where there is no readily available closing price on the valuation date, long positions are valued at the bid price and short positions are valued at the ask price. Restrictions that are attached to a security are factored into the valuation of that security, reflective of the estimated impact of those restrictions. Investments in non-exchange traded debt and equity instruments are primarily valued using inputs provided by independent pricing services or by broker/dealers who actively make markets in these securities.

Derivatives

The University uses a variety of financial instruments with off-balance sheet risk involving contractual or optional commitments for future settlement, which are exchange traded or executed over the counter (OTC). These instruments are used to (1) manage exposure to certain asset classes and/or various market risks, (2) arbitrage mispricings of related securities and (3) to manage the interest, cost and risk associated with its outstanding and/or future debt. These instruments are classified as due to/from brokers and may include option, swap, credit default, interest rate, and forward contracts. These types of instruments are primarily valued using industry standard models with independent market inputs, or by broker quotes. Inputs such as prices, spreads, curves, and/or broker quotes are evaluated for source reliability and consistency with industry standards. Counterparty marks obtained and utilized to determine daily collateral requirements are also used to corroborate input reasonability. The University considers current market conditions including interest rate and credit risks in its evaluation of inputs, pricing methodologies, and models utilized to determine fair values.

In connection with its derivative activities, the University generally maintains master netting agreements and collateral agreements with its counterparties. These agreements provide the University the right, in the event

of default by the counterparty (such as bankruptcy or a failure to pay or perform), to net a counterparty's rights and obligations under the agreement and to liquidate and offset collateral against any net amount owed by the counterparty. Collateral, generally in the form of debt obligations issued by the US Treasury, is exchanged on a daily basis as required by fluctuations in the market.

Specific credit limits are established for counterparties based on their individual credit ratings. Credit limits are monitored daily by the University and are adjusted according to policy, as necessary. Some of the financial instruments entered into by the University contain credit-risk-related contingency features that allow the parties to the agreement to demand immediate payment for outstanding contracts and/or collateral.

The following table presents information about the University's derivatives by primary risk exposure for the years ended June 30, 2019 and 2018 (in thousands of dollars):

	As of June 30, 2019			For the year ended June 30, 2019	As of June 30, 2018			For the year ended June 30, 2018
	Average Quarterly Notional	Gross derivative assets	Gross derivative liabilities	Net profit/ (loss) ⁴	Average Quarterly Notional	Gross derivative assets	Gross derivative liabilities	Net profit/ (loss) ⁴
Primary risk exposure								
Equity instruments	\$ 1,686,686	\$ 63,618	\$ 25,824	\$ 10,413	\$ 3,623,341	\$ 37,826	\$ 123,157	\$ 351,485
Fixed income instruments ¹	117,000		27,409	(13,880)	117,000		15,481	4,010
Currency instruments	1,151,191	527	468	(1,408)	2,450,565	87,538	101,058	(91,194)
Credit instruments	4,726	4,723		12	4,792	4,770		(9)
SUBTOTAL		\$ 68,868	\$ 53,701	\$ (4,863)		\$ 130,134	\$ 239,696	\$ 264,292
TOTAL COUNTERPARTY NETTING		(19,789)	(19,789)			(124,310)	(124,310)	
NET AMOUNTS INCLUDED IN THE BALANCE SHEETS³		49,079	33,912			5,824	115,386	
Collateral								
Cash collateral received/posted						871		
Securities collateral received/ posted ⁵		52,579	26,690			4,032	135,934	
TOTAL COLLATERAL		52,579	26,690			4,903	135,934	
NET AMOUNT		(3,500)	7,222			921	(20,548)	
NET AMOUNT IN ACCORDANCE WITH ASC 210⁶		\$ 0	\$ 7,222			\$ 921	\$ 0	

¹ For the year ended June 30, 2019, balances include a gross derivative liability of \$27,409 and a net realized and change in unrealized loss of \$(13,880), related to an interest rate exchange agreement on the University's debt portfolio. For the year ended June 30, 2018, balances include a gross derivative liability of \$15,481 and a net realized and change in unrealized gain of \$4,010 related to an interest rate exchange agreement on the University's debt portfolio. These positions are further discussed in Note 10.

² GAAP permits the netting of derivative assets and liabilities and the related cash collateral received and paid when a legally enforceable master netting agreement exists between the University and a derivative counterparty.

³ Included within the "Investment portfolio, at fair value" and "Other liabilities associated with the investment portfolio" line items of the Balance Sheets.

⁴ Included within "Realized and change in unrealized appreciation/(depreciation), net" within the Statements of Changes in Net Assets.

⁵ Includes securities posted to meet initial margin requirements on exchange traded futures.

⁶ Excludes any over-collateralized amounts in accordance with ASC 210.

External advisors

Investments managed by external advisors include investments in private equity, real estate, natural resources, hedge funds, and other externally managed funds. The majority of these investments are not readily marketable and are reported at NAV utilizing the most current information provided by the external advisor, subject to assessments that the information is representative of fair value and in consideration of any additional factors deemed pertinent to the fair value measurement. The University evaluates these external advisors through ongoing due diligence and operational oversight, which includes an analysis of an advisor's use of and adherence to fair value principles.

The University, as an investor, has commitments to make periodic contributions in future periods to the investments managed by external advisors. The amounts of these expected disbursements as of June 30, 2019 and 2018 are disclosed below (in thousands of dollars):

	As of June 30, 2019			As of June 30, 2018		
	Fair value ¹	Remaining unfunded commitments	Estimated remaining life ²	Fair value ¹	Remaining unfunded commitments	Estimated remaining life ²
Private equity funds	\$ 8,351,163	\$ 6,885,617	4 – 10	\$ 6,848,285	\$ 6,475,884	4 – 10
Real estate funds	3,556,511	1,702,201	4 – 10	3,900,327	1,542,336	4 – 10
Other externally managed funds ³	3,253,362	2,112,165	2 – 8	2,421,899	2,868,214	2 – 8
TOTAL	\$ 15,161,036	\$ 10,699,983		\$ 13,170,511	\$ 10,886,434	

¹ Represents the fair value of the funded portion of investments with remaining unfunded commitments.

² The estimated remaining lives of these funds, expressed in years, are forward-looking projections based on the University's estimates and could vary significantly depending on the investment decisions of external managers, changes in the University's investment portfolio, and other circumstances.

³ Investments in externally managed funds primarily include exposures to hedge funds and natural resources.

Investments in externally managed funds generally have limited redemption options for investors and, subsequent to final closing, may or may not permit subscriptions by new or existing investors. These entities may also have the ability to impose gates, lockups, and other restrictions on an investor's ability to readily redeem out of their investment interest in the fund.

Direct investments

Direct investments in natural resources and private equity are primarily valued using a combination of independent appraisals and/or one or more industry standard valuation techniques (e.g., income approach, market approach, or cost approach). The income approach is primarily based on the investment's anticipated future income using one of two principal methods: the discounted cash flow method or the capitalization method. Inputs and estimates developed and utilized with these techniques may be subjective, unobservable, and require judgment regarding

The University generally utilizes its capital account balance as a practical expedient to fair value measurements for funds managed by external advisors. To evaluate the adequacy of these fair value measurements, the University has assessed factors including, but not limited to, the external advisor's adherence to fair value principles in calculating the capital account balance, the existence of transactions at NAV at the measurement date and the existence or absence of certain restrictions at the measurement date.

significant matters such as estimating the amount and timing of future cash flows, forward pricing assumptions, and the selection of discount and capitalization rates that appropriately reflect market and credit risks. The market approach derives investment value through comparison to recent and relevant market transactions with similar investment characteristics. The cost approach is utilized when the cost of the investment is determined to be the best representation of fair value. This method is typically used for newly purchased or undeveloped assets. When applicable, the University examines market data and collaborates closely with independent appraisers to arrive at the best estimation of fair value for each respective asset. The HMC Board of Directors discusses the valuation process and results with HMC management, and makes determinations on significant matters impacting valuation that may arise from time to time.

The following table presents the ranges of significant unobservable inputs used to value the University's Level 3 assets. While the inputs described below represent the range of inputs utilized as of the measurement date, these inputs may change over time, which may have a material effect on the valuation of these types of investments in the future.

Significant unobservable input by asset class ^{1,3,4}	As of June 30, 2019			As of June 30, 2018	
	Level 3 investments subject to fair value (in thousands of dollars) ²	Range of inputs utilized in valuation model ³	Weighted average of inputs utilized in valuation model	Level 3 investments subject to fair value (in thousands of dollars) ²	Range of inputs utilized in valuation model ³
Natural resources:	\$ 1,878,205			\$ 2,183,270	
Income approach discount rate		6.0% – 16.0%	10.2%		5.0% – 16.0%
Price per planted hectare		\$1,073 – \$164,937	\$43,431		\$1,386 – \$158,900
Price per gross hectare		\$168 – \$57,422	\$15,231		\$118 – \$51,559
Discount for lack of marketability		2.0% – 20.0%	9.0%		
High yield:	233,681			106,481	
Income approach discount rate					8.6%
Shadow rating discount rate		6.8% – 8.9%	8.0%		8.4% – 9.9%
Collateral coverage market risk factor		100%	100%		100%
EBITDA multiple		11.3x – 13.5x	11.9x		
Weighted average cost of capital					7.1% – 10.9%
Real estate:	32,661			40,669	
Income approach discount rate		11.5% – 13.5%	12.5%		13.0% – 13.5%
Income approach growth rate		3.0%	3.0%		3.0%
Discount for lack of marketability		15.0%	15.0%		15.0%
Private equity:	69,430			87,236	
Income approach discount rate		6.0% – 8.0%	7.0%		6.0% – 8.0%
Book value multiplier		0.6x	0.6x		0.8x
Net income multiple					5.0x
Other liabilities subject to fair value	(288,372)			(158,008)	
Loan to value		8.7% – 43.5%	22.4%		8.5% – 44.0%
Market interest rate		2.5% – 10.5%	5.1%		2.5% – 15.0%
NET AMOUNT	\$ 1,925,605			\$ 2,259,648	

¹ The fair value of investments may be determined using multiple valuation techniques.

² Included within Level 3 investments is \$606,844 and \$636,602 as of June 30, 2019 and 2018, respectively, which were valued using other inputs including, but not limited to, single source broker quotations, third party pricing, and transactions.

³ The range of inputs encompasses a variety of investment types within each asset class.

⁴ Certain prior year amounts have been reclassified to conform to current year presentation.

4. RECEIVABLES

The major components of receivables, net of reserves for doubtful accounts of \$12.2 million and \$12.9 million as of June 30, 2019 and 2018, respectively, were as follows (in thousands of dollars):

	2019	2018
Federal sponsored support	\$ 71,425	\$ 72,148
Publications	62,872	60,424
Executive education	62,842	66,837
Tuition and fees	19,146	20,479
Non-federal sponsored support	10,821	14,030
Gift receipts	4,430	22,510
Other	64,785	44,830
TOTAL RECEIVABLES, NET	\$ 296,321	\$ 301,258

5. NOTES RECEIVABLE

Notes receivable are recorded initially at face value plus accrued interest, which approximates fair value. Notes receivable, and related allowance for doubtful accounts, were as follows (in thousands of dollars):

	2019			2018		
	Receivable	Allowance	Net	Receivable	Allowance	Net
Student Loans:						
Government revolving	\$ 49,213	\$ 1,266	\$ 47,947	\$ 59,941	\$ 1,433	\$ 58,508
Institutional	86,467	2,481	83,986	87,206	2,372	84,834
Federally insured	344	159	185	371		371
Total student loans	136,024	3,906	132,118	147,518	3,805	143,713
Faculty and staff loans	234,148	179	233,969	230,335	179	230,156
Other loans	29,475	21,939	7,536	30,989	23,063	7,926
TOTAL	\$ 399,647	\$ 26,024	\$ 373,623	\$ 408,842	\$ 27,047	\$ 381,795

Government revolving loans are funded principally with federal advances to the University under the Perkins Loan Program and certain other programs. These advances totaled \$66.7 million and \$65.4 million as of June 30, 2019 and 2018, respectively, and are classified as liabilities in the *Balance Sheets*. During fiscal year 2018, the Perkins Loan Program ended and as a result the University made the first of its annual required repayments to the government. In fiscal year 2019 an annual repayment was not due while the Department of Education calculates the reimbursement owed to the University for public service cancellations since fiscal year 2010, as required by law. Interest earned on the revolving and institutional loan programs is reinvested to support additional loans. The repayment and interest rate terms of the institutional loans vary considerably.

Faculty and staff notes receivable primarily consists of mortgage and educational loans. Mortgages include shared appreciation loans, loans that bear interest at the applicable federal rate and interest-free loans. In addition,

certain mortgages that bear interest at the current market rate or applicable federal rate may be subsidized for an initial period. The educational loans are primarily zero-interest loans.

The University assesses the adequacy of the allowance for doubtful accounts by evaluating the loan portfolio, including such factors as the differing economic risks associated with each loan category, the financial condition of specific borrowers, the economic environment in which the borrowers operate, the level of delinquent loans, the value of any collateral, and, where applicable, the existence of any guarantees or indemnifications. In addition to these factors, the University reviews the aging of the loans receivable and the default rate in comparison to prior years. The allowance is adjusted based on these reviews. The University considers the allowance at June 30, 2019 and 2018 to be reasonable and adequate to absorb potential credit losses inherent in the loan portfolio.

6. PLEDGES RECEIVABLE

Unconditional promises to donate to the University in the future are initially recorded at fair value (pledge net of discount) and subsequently amortized over the expected payment period, net of an allowance for uncollectible pledges. The University's indicative 1- to 5-year taxable unsecured borrowing rate is used to discount pledges receivable at the end of the fiscal year they are received. Discounts of \$149.6 million and \$91.8 million for the years ended June 30, 2019 and 2018, respectively, were calculated using rates ranging from 1.3% to 3.1%.

Pledges receivable included in the financial statements as of June 30, 2019 and 2018 are expected to be realized as follows (in thousands of dollars):

	2019	2018
Within one year	\$ 408,858	\$ 276,074
Between one and five years	1,635,428	1,104,294
More than five years	992,743	632,340
Less: discount and allowance for uncollectible pledges	(271,202)	(174,916)
TOTAL PLEDGES RECEIVABLE, NET	\$ 2,765,827	\$ 1,837,792

Pledges receivable as of June 30, 2019 and 2018 have been designated for the following purposes (in thousands of dollars):

	2019	2018
General Operating Account balances:		
Gifts for current use	\$ 744,871	\$ 552,268
Non-federal sponsored awards	215,972	127,140
Construction and life income	294,180	222,735
Total General Operating Account balances	1,255,023	902,143
Endowment	1,510,804	935,649
TOTAL PLEDGES RECEIVABLE, NET	\$ 2,765,827	\$ 1,837,792

Because of uncertainties with regard to realizability and valuation, conditional promises are only recognized if and when the specified conditions are met. Conditional pledges totaled \$49.8 million and \$59.5 million as of June 30, 2019 and 2018, respectively.

7. FIXED ASSETS

Fixed assets are reported at cost or, if a gift, at fair value as of the date of the gift, net of accumulated depreciation. Depreciation is computed using the straight-line method over the estimated useful lives of the assets.

The major categories of fixed assets as of June 30, 2019 and 2018 are summarized as follows (in thousands of dollars):

	2019	2018	Estimated useful life (in years)
Research facilities	\$ 2,432,190	\$ 2,376,412	*
Classroom and office facilities	2,291,410	2,046,484	35
Housing facilities	2,241,939	2,010,649	35
Other facilities	448,844	427,397	35
Service facilities	778,149	751,236	35
Libraries	479,741	487,598	35
Museums and assembly facilities	959,455	788,587	35
Athletic facilities	235,910	223,072	35
Land	1,023,726	968,922	N/A
Construction in progress	1,297,194	1,337,279	N/A
Equipment	1,281,259	1,289,975	**
SUBTOTAL AT COST	13,469,817	12,707,611	
Less: accumulated depreciation	(5,198,106)	(4,975,439)	
FIXED ASSETS, NET	\$ 8,271,711	\$ 7,732,172	

* Estimated useful lives of components range from 10 to 45 years.

** Estimated useful lives of equipment range from 3 to 8 years.

Certain University facilities are subject to restrictions as to use, structural modifications, and ownership transfer. Included in the fixed asset balances are restricted facilities with a net book value of \$303.0 million and \$292.8 million as of June 30, 2019 and 2018, respectively.

The costs of research facilities are separated into the shell, roof, finishes, fixed equipment, and services. These components are separately depreciated.

Equipment includes general and scientific equipment, computers, software, furniture, and vehicles.

The University has asset retirement obligations of \$176.8 million and \$174.4 million, which are included in "Deferred revenue and other liabilities" in the *Balance Sheets* as of June 30, 2019 and 2018, respectively.

8. ENDOWMENT AND GENERAL OPERATING ACCOUNT NET ASSETS

The University's net assets consisted of the following as of June 30, 2019 and 2018 (in thousands of dollars):

	2019			2018		
	Without donor restrictions	With donor restrictions	Total	Without donor restrictions	With donor restrictions	Total
NATURE OF SPECIFIC NET ASSETS						
Perpetual endowment funds		\$ 7,848,495	\$ 7,848,495		\$ 7,378,054	\$ 7,378,054
Endowment funds and appreciation, subject to distribution policy and appropriation		24,092,097	24,092,097		23,783,159	23,783,159
Endowment funds without restriction, board designated and subject to distribution policy	\$ 7,091,584		7,091,584	\$ 6,759,901		6,759,901
Pledge balances		1,510,804	1,510,804		935,649	935,649
Interests in trusts held by others		386,720	386,720		376,973	376,973
TOTAL ENDOWMENT	7,091,584	33,838,116	40,929,700	6,759,901	32,473,835	39,233,736
Operating	4,890,118		4,890,118	4,592,384		4,592,384
Unexpended contributions and endowment distributions		2,784,170	2,784,170		2,480,144	2,480,144
Student loan funds		99,129	99,129		98,769	98,769
TOTAL GENERAL OPERATING ACCOUNT	4,890,118	2,883,299	7,773,417	4,592,384	2,578,913	7,171,297
Split interest agreements (<i>Note 9</i>)		573,369	573,369		559,151	559,151
TOTAL NET ASSETS	\$ 11,981,702	\$ 37,294,784	\$ 49,276,486	\$ 11,352,285	\$ 35,611,899	\$ 46,964,184

Endowment

The University's endowment consists of 13,891 separate funds established over many years for a wide variety of purposes. Endowment fund balances are classified and reported in accordance with donor specifications and state law. The endowment includes both donor-restricted endowment funds and funds functioning as endowment which are not subject to donor-imposed restrictions, however decisions to spend their principal require the approval of the Corporation and therefore are classified as Board-designated endowment funds. The majority of the endowment is invested in the GIA (*Note 3*).

The University is also the beneficiary of certain irrevocable trusts held and administered by others. The estimated fair values of trust assets, which include the present values of expected future cash flows from outside trusts and the fair value of the underlying assets of perpetual trusts, are recognized as assets and increases in net assets when the required trust documentation is provided to the University.

The fair values of these trusts are provided by the external trustees and are adjusted annually by the University. These are included as Level 3 investments in the fair value hierarchy table in *Note 3*.

The University's endowment distribution policies are designed to preserve the value of the endowment in real terms (after inflation) and generate a predictable stream of available income. Each fall, the Corporation approves the endowment distribution for the following fiscal year. Distribution from an underwater endowment fund (a fund below its historic dollar value) could continue in limited and defined circumstances under the University's endowment distribution policy. To the extent that the fair value of a donor restricted endowment fund falls below its historic dollar value it would be reported as a reduction of net assets with donor restrictions.

At June 30, 2019 and 2018, funds in a deficit position were reported in net assets with donor restrictions and are comprised as follows (in thousands):

	2019	2018
Fair value of underwater endowment funds	\$ 27,240	\$ 30,703
Historic dollar value	32,672	33,351
TOTAL DEFICIT OF UNDERWATER ENDOWMENT FUNDS	\$ (5,432)	\$ (2,648)

The endowment distribution is based in part on presumptive guidance from a formula that is intended to provide budgetary stability by smoothing the impact of annual investment gains and losses. The formula's inputs reflect expectations about long-term returns and inflation rates. For fiscal year 2019, the endowment distribution approved by the Corporation (prior to decapitalizations) was equal to 5.1% of the fair value of the endowment invested in the GIA as of the beginning of the fiscal year. The total endowment distribution made available for operations was \$1.9 billion and \$1.8 billion in fiscal year 2019 and 2018, respectively.

Each year the Corporation also approves certain decapitalizations from the endowment to support strategic, mission-critical activities or objectives that are typically one-time or time-limited and therefore, are excluded from net operating surplus. These decapitalizations totaled \$32.2 million and \$46.0 million in fiscal year 2019 and 2018, respectively. These additional decapitalizations, in combination with the endowment distribution, resulted in an aggregate payout rate of 5.1% and 5.3% in fiscal year 2019 and 2018, respectively. The aggregate payout rate does not include the impact of new tax charges related to the endowment, if included, the total payout rate would be 5.2% for fiscal year 2019.

General operating account

The GOA consists of the general or current funds of the University as well as the assets and liabilities related to student and faculty loans and facilities. The GOA accepts, manages, and pays interest on deposits made by University departments; invests surplus working capital; makes loans; and arranges external financing for major capital projects. It is used to manage, control, and execute all University financial transactions, except for those related to investment activities conducted by HMC.

9. SPLIT INTEREST AGREEMENTS

Under split interest agreements, donors enter into trust or other arrangements with the University in which the University receives benefits that are shared with other beneficiaries and institutions. Split interest agreement (SIA) investment assets are invested primarily in the GIA and publicly-traded securities, a small segment is managed by an external advisor, and all are recorded in the “Investment portfolio, at fair value” in the University’s *Balance Sheets*. Additional disclosures are included in *Note 3*. Associated liabilities are recorded at the present value of estimated future payments due to beneficiaries and other institutions.

These liabilities are calculated using the University’s current taxable unsecured borrowing rate of 2.1% and 3.1% as of June 30, 2019 and 2018, respectively. All split interest agreement net assets and the respective activity are reported within net assets with donor restrictions. Upon termination of a split interest agreement, the net assets are transferred to the GOA or endowment accordingly.

The changes in split interest agreement net assets for fiscal years 2019 and 2018 were as follows (in thousands of dollars):

	2019	2018
Investment return:		
Investment income	\$ 13,807	\$ 11,365
Realized and change in unrealized appreciation, net	45,694	72,780
Total investment return	59,501	84,145
Gifts (<i>Note 14</i>)*	8,437	12,166
Payments to annuitants	(65,770)	(65,728)
Transfers to endowment	(15,213)	(25,707)
Transfers between SIA and the GOA	(13,886)	(12,661)
Change in liabilities and other adjustments	41,149	33,054
NET CHANGE DURING THE YEAR	14,218	25,269
Total split interest agreement net assets, beginning of year	559,151	533,882
TOTAL SPLIT INTEREST AGREEMENT NET ASSETS, END OF YEAR	\$ 573,369	\$ 559,151

* Shown at net present value. The undiscounted value of these gifts was \$18,508 and \$29,287 for the years ended June 30, 2019 and 2018, respectively.

Split interest agreement net assets as of June 30, 2019 and 2018 consisted of the following (in thousands of dollars):

	2019	2018
Split interest agreement investments (<i>Note 3</i>)		
Charitable remainder trusts	\$ 930,742	\$ 924,576
Charitable lead trusts	125,040	125,341
Charitable gift annuities	249,917	250,473
Pooled income funds	127,414	121,174
Total split interest agreement investments ¹	1,433,113	1,421,564
Liabilities due under split interest agreements:		
Amounts due to beneficiaries	(792,558)	(801,355)
Amounts due to other institutions	(67,186)	(61,058)
Total liabilities due under split interest agreements	(859,744)	(862,413)
TOTAL SPLIT INTEREST AGREEMENT NET ASSETS, END OF YEAR	\$ 573,369	\$ 559,151

¹ For the year ended June 30, 2019, \$780,737 of SIA investments are held in the pooled general investment account and \$652,376 of SIA investments are held in the other investments outside the general investment account. For the year ended June 30, 2018, \$820,725 of SIA investments are held in the pooled general investment account and \$600,839 of SIA investments are held in the other investments outside the general investment account. Refer to Note 3.

10. BONDS AND NOTES PAYABLE

Bonds and notes payable as of June 30, 2019 and 2018 were as follows (in thousands of dollars):

	Fiscal year of issue	Years to final maturity ¹	One-year yield ²	Outstanding principal	
				2019 ³	2018 ³
TAX-EXEMPT BONDS AND NOTES PAYABLE:					
Variable-rate demand bonds and commercial paper:					
Series R – daily	2000-2006	13	1.3%	\$ 131,200	\$ 131,200
Series Y – weekly	2000	16	1.5%	117,905	117,905
Commercial paper	2019	< 1	1.8%	350,000	0
Total variable-rate bonds and notes payable			1.6%	599,105	249,105
Fixed-rate bonds:					
Series N (par value, \$80,000)	1992	1	6.3%	79,916	79,815
Series 2009A (par value, \$0)	2009	0	4.8%	0	22,692
Series 2010A (par value, \$49,590)	2010	2	4.7%	51,407	52,134
Series 2010B (par value, \$110,235)	2011	5	4.8%	113,844	115,891
Series 2016A (par value, \$1,539,720)	2017	21	3.9%	1,860,731	1,886,801
Total fixed-rate bonds			4.1%	2,105,898	2,157,333
TOTAL TAX-EXEMPT BONDS AND NOTES PAYABLE			3.6%	2,705,003	2,406,438
TAXABLE BONDS AND NOTES PAYABLE:					
Variable-rate bonds and notes payable:					
Commercial paper	2012	0	2.4%	0	262,798
Total variable-rate bonds and notes payable			2.4%	0	262,798
Fixed-rate bonds:					
Series 2008A (par value, \$243,000)	2008	19	5.6%	242,881	242,875
Series 2008C (par value, \$0)	2008	0	5.3%	0	125,205
Series 2008D (par value, \$500,000)	2009	20	6.5%	498,812	498,751
Series 2010C (par value, \$300,000)	2011	21	4.9%	298,573	298,506
Series 2013A (par value, \$402,000)	2013	18	3.4%	402,000	402,000
Series 2016B (par value, \$1,000,000)	2017	37	3.3%	995,765	995,643
Total fixed-rate bonds			4.4%	2,438,031	2,562,980
TOTAL TAXABLE BONDS AND NOTES PAYABLE			4.3%	2,438,031	2,825,778
Other notes payable	Various	Various	Various	87,405	87,057
Unamortized bond issuance costs				(17,090)	(18,352)
TOTAL BONDS AND NOTES PAYABLE			4.0%	\$ 5,213,349	\$ 5,300,921

¹ The weighted average maturity of the portfolio on June 30, 2019 was 17.5 years.

² Exclusive of interest rate exchange agreement. Inclusive of this agreement, the overall portfolio rate was 0.05% higher (4.06% vs. 4.01%).

³ Balances include original issuance premiums/discounts.

Interest expense related to bonds and notes payable was \$183.7 million and \$187.5 million for fiscal 2019 and 2018, respectively. The interest expense in the *Statement of Changes in Net Assets with General Operating Account Detail* includes additional components related to capital leases. Excluding maturity of commercial paper and unamortized discounts and premiums, unamortized underwriter's discount and unamortized cost of issuance, scheduled principal payments are (in thousands of dollars):

Fiscal year	Principal payments
2020	\$ 467,999
2021	88,186
2022	109,619
2023	54,891
2024	101,853
Thereafter	4,088,507
TOTAL PRINCIPAL PAYMENTS	\$ 4,911,055

The University is rated Aaa by Moody's Investors Service and AAA by Standard & Poor's Global Ratings. The Standard & Poor's rating was re-affirmed in December 2018 and the Moody's Investors Service rating was re-affirmed in January 2019.

The University has one unsecured, revolving credit facility totaling \$1.5 billion, which expires in March 2022. There was no outstanding drawn balance on the credit facility at June 30, 2019.

The University has taxable commercial paper line available totalling \$2 billion. There was no outstanding drawn balance on the taxable commercial paper line at June 30, 2019.

As of June 30, 2019, the University had \$249.1 million of variable-rate demand bonds outstanding (excluding commercial paper) with either a daily or weekly interest

rate reset, as noted in the bonds and notes payable table. In the event that the University receives notice of any optional tender on its variable-rate demand bonds, or if the bonds become subject to mandatory tender, the purchase price of the bonds will be paid from the remarketing of such bonds. However, if the remarketing proceeds are insufficient, the University will have a general obligation to purchase the bonds tendered with cash on hand.

Interest rate exchange agreements

In fiscal 2019, the University had in place one interest rate exchange agreement, used to manage the interest cost and risk associated with a portion of its outstanding debt.

The fair value of the interest rate exchange agreement was \$(27.4) million and \$(15.5) million as of June 30, 2019 and 2018, respectively and is recorded in "Other liabilities associated with the investment portfolio" on the University's *Balance Sheets*.

11. EMPLOYEE BENEFITS

The University offers current employees a choice of health plans, a dental plan, short-term and long-term disability plans, life insurance, tuition assistance, and a variety of other benefits such as subsidized passes for public transportation and for Harvard athletic facilities. In addition, the University has retirement plans covering substantially all employees.

The University uses a measurement date of June 30 for its pension and postretirement health plans.

457(b) deferred compensation plan

The University offers a non-qualified deferred compensation plan under Internal Revenue Code 457(b) to a select group of employees. There is no University contribution related to the plan. The University has recorded both an asset and a liability related to the plan of \$151.2 million as of June 30, 2019; the assets are included in "Prepayments and deferred charges" and the liabilities are included in "Deferred revenue and other liabilities" on the University's *Balance Sheets*.

Pension benefits

All eligible faculty members and staff are covered by retirement programs that include a defined benefit component, a defined contribution component, or a combination of the two.

In accordance with the Employee Retirement Income Security Act (ERISA) requirements, the University has established a trust to hold plan assets for its defined benefit pension plans. The fair value of the trust's assets was \$863.5 million and \$828.1 million as of June 30, 2019 and 2018, respectively. During fiscal years 2019 and 2018, the University made cash contributions to the defined benefit pension plan of \$14.9 million and \$15.5 million, respectively. The University recorded expenses for its defined contribution plans of \$148.5 million and \$141.5 million for fiscal year 2019 and 2018, respectively.

Postretirement health benefits

The University provides postretirement health coverage and life insurance to substantially all of its employees. As of June 30, 2019, the University had internally designated and invested \$727.9 million in the GIA to fund the postretirement health benefit accrued liability of \$854.6 million. As of June 30, 2018, the University had internally designated and invested \$692.2 million to fund the postretirement health benefit accrued liability of \$806.7 million.

The following table sets forth the pension and postretirement plans' funded status that is reported in the *Balance Sheets* as of June 30, 2019 and 2018 (in thousands of dollars):

	Pension benefits		Postretirement health benefits	
	2019	2018	2019	2018
Change in projected benefit obligation:				
Projected benefit obligation, beginning of year	\$ 1,004,962	\$ 1,075,728	\$ 806,714	\$ 853,003
Service cost	9,675	11,233	30,474	34,645
Interest cost	42,455	42,418	34,719	35,522
Plan participants contributions			3,761	3,377
Plan change			71	(193)
Gross benefits paid	(51,817)	(44,157)	(28,509)	(23,555)
Actuarial (gain)/loss	124,122	(80,260)	7,409	(96,085)
PROJECTED BENEFIT OBLIGATION, END OF YEAR¹	1,129,397	1,004,962	854,639	806,714
Change in plan assets:				
Fair value of plan assets, beginning of year	828,124	836,456		
Actual return on plan assets	72,320	20,302		
Employer contributions	14,865	15,523		
Gross benefits paid	(51,817)	(44,157)		
FAIR VALUE OF PLAN ASSETS, END OF YEAR	863,492	828,124	0	0
ACCRUED RETIREMENT OBLIGATIONS/UNFUNDED STATUS²	\$ (265,905)	\$ (176,838)	\$ (854,639)	\$ (806,714)

¹ Measurement of the University's pension benefit obligation including assumed salary increases (required by GAAP).

² These amounts totaling \$1,120,544 as of June 30, 2019 and \$983,552 as of June 30, 2018 are included in the "Accrued Retirement Obligations" line in the Balance Sheets.

The accumulated pension benefit obligation (ABO) is a measurement of the University's pension benefit obligation, based on past and present compensation levels and does not include assumed salary increases. The ABO was \$968.9 million and \$860.8 million at June 30, 2019 and 2018, respectively. The funded status disclosed above has been prepared in accordance with pension accounting rules. When measured on an IRS funding basis, which informs the University's required cash contribution amount, the plan was overfunded at January 1, 2019.

Net periodic benefit cost

Components of net periodic benefit cost recognized in operating activity and other amounts recognized in non-operating activity in net assets without donor restrictions in the *Statements of Changes in Net Assets with General Operating Account Detail* are summarized as follows for the years ended June 30, 2019 and 2018 (in thousands of dollars):

	Pension benefits		Postretirement health benefits	
	2019	2018	2019	2018
Components of net periodic benefit cost:				
Service cost	\$ 9,675	\$ 11,233	\$ 30,474	\$ 34,645
Interest cost	42,455	42,418	34,719	35,522
Expected return on plan assets	(50,469)	(50,426)		
Amortization of:				
Actuarial loss/(gain)	3,320	10,088	(13,469)	(6,564)
Prior service cost/(credit)	288	288	(7,132)	(7,116)
Total net periodic benefit cost recognized in operating activity	5,269	13,601	44,592	56,487
Other amounts recognized in non-operating activity in net assets without donor restrictions:				
Current year net actuarial loss/(gain)	102,271	(50,136)	7,409	(96,085)
Current year net prior service cost			71	(193)
Amortization of:				
Prior service (cost)/credit	(288)	(288)	7,132	7,116
Actuarial (loss)/gain	(3,320)	(10,088)	13,469	6,564
Total other amounts recognized in non-operating activity ¹	98,663	(60,512)	28,081	(82,598)
TOTAL RECOGNIZED IN STATEMENTS OF CHANGES IN NET ASSETS WITH GENERAL OPERATING ACCOUNT DETAIL	\$ 103,932	\$ (46,911)	\$ 72,673	\$ (26,111)

¹ These amounts totaling \$126,744 in fiscal year 2019 and \$(143,110) in fiscal year 2018 include gains and losses and other changes in the actuarially determined benefit obligations arising in the current period but that have not yet been reflected within net periodic benefit cost/(income) and are included in the "Change in Retirement Obligations" line in the Statements of Changes in Net Assets with General Operating Account Detail.

Cumulative amounts recognized as non-operating changes in net assets without donor restrictions are summarized as follows for the years ended June 30, 2019 and 2018 (in thousands of dollars):

	Pension benefits		Postretirement health benefits	
	2019	2018	2019	2018
Net actuarial loss/(gain)	\$ 196,647	\$ 97,697	\$ (245,254)	\$ (266,133)
Prior service cost/(credit)	1,181	1,469	(46,386)	(53,589)
CUMULATIVE AMOUNTS RECOGNIZED IN NET ASSETS WITHOUT DONOR RESTRICTIONS	\$ 197,828	\$ 99,166	\$ (291,640)	\$ (319,722)

The estimated net actuarial loss and prior service cost for the defined benefit plan that will be amortized from net assets without donor restrictions into net periodic benefit (income)/cost in fiscal year 2020 are \$15.7 million and \$0.3 million, respectively. The estimated net actuarial gain and estimated prior service credit for the postretirement health benefit that will be amortized from net assets without donor restrictions into net periodic benefit

(income)/cost in fiscal year 2020 are (\$11.2) million and (\$7.1) million, respectively.

Other assumptions and health care cost trend rates used in determining the year end obligation as well as the net periodic benefit (income)/cost of the pension and postretirement health plans are summarized as follows for fiscal years 2019 and 2018:

	Pension benefits		Postretirement health benefits	
	2019	2018	2019	2018
Weighted-average assumptions used to determine benefit obligation as of June 30:				
Discount rate	3.65%	4.30%	3.60%	4.20%
Compensation increase trend:				
Initial rate	3.50%	3.00%	3.50%	3.00%
Ultimate rate	N/A	4.00%	4.00%	4.00%
Year of ultimate	N/A	2021	2021	2021
Health care cost trend rate:				
Initial rate	N/A	N/A	5.00%	5.00%
Ultimate rate	N/A	N/A	4.75%	4.75%
Year of ultimate	N/A	N/A	2023	2023
Weighted-average assumptions used to determine net periodic benefit (income)/cost:				
Discount rate	4.30%	4.00%	4.20%	4.05%
Expected long-term rate of return on plan assets	6.50%	6.50%	N/A	N/A
Compensation increase trend:				
Initial rate	3.00%	3.00%	3.00%	3.00%
Ultimate rate	4.00%	4.00%	4.00%	4.00%
Year of ultimate	2021	2021	2021	2021
Health care cost trend rate:				
Initial rate	N/A	N/A	5.00%	5.50%
Ultimate rate	N/A	N/A	4.75%	4.75%
Year of ultimate	N/A	N/A	2023	2023

As an indicator of sensitivity, a one percentage point change in assumed health care cost trend rate would affect 2019 as shown in the following table (in thousands of dollars):

	1% point increase	1% point decrease
Effect on 2019 postretirement health benefits service and interest cost	\$ 17,277	\$ (11,152)
Effect on postretirement health benefits obligation as of June 30, 2019	189,576	(133,497)

The expected return on pension plan assets is determined by utilizing an independent advisor's capital markets model, which takes into account the expected real return, before inflation, for each of the pension portfolio's asset classes, as well as the correlation of any one asset class to every other asset class. This model calculates the real returns and correlations and derives an expected real return for the entire portfolio, given the percentage weighting allocated to each asset class. After calculating the expected real return, an assessment is made to accommodate the expected

inflation rate for the forthcoming period. The final expected return on assets is the aggregate of the expected real return plus the expected inflation rate.

Plan assets

The actual asset allocation of the investment portfolio for the pension plan at June 30, 2019 and 2018, along with target allocations for June 30, 2020, is as follows:

	2020 Target	June 30, 2019	June 30, 2018
Asset allocation by category for pension plan:			
Equity securities	30-55%	38.7%	38.8%
Fixed income securities	30-50	47.1	48.9
Hedge funds	10-30	12.5	10.9
Cash	0-5	1.7	1.4
TOTAL OF ASSET ALLOCATION CATEGORIES		100.0%	100.0%

The University's investment strategy for the pension portfolio is to manage the assets across a broad and diversified range of investment categories, both domestic and international. The objective is to achieve a risk-adjusted return that is in line with the long-term obligations that the University has to the pension plan beneficiaries. During fiscal year 2018, the University maintained its allocation to fixed income securities to manage the interest rate volatility associated with its pension obligations. The University

expects to continue this strategy in future years. The investment program is also managed to comply with all ERISA regulations.

The following is a summary of the levels within the fair value hierarchy for the pension plan assets subject to fair value measurement as of June 30, 2019 and 2018 (in thousands of dollars):

	2019				2018	
	Level 1	Level 2	Level 3	NAV as practical expedient	Total	Total
PLAN ASSETS:						
Cash and short-term investments	\$ 26,135				\$ 26,135	\$ 21,951
Domestic equity				\$ 163,500	163,500	145,989
Foreign equity	73,246			34,311	107,557	107,101
Domestic fixed income	88,869	\$ 279,469			368,338	358,626
Foreign fixed income		22,555			22,555	21,110
Emerging market equity and debt	32,388	2,561		26,836	61,785	70,190
Hedge funds				108,398	108,398	89,505
Due from brokers	4				4	330
Buy-sell backs		33,343			33,343	25,962
Private equity				4,234	4,234	8,994
Real estate				27	27	34
PLAN ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 220,642	\$ 337,928	\$ 0	\$ 337,306	\$ 895,876	\$ 849,792
Other assets not subject to fair value					1,086	3,007
TOTAL PLAN ASSETS					\$ 896,962	\$ 852,799
PLAN LIABILITIES:						
Due to brokers	\$ 49				\$ 49	\$ 22
Forward sale commitment		\$ 19,806			19,806	20,022
PLAN LIABILITIES SUBJECT TO FAIR VALUE LEVELING	\$ 49	\$ 19,806			\$ 19,855	\$ 20,044
Other liabilities not subject to fair value					13,614	4,631
TOTAL PLAN LIABILITIES					\$ 33,469	\$ 24,675

The following is a rollforward of Level 3 investments for the year ended June 30, 2018 (in thousands of dollars):

	Beginning balance as of July 1, 2017	Net realized gains/ (losses)	Net change in unrealized appreciation (depreciation)	Purchases/ contributions	Sales/ distributions	Transfers into Level 3	Transfers out of Level 3	Ending balance as of June 30, 2018
PRIOR YEAR NET ASSETS SUBJECT TO FAIR VALUE LEVELING	\$ 23,709	\$ (27,161)	\$ 21,137	\$ 7	\$ (17,692)	\$ 0	\$ 0	\$ 0

Expected future benefit payments

Employer contributions of \$52.0 million are expected for fiscal year 2020 to fund the pension benefit plan.

The following table summarizes expected benefit payments and subsidies for pension and other postretirement benefits for the University (in thousands of dollars):

Fiscal year	Expected benefit payments	
	Pension	Postretirement health
2020	\$ 57,123	\$ 21,622
2021	58,351	23,601
2022	60,714	25,334
2023	63,019	27,253
2024	65,111	29,264
Thereafter	350,724	178,749

12. STUDENT FINANCIAL AID

Financial aid granted to students in fiscal 2019 and 2018 is summarized as follows (in thousands of dollars):

	2019	2018
Scholarships and other student awards:		
Scholarships applied to student income ¹	\$ 457,369	\$ 439,445
Scholarships and other student awards paid directly to students	155,874	152,421
Total scholarships and other student awards	613,243	591,866
Student employment	81,287	76,133
Student loans	14,639	15,943
Agency financial aid ²	20,326	19,564
TOTAL STUDENT FINANCIAL AID	\$ 729,495	\$ 703,506

¹ Includes \$192,712 of undergraduate scholarships applied to student income.

² Represents aid from sponsors for which the University acts as an agent for the recipient.

13. SPONSORED SUPPORT

Total expenditures funded by US government sponsors or by institutions that subcontract federally-sponsored projects to the University were \$630.8 million and \$625.3 million in fiscal year 2019 and 2018, respectively. The University's principal source of federally-sponsored funds is the Department of Health and Human Services. The University also has many non-federal sources of sponsored awards and grants, including corporations, foundations, state and local governments, foreign governments, and research institutes.

Sponsored grants and contracts normally provide for the recovery of direct and indirect costs. Recovery of related indirect costs is generally recorded at fixed or predetermined rates negotiated with the federal government and other sponsors. Predetermined federal indirect cost rates have been established for the University Area and the Medical School (including the School of Dental Medicine) through fiscal year 2019 and for T.H. Chan School of Public Health through fiscal year 2023. Funds received for federally-sponsored activity are subject to audit.

14. GIFTS

Gifts are classified as net assets with or without restrictions in accordance with donor specifications.

Additionally gifts are categorized by purpose as “Current use”, “Non-federal sponsored grants”, “Endowment funds”, “Split interest agreements”, or “Loan funds and facilities”.

Gifts received for the year ended June 30, 2019 are summarized as follows (in thousands of dollars):

	2019		Total
	Gifts received	Donor redesignations/ other changes	
Current use	\$ 472,432	\$ (319)	\$ 472,113
Non-federal sponsored grants	197,236	(778)	196,458
Endowment funds ¹	614,561	(1,274)	613,287
Split interest agreements ²	8,437		8,437
Loan funds and facilities ¹	85,744	628	86,372
TOTAL GIFTS	\$ 1,378,410	\$ (1,743)	\$ 1,376,667

¹ Gift receipts include non-cash gifts of \$2.5 million for the year ended June 30, 2019.

² Shown at net present value. The undiscounted value of these gifts was \$18,508 for the year ended June 30, 2019.

Gifts received for the year ended June 30, 2018 are summarized as follows (in thousands of dollars):

	2018		Total
	Gifts received	Donor redesignations/ other changes	
Current use	\$ 466,991	\$ (445)	\$ 466,546
Non-federal sponsored grants	183,331	(2,258)	181,073
Endowment funds ¹	646,340	(41)	646,299
Split interest agreements ²	12,166		12,166
Loan funds and facilities	109,410	(183)	109,227
TOTAL GIFTS	\$ 1,418,238	\$ (2,927)	\$ 1,415,311

¹ Gift receipts include non-cash gifts of \$10 million for the year ended June 30, 2018.

² Shown at net present value. The undiscounted value of these gifts was \$29,287 for the year ended June 30, 2018.

15. OTHER REVENUE

The major components of other revenue for the years ended June 30, 2019 and 2018 were as follows (in thousands of dollars):

	2019	2018
Publications and royalties from copyrights	\$ 238,385	\$ 226,757
Rental and parking ¹	141,375	135,529
Services income	136,288	120,309
Royalties from the commercialization of intellectual property ²	97,568	54,573
Health and clinic fees	64,780	61,211
Sales income	29,888	29,665
Interest income	10,961	10,699
Other student income	5,112	5,421
Other	47,681	44,560
TOTAL OTHER REVENUE	\$ 772,038	\$ 688,724

¹ The University is the lessor of space and facilities under operating leases, the income from which is included in rental and parking.

² Excludes distributions to external parties.

16. OTHER EXPENSES

The major components of other expenses for the years ended June 30, 2019 and 2018 were as follows (in thousands of dollars):

	2019	2018
Subcontract expenses under sponsored projects	\$ 158,543	\$ 165,445
Travel	103,697	99,555
Publishing	46,951	46,223
Taxes and Fees	43,199	35,278
Advertising	38,568	36,113
Insurance	18,617	17,182
Postage	17,398	18,073
Telephone	14,663	14,398
Other	116,165	79,511
TOTAL OTHER EXPENSES	\$ 557,801	\$ 511,778

17. FUNCTIONAL AND NATURAL CLASSIFICATION OF OPERATING EXPENSES

Operating expenses are allocated functionally on a direct basis. Operations and maintenance expenses are allocated based on square footage.

Operating expenses by functional and natural classification for the years ended June 30, 2019 and 2018 were as follows (in thousands of dollars):

	2019				Total
	Instruction and academic support	Research ¹	Student services and scholarships	Institutional support and auxiliary services	
Salaries and wages	\$ 1,043,852	\$ 294,285	\$ 141,588	\$ 558,753	\$ 2,038,478
Employee benefits	273,353	74,868	50,451	166,833	565,505
Services purchased	363,109	85,599	60,311	171,672	680,691
Space and occupancy	113,374	59,349	30,083	176,484	379,290
Depreciation	43,817	119,333	19,985	199,640	382,775
Supplies and equipment	84,587	57,428	43,222	85,386	270,623
Interest	15,201	33,081	11,890	121,461	181,633
Scholarships and other student awards			155,874		155,874
Other expenses	36,229	414,717	35,030	71,825	557,801
TOTAL EXPENSES	\$ 1,973,522	\$ 1,138,660	\$ 548,434	\$ 1,552,054	\$ 5,212,670

¹ The methodology used to allocate expenses for financial statement purposes is different than methodologies used for other purposes, such as governmental surveys.

	2018				Total
	Instruction and academic support	Research ¹	Student services and scholarships	Institutional support and auxiliary services	
Salaries and wages	\$ 994,293	\$ 279,236	\$ 136,716	\$ 533,591	\$ 1,943,836
Employee benefits	273,849	74,813	49,759	170,802	569,223
Services purchased	331,480	82,977	56,394	146,359	617,210
Space and occupancy	117,482	67,185	30,587	195,187	410,441
Depreciation	36,376	115,941	22,169	183,479	357,965
Supplies and equipment	91,447	55,027	42,160	79,566	268,200
Interest	15,417	36,838	11,634	123,994	187,883
Scholarships and other student awards			152,421		152,421
Other expenses	34,045	397,744	33,980	46,009	511,778
TOTAL EXPENSES	\$ 1,894,389	\$ 1,109,761	\$ 535,820	\$ 1,478,987	\$ 5,018,957

¹ The methodology used to allocate expenses for financial statement purposes is different than methodologies used for other purposes, such as governmental surveys.

18. COMMITMENTS AND CONTINGENCIES

Lease commitments

The University is the lessee of equipment and space under operating (rental) and capital leases. Rent expense related to leases was \$105.4 million and \$86.0 million in fiscal year 2019 and 2018, respectively.

Future minimum lease payments under these operating and capital leases (in thousands of dollars):

	Operating	Capital
2020	\$ 79,551	\$ 11,664
2021	73,511	10,943
2022	68,031	11,215
2023	63,325	11,276
2024	52,038	11,406
Thereafter	289,570	151,240
TOTAL FUTURE MINIMUM PAYMENTS	\$ 626,026	\$ 207,744

Fixed asset-related commitments

The University has various commitments for capital projects involving construction and renovation of certain facilities, real estate acquisitions, and equipment purchases, for which the outstanding commitments as of June 30, 2019 totaled approximately \$367.3 million.

Environmental remediation

The University is subject to laws and regulations concerning environmental remediation and has established reserves for potential obligations that management considers to be probable and for which reasonable estimates can be made. These estimates may change substantially depending on new information regarding the nature and extent of contamination, appropriate remediation technologies, and regulatory approvals. Costs of future environmental remediation have been discounted to their net present value. Management is not aware of any existing conditions that it believes are likely to have a material adverse effect on the University's financial position, changes in net assets, or cash flows.

Utilities purchase commitments

The University has entered into Power Purchase Agreements (PPAs) with a series of utilities providers to purchase natural gas and electricity for various quantities and time periods. As of June 30, 2019, future obligations under the PPAs are as follows (in thousands of dollars):

2020	\$ 18,836
2021	12,439
2022	10,433
2023	9,552
2024	8,569
Thereafter	12,105
TOTAL UTILITY FUTURE PURCHASE OBLIGATIONS	\$ 71,934

General

The University is a defendant in various legal actions arising from the normal course of its operations. While it is not possible to predict accurately or determine the eventual outcome of such actions, management believes that the outcome of these proceedings will not have a material adverse effect on the University's financial position, changes in net assets, or cash flows.

The University has evaluated subsequent events through October 24, 2019, the date the financial statements were issued. The University has concluded that no material events have occurred that are not accounted for in the accompanying financial statements or disclosed in the accompanying notes.

Schedule of Expenditures of Federal Awards

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Research and Development Cluster (R & D)					
Direct Awards					
Department of Agriculture					
Synergistic impacts of pesticide exposure and temperature stress in bumblebees	10.310	2019-67012-29666		\$ 9,708	\$ -
Total for CFDA 10.310				<u>9,708</u>	<u>-</u>
Transects across New England landscapes: Investigating historical disturbances, vegetation dynamics, and functional changes in forest ecosystems	10.RD	17-JV-11242306-038		41,068	-
Total for CFDA 10.RD				<u>41,068</u>	<u>-</u>
Total for Department of Agriculture Direct Awards R&D				<u>50,776</u>	<u>-</u>
Department of Commerce					
Mapping Regional Innovation Clusters	11.303	99-07-13869-03		(40,214)	(40,214)
Total for CFDA 11.303				<u>(40,214)</u>	<u>(40,214)</u>
CO2 Urban Synthesis and Analysis (CO2-USA) Network	11.431	NA17OAR4310086		76,799	-
Maritime Continent as a barrier to the MJO propagation: an analysis of the sensitivity of convection to column moisture	11.431	NA17OAR4310260		40,086	-
Total for CFDA 11.431				<u>116,885</u>	<u>-</u>
Total for Department of Commerce Direct Awards R&D				<u>76,671</u>	<u>(40,214)</u>
Department of Defense					
Adaptive Choice Set Construction for Complex Decision Making	12.300	N00014-19-1-2025		189,153	-
Analysis of high dimensional Gibbs samplers and Bayesian modeling of climate data	12.300	N00014-18-1-2730		120,079	-
Bi-Layer Thermal Barrier Coatings Based on the Yttrium-Tantalate Zirconia System	12.300	N00014-15-1-2715		97,597	-
Bio-Electrical Energy from Seafloor Methane Sources	12.300	N00014-19-1-2244		54,939	-
Biophysiological effect of NIR on cochlear oxidative stress and TTS	12.300	N00014-16-1-2966		922,610	-
Chemistry of Seawater Electrolysis and Byproduct Management for Underwater Breathing	12.300	N00014-19-1-2385		35,657	-
Confirmatory GWAS Analysis of the Samples in the Marine Recruit Archive	12.300	N00014-15-1-2518		152,450	-
Designing a Dynamic Platform that Provides Multiple Defense Mechanisms against Fouling	12.300	N00014-16-1-3169		(53,679)	-
Development Platform for Analysis of NIR-mediated Exosomal Micro Carriers	12.300	N00014-18-1-2849		172,417	-
DNA-based technologies for reading and writing large-scale molecular patterns with nanoscale-precision	12.300	N00014-18-1-2549		250,821	-
Efficient Bayesian Computation for Massive Data Sets - Theory and Methods	12.300	N00014-16-1-2663		10,155	-
Elements of Causal Learning: Basic Concepts, Theory, Methods, Algorithms and Applications	12.300	N00014-17-1-2131		257,522	257,522
Embedded Deep Learning and Advanced Computation	12.300	FA8750-18-1-0112		145,274	-
Equipment for Infrared Optoelectronic Measurement in 2D Materials Nanostructures	12.300	N00014-18-1-2246		406,686	-
Fluidic Powered Soft Fabric-Based Actuators for Wearable Robotic Applications	12.300	N00014-17-1-2121		192,096	-
Genotyping Completion of samples in the Marine Recruit Archive	12.300	N00014-16-1-2866		108,357	-
High-Tc Superconductivity at Oxide-Chalcogenide Interfaces	12.300	N00014-18-1-2691		143,148	-
Many-Body Quantum Dynamics with Microscope Control- A New Research Frontier	12.300	N00014-18-1-2863		461,982	-
Mass Cytometry Platform for Integrated NIHL Research	12.300	N00014-17-1-2823		(50,085)	-
Measuring and understanding information and behavioral patterns for planning and executing non-kinetic course of actions	12.300	N00014-14-1-0485		137,583	-
MicroRNA-mediated genomic stability and NIHL susceptibility	12.300	N00014-17-1-2647		395,189	-
Nanostructured Surfaces for Integrated Optoelectronics, Plasmonics, and Quantum Optics	12.300	N00014-16-1-2825		599,254	-
NIR effect on exosome-mediated inflammation in a cellular model of DCS	12.300	N00014-16-1-2411		26,608	-
Optimization for Intelligent Embedded Devices	12.300	N00244-16-1-0018		(5,503)	-
Oxygen Generation and Extraction from Seawater	12.300	N00014-18-1-2650		142,518	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Porous Metal-Organic Liquids as a New Platform for Investigation Gas-Liquid Interactions	12.300	N00014-19-1-2148		195,724	-
Practical and Scalable Quantum Simulators for Chemistry and Materials	12.300	N00014-16-1-2008		595,337	-
Programmable Architected Materials	12.300	N00014-16-1-2823		461,156	-
Programmable synthesis of DNA nanostructures for spatial and temporal control	12.300	N00014-16-1-2410		332,175	-
Quantum Engineered van der Waals Heterostructures for Topological Electronic Structures toward Novel Device Applications	12.300	N00014-18-1-2877		1,030,566	-
Quantum Opto-Mechanics with Atoms and Nanostructured Diamond: QOMAND	12.300	N00014-15-1-2761		1,106,509	683,682
Quantum Sensing and Metrology: Novel Methods and Applications	12.300	N00014-15-1-2846		746,989	-
Quantum simulation: From spin models to gauge-gravity correspondence	12.300	N00014-18-1-2899		407,534	-
Randomized Dimensionality Reduction Methods for Machine Learning	12.300	N00014-15-1-2388		38,499	-
Real-time Distributed Coordination of Multi-agent Systems under Limited Communication	12.300	N00014-19-1-2217		22,524	-
Reprogrammed Cochlear Resilience to Inflammation and Apoptosis	12.300	N00014-16-1-2744		(126)	-
Seeding cooperation.	12.300	N00014-16-1-2914		180,058	-
Sketching methods for high-dimensional data analysis	12.300	N00014-17-1-2127		287,053	-
SLIPS Mechanisms and Design Principles for Marine Biofouling Prevention	12.300	N00014-17-1-2913		211,269	-
Structured Reinforcement Learning in the Human Brain	12.300	N00014-17-1-2984		158,849	-
Synthetic biodetector of mitothermogenesis in NIH3T3 model system.	12.300	N00014-17-1-2822		43,637	-
Synthetic Bioelectrical Materials for Sensing, Pattern Formation, and Computation	12.300	N00014-18-1-2859		274,646	-
Towards Living Materials using Synthetic Building blocks	12.300	N00014-17-1-3029		677,355	-
TwoRavens: Intuitive Statistical Exploration, Model Extraction, and Curation	12.300	FA8750-17-2-0114		478,326	88,366
Total for CFDA 12.300				12,160,908	1,029,570
Paper diagnostics for food- and waterborne pathogen detection	12.335	W911QY1910001		23,882	-
Total for CFDA 12.335				23,882	-
An evolutionary approach to vulnerability mapping in order identify alternative and synergistic therapeutic strategies for TSC and related diseases	12.420	W81XWH1810659		197,971	-
An Herbal Derivative as the Basis for a New Approach to Treating Post-Traumatic Osteoarthritis	12.420	W81XWH-15-1-0396		144,785	-
An Herbal Derivative as the Basis for a New Approach to Treating Post-Traumatic Osteoarthritis	12.420	W81XWH-15-1-0397		(33,316)	-
Anticoagulant Vascular Shunts for Temporary Arterial Bypass	12.420	W81XWH-17-2-0028		1,178,272	194,532
Chemigenomic Drug Discovery for Tuberculosis	12.420	W81XWH-17-1-0692		2,417,180	1,900,260
Evaluation of a Small-Molecule Inhibitor of DDR2 as a Drug in Treatment of Osteoarthritis	12.420	W81XWH1810097		214,668	-
Identification of Premotor Parkinson disease	12.420	W81XWH-14-1-0131		213,900	115,836
Mapping the routes to tumor cell death in TSC	12.420	W81XWH-18-1-0370		257,177	-
Posttraumatic Stress Disorder and Ovarian Cancer Risk	12.420	W81XWH-17-1-0153		236,375	27,527
Preclinical Evaluation of BCL2/BCLXL Inhibition to Enhance the Efficacy of Antibody-Drug Conjugates (ADCs) for the Treatment of Distinct Breast Cancer Subtypes	12.420	W81XWH-16-1-0340		374,482	-
Theranostic Cellular Backpacks for Precision Imaging and Treatment of Traumatic Brain Injury Sites	12.420	W81XWH1920011		194,244	-
Understanding Microbial Sensing in Inflammatory Bowel Disease Using Click Chemistry	12.420	W81XWH-15-1-0368		83,897	-
Understanding Microbial Sensing in Inflammatory Bowel Disease Using Click chemistry	12.420	W81XWH-15-1-0367		163,422	-
Total for CFDA 12.420				5,643,057	2,238,155
6.2.3 Quantum Computation and Communication	12.431	W911NF-15-1-0256		66,410	-
A Cell-Type Specific Platform for Identifying Toxicity of Proteins and Polypeptides	12.431	W911NF-17-2-0089		735,413	183,090
A Quantum Gas Microscope for Extended Fermi-Hubbard Models	12.431	W911NF1810182		352,061	-
Aggregation in Foreign Policy Decision-Making	12.431	W911NF1920162		29,505	-
An Automated Scientific Discovery Framework (ASDF) for Mechanistic Reasoning Across Complex Data	12.431	W911NF-18-1-0124		920,942	283,911
Continuation Study: A Systems Approach to Understanding Post-Traumatic Stress Disorder	12.431	W911NF-17-2-0086		610,003	94,736

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Design of Cellular Blocks, their Programmatic Assembly into Biological Meshes, and the Synthesis of Tissue-Like Structures	12.431	W911NF-17-2-0079		1,178,445	-
Exploring New Approaches for Coupling Spin Qubits	12.431	W911NF-15-1-0203		95,279	-
Hydrodynamic Electron Transport in 2-Dimensional Materials for Nanoelectronics	12.431	W911NF-17-1-0574		162,935	29,427
Imaging and Control of Biological Transduction using NV-Diamond	12.431	W911NF-15-1-0548		1,025,222	598,034
Integrated Human Organ-on-Chip Microphysiological Systems	12.431	W911NF-12-2-0036		723,572	66,379
Nano- and Bio-Electronics: CMOS-Enabled Massively-Parallel Intracellular Nanowire Array as a New Neuroscience Tool and its Biotic-Abiotic Hybrid Application for Micro-Neuroprosthesis Technology	12.431	W911NF-15-1-0565		64,947	-
Oxidative decomposition of chemical agent simulants using atomically dispersed metal centers on oxides	12.431	W911NF1820143		207,166	-
Quantum Sensing of Quantum Materials	12.431	W911NF-17-1-0023		254,226	-
Rapid Tests for Virus Genes that Suppress the Host Antiviral Defenses	12.431	W911NF-17-2-0092		1,820,704	733,931
Statistical Structural Health Monitoring in the Presence of Environmental Variability and Uncertainty	12.431	W911NF-15-1-0172		1,399	-
Topological Superconductivity using Layered Materials	12.431	W911NF1810316		218,520	38,066
Variable Temperature Cryostat for Quantum Sensing of Materials Using NV Centers in Diamond	12.431	W911NF1810206		(3,105)	-
Total for CFDA 12.431				8,463,644	2,027,574
Instrumentation Proposal—Fabrication of a CMOS Integrated Circuit with Inter-Pixel Communication Networks for Neuroscience Applications of CMOS Nanoelectrode Arrays	12.630	W911NF-17-1-0425		60,000	-
Total for CFDA 12.630				60,000	-
Active Metasurfaces for Advanced Wavefront Engineering and Waveguiding	12.800	FA9550-14-1-0389		1,110,346	696,004
Chiral Nanophotonics	12.800	FA9550-16-1-0156		197,833	-
Cyborgcell: Molecular-Nanoscale Circuits for Active Control of Cells	12.800	FA9550-15-1-0401		99,783	-
Distributed Coordination in Multi-agent Networked Systems Algorithms and Fundamental Limits	12.800	FA9550-18-1-0150		151,240	-
Entangling ultracold molecules	12.800	FA9550-19-1-0089		23,837	-
Equipment to Support Advance Research in Basic Mechanism of Oxidative Stress	12.800	N00014-18-1-2234		197,486	-
Generating Multiple Hypotheses in Non-negative Matrix Factorization and Related Linear Models	12.800	FA9550-17-1-0155		92,652	-
High-Performance Electro-Optic Frequency Combs for High-Precision Measurements	12.800	FA9550-19-1-0310		1,037	-
High-Throughput Experimentally and Computationally Guided Discovery of Next Generation High-Temperature Shape Memory Alloys	12.800	FA9550-16-1-0180		169,733	116,924
Injectable Mesh Nanoelectronics for Brain Mapping and Modulation	12.800	FA9550-18-1-0469		346,129	-
Laser Cooling of Complex Molecules for Quantum Science	12.800	FA9550-19-1-0068		154,782	-
Laser Cooling of Polyatomic Molecules	12.800	FA9550-15-1-0446		154,312	-
Modulating Cellular Performance with Nanoscale Biocircuits	12.800	FA9550-19-1-0246		9,546	-
Nanoelectronics Innervated Cells, Cell Networks and Three-Dimensional Biomaterials	12.800	FA9550-14-1-0136		38,991	-
Optical Magnetic Imaging of Neuronal Currents and Impedance using Quantum Defects in Diamond	12.800	FA9550-17-1-0371		225,223	-
The Production and Study of Antiprotons and Cold Antihydrogen	12.800	FA9550-15-1-0275		114,939	-
Ultracold Molecular Assembly and Quantum Chemistry	12.800	FA9550-15-1-0260		2,043	-
Writing and Securing Peer-to-Peer Computation	12.800	FA9550-16-1-0351		84,965	-
Total for CFDA 12.800				3,174,877	812,928
Active Context	12.910	W911NF-15-1-0544		2,016,882	578,196
DARPA Biological Control: A generalizable approach to engineer ultra-precise cellular control systems with applications to drug resistance	12.910	HR0011-16-2-0049		1,877,908	186,894
Deep Learning Architectures for Robust Classification Under Adversarial Noise	12.910	FA8850-18-1-7811		131,785	-
Design and Engineering of Biostasis Proteins	12.910	W911NF1920017		1,049,079	136,845
Diamond Micro-Combs and Applications	12.910	W31P4Q-15-1-0013		250,859	161,349
Discovery of Tolerance-Mediating Gut Microbial Metabolites	12.910	HR0011-16-2-0013		39,518	-
Engineering Self-Organizing Systems: Theory and Top-down Synthesis Methodology for Resilient Collectives using Kilobot and Molecular Robotics Platforms	12.910	W911NF-17-1-0075		185,776	-

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Executable Knowledge	12.910	W911NF-14-1-0367		80,265	-
High-efficiency aberration corrected large metalenses	12.910	HR00111810001		386,132	-
Identifying pathogenic bacteria by phenotyping	12.910	W911NF-19-2-0018		1,185,242	252,903
Incentive alignment and lifelong learning in stochastic games.	12.910	W911NF1820265		33,539	-
Information Storage and Processing Using Time-Ordered Strings of Molbytes, and Molecular Processes	12.910	W911NF-18-2-0030		517,168	-
Molecular Control and Prevention of Genome Editing	12.910	N66001-17-2-4056		488,461	191,434
Multiplexed Organism-Based Pathogen Detection	12.910	W911NF1920023		346,621	-
Programmatic modelling for reasoning across complex mechanisms	12.910	W911NF-14-1-0397		14,279	14,279
Rapid Tests for signatures of genetic engineering in biological samples	12.910	N660011824505		526,419	-
Surveillance of Passenger Organisms to Record Embarkment	12.910	HR0011-18-2-0014		2,015,747	366,225
Translation and Selection of Functional Sequence-Defined Synthetic Polymers	12.910	N66001-14-2-4053		170,929	997
Ultrahigh-Throughput Virus-Host Cell PicoReactor System for Predictive Modeling of Viral Evolution	12.910	HR0011-11-C-0093		(3,567)	-
Total for CFDA 12.910				11,313,042	1,889,122
An Integrative Exploration of Actuation and Power Systems for Microrobots	12.RD	HR001119C0044		96,894	-
Evaluating the Importance of Precursor Transport and Transformation for Groundwater Contamination with Poly- and Perfluoroalkyl Substances	12.RD	W912HQ19C0002		111,276	-
Reverse Engineering Host Resilience	12.RD	W911NF-16-C-0050		1,909,809	335,466
Time-Tolerant Biostasis Therapeutics	12.RD	W911NF1920027		1,720,746	-
Metabolomic Predictors of MS Outcomes	12.RD	W81XWH1810341		176,244	-
Total for CFDA 12.RD				4,014,969	335,466
Total for Department of Defense Direct Awards R&D				44,854,379	8,332,815
Department of Housing & Urban Development					
Prospective Evaluation of a Comprehensive Smoke-Free Public Housing Policy in a Multi-State Setting	14.902	MAHUU0025-14		141,555	-
Total for CFDA 14.902				141,555	-
Optimizing the Impact of Smoke-Free Residential Policies using an Evidence-Informed Implementation Approach	14.906	MAHUU0041-18		101,160	-
Total for CFDA 14.906				101,160	-
Total for Department of Housing & Urban Development Direct Awards R&D				242,715	-
Department of the Interior					
Digitization of Harvard-Adam Dzierwoński Analog Seismograms from January 1939 for Improved Seismicity Constraints in the Northeastern United States and the World	15.807	G18AP00018		7,748	-
Total for CFDA 15.807				7,748	-
Historic Resource Study: African-American Civil Rights Leaders and the Roosevelts	15.946	P14AC00888		32,201	-
Total for CFDA 15.946				32,201	-
Algorithms for Representation and Inference informed by the Acquisition of Data from Neuroscience Experiments	15.RD	D16PC00002		37,593	37,593
Total for CFDA 15.RD				37,593	37,593
Total for Department of the Interior Direct Awards R&D				77,542	37,593
Department of Justice					
Evaluation of the Peer to Peer (P2P): Challenging Extremism Initiative	16.560	2016-ZA-BX-K001		471,468	98,935
Research Assistantship Program, VAIW	16.560	2015-JJ-CX-0014		18,687	-
Using Public Health Datasets to Analyze Legal Intervention Shootings	16.560	2016-R2-CX-0038		402,172	149,814
Total for CFDA 16.560				892,327	248,749
Total for Department of Justice Direct Awards R&D				892,327	248,749
Department of Labor					
The Real Effects of Electronic Wage Payments: An Experiment with Salaried Factory Workers in Bangladesh	17.791	EO-30274-17-60-5-25		10,678	-
Total for CFDA 17.791				10,678	-
Total for Department of Labor Direct Awards R&D				10,678	-

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Department of Transportation					
Rapid Classification of Hazardous Materials in Transportation	20.RD	DTPH5617C00002		197,151	122,888
Total for CFDA 20.RD				<u>197,151</u>	<u>122,888</u>
Total for Department of Transportation Direct Awards R&D				<u>197,151</u>	<u>122,888</u>
NASA					
A Comprehensive Search for X-ray Emission from the Coolest Magnetically Active Brown Dwarfs	43.001	GO8-19005X		21,637	-
A comprehensive state-of-science GEOS-Chem capability for atmospheric chemistry in the GEOS Earth System Model (ESM) and Data Assimilation System (DAS) at GMAO	43.001	80NSSC17K0134		141,260	-
Advancing Tidal Tomography for Study of Earth's Interior	43.001	NNX17AE42G		150,547	-
Astrophysical Probes of Dark Matter Interactions	43.001	NNX16AI12G		143,696	-
Atmospheric chemistry modeling on cloud computing platforms: development of a new resource for analysis of Earth science data	43.001	80NSSC18K1334		29,533	-
Atmospheric Collapse and Volatile Transport on Rocky M-Star Planets	43.001	NNX16AR86G		208,758	-
Atmospheric Tomography Mission (ATom): Imaging the Chemistry of the Global Atmosphere	43.001	NNX15AJ23G		203,208	-
Aura Science Team activities and GEOS-Chem support	43.001	NNX17AI67G		63,882	-
Caught Red-Handed: A Novel Search for the Culprit Behind Thermal Inversions in Exoplanet Atmospheres	43.001	HST-GO-15109.001-A		13,775	-
Chandra Cycle 17: Rapid Observations of Short-Duration Gamma-Ray Bursts: Accurate Positions Hold the Key to the Progenitor Population	43.001	GO6-17049X		2,322	-
Characterizing Small K2 Planets with the HARPS-N Spectrograph	43.001	80NSSC18K0293		21,780	-
Characterizing Small K2 Planets with the HARPS-N Spectrograph	43.001	NNX17AL48G		56,983	-
Confirming Extreme Lyman Continuum Emission in a z-equals-3.27 Star-Forming Galaxy	43.001	HST-GO-15414.006-A		23,497	-
Constraining the onset of multiple stellar populations in globular clusters	43.001	HST-HF2-51387.001-A		103,909	-
Deep X-ray Follow-up of a TDE Candidate	43.001	DDT-18092X		14,170	-
Determining the explosion mechanism of a superluminous supernova through the deepest ever late-time study	43.001	HST-GO-14743.002-A		11,468	-
Development and deployment of an Autonomous Biogeochemical Instrument for In Situ Studies (the ABISS)	43.001	NNX17AB31G		618,317	166,095
Dynamics and Chemistry of the Summer Stratosphere	43.001	80NSSC19K0326		214,288	-
Evolution of sub-cellular metabolism in photosynthetic eukaryotes: Isotopic investigation of the partitioning of nitrogen between chloroplasts and mitochondria	43.001	NNX16AJ52G		132,186	61,098
Extracting distances from WFIRST/AFTA light curves and spectra	43.001	NNX15AJ55G		68,102	-
Field Measurements of Atmospheric Trace Species: Airborne/Balloon in situ and Ground-Based Remote Sensing of CO2, CH4, CO, N2O, and C2H6	43.001	NNX17AF54G		207,543	-
Fine-Tuned Search for Kilonova Emission in a Short Gamma-Ray Burst: Implications for the Progenitors, Advanced LIGO, and r-Process Nucleosynthesis	43.001	HST-GO-15329.001-A		43,447	-
Following the Kepler Planets with the HARPS-N Spectrograph to Determine the Transition from Rocky to Neptune-like Worlds	43.001	NNX15AC90G		26,632	16,291
Gamma-Ray Bursts: Progenitors to Probes	43.001	NNX15AE50G		119,050	-
Glacial Isostatic Adjustment in the Antarctic in the Presence of Complex Earth Structure: Applications to Space-Geodetic Measurements of Climate Change	43.001	NNX17AE17G		86,380	-
High Resolution Energetic X-ray Imager (HREXI)	43.001	NNX14AD59G		(170)	-
HREXI prototype for 4pixIO	43.001	NNX17AE62G		425,299	17,491
Imaging the transition of SN 1987A to SNR 1987A	43.001	HST-GO-15256.002-A		3,549	-
Improved Understanding of Methane Emissions and Trends in North America and Globally Through a Unified Top-Down and Bottom-Up Approach Exploiting GOSAT and TROPOMI Satellite Data	43.001	80NSSC18K0178		169,335	-
Improving terrestrial biosphere model predictions of coupled carbon, water, and energy fluxes using remotely sensed surface and vegetation temperatures	43.001	NNX16AO21H		42,403	-

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Investigation of Tropospheric Chemistry-Climate Interactions in Hindcasts of the Recent Past	43.001	NNX13AO08G		3,622	-
Isotopic and chemical consequences of different accretion scenarios: Comparing models with observations	43.001	NNX17AE27G		118,630	18,732
Laboratory Kinetics and Spectroscopic Studies of Halogens and Nitrogen Oxides in Support of the NASA Panel for Data Evaluation	43.001	80NSSC18K1063		152,609	-
Management of the GEOS-Chem Chemical Transport Model and Application to Improve Understanding of Tropospheric Ozone	43.001	NNX15AB09G		26,233	-
Mapping the true boundary of dark matter halos with the splashback radius	43.001	HST-HF2-51406.001-A		97,297	-
Merging and Observing Massive Black Hole Binaries: Interactions with a Gas Disk	43.001	PF6-170151		102,589	-
Miniature Light-weight X-ray Optics for Solar System Exploration	43.001	NNX16AL75G		268,167	230,291
Mission Concept Study for HREXI SmallSat Pathfinder (HSP)	43.001	80NSSC19K0143		92,002	-
Multi-Scale Data Assimilation and Model Comparison for ABoVE to Identify Processes Controlling CO2 and CH4 Exchange and Influencing Seasonal Transitions in Arctic Tundra Ecosystems	43.001	NNX17AE75G		279,240	52,789
Multi-Scale Plasma Flows around Black Holes (Harvard node)	43.001	NNX14AB47G		28,978	-
One last peek at SN 2015F	43.001	HST-GO-15415.002-A		25,961	-
Predictive Simulations of Metals Ejected from Galaxies in Galactic Winds	43.001	HST-AR-13909.003-A		28,079	-
Reducing the Effect of Stellar Jitter to Enable RV Measurements of Earth-Like Exoplanets.	43.001	NNX16AD42G		247,152	120,254
Ruprecht 106: Too small to succeed	43.001	HST-GO-14726.004-A		6,486	-
Shocks Across Simulated Cosmological Environments	43.001	80NSSC18K1111		37,466	-
Study of the Madden-Julian Oscillation with isotope-enabled regional and global models	43.001	NNX13AN47G		19,115	19,115
Supernova 1987A at 30 years	43.001	HST-GO-14753.002-A		21,817	-
The Atmospheric Diversity of Mini-Neptunes in Multi-planet Systems	43.001	HST-GO-15333.009-A		14,481	-
The Emergence of Galactic Structure	43.001	HST-HF2-51416.001-A		88,282	-
The Hubble Constant to 1 percent: Physics beyond LambdaCDM	43.001	HST-GO-15145.007-A		20,304	-
The isotopic consequences of microbial sulfur disproportionation	43.001	NNX15AP58G		80,143	-
The KELT-11b Opportunity: Measuring the Atmospheric Water Abundance for a Sub-Saturn-Mass Planet around a Metal-Rich Star	43.001	HST-GO-15255.011-A		14,646	-
Towards a Complete Understanding of Stellar Feedback in Massive Star Formation	43.001	PF7-180166		101,631	-
Transit Search Around 2 White Dwarfs with Infrared Excesses	43.001	80NSSC18K0295		5,716	-
Understand predictability and improve prediction of atmospheric blocking and associated extreme weather	43.001	80NSSC17K0267		143,253	-
Understanding The Atmospheric Methane Budget And Trends Using Satellite Observations In Combination With New Emission Inventories And Biogeochemical Models	43.001	NNX17AK81G		128,599	-
Unique Insights Into Swift GRBs With The VLA and ALMA	43.001	80NSSC17K0298		1,650	-
Using NASA aircraft observations to improve understanding of biogenic VOC chemistry and aerosols over the eastern US, and to increase the value of related satellite observations	43.001	NNX14AP42G		3,430	-
UV spectroscopy of the first ever optical counterpart to a gravitational wave source	43.001	HST-GO-15382.002-A		10,431	-
Watching Supernovae Explode: The K2 Supernova Experiment	43.001	HST-GO-15274.002-A		3,549	-
Total for CFDA 43.001				5,538,344	702,156
Crowd Innovation Laboratory at Harvard University NASA Open Innovation Research	43.003	NNX16AC77A		239,364	-
Total for CFDA 43.003				239,364	-
Nicotinamide dinucleotide (NAD)-boosting as a strategy to mitigate musculoskeletal loss during space exploration	43.007	16-ROSBFP-PD-0004		29,074	-
Physics of Colloids in Space	43.007	80NSSC19K0598		95,910	-
Physics of Colloids in Space	43.007	NNX13AQ48G		31,016	-
Total for CFDA 43.007				156,000	-

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Study of Low-Temperature Shape Memory Alloys Using Combinatorial Nanocalorimetry	43.RD	NNX17ED02P		(732)	-
A Year in the Whirlpool	43.RD	HST-GO-14704.001-A		101,474	-
Atmospheric Escape from the Closest Super-Earth	43.RD	HST-GO-14461.002-A		496	-
Clouds in the Forecast- A Joint Spitzer and HST Investigation of Clouds and Hazes for Two Exo-Neptunes.	43.RD	HST-GO-14843.001-A		14,481	-
Constraining the Late-Time Light Curve Behavior of Three Diverse Superluminous Supernovae	43.RD	HST-GO-15162.002-A		7,798	-
Cycle 22 program: Understanding the Progenitor Systems, Explosion Mechanisms, and Cosmological Utility of Type Ia Supernovae	43.RD	HST-GO-13646.003-A		1,131	-
Cycle 23 Program GO-14216: RAISIN2: Tracers of cosmic expansion with SN IA in the IR	43.RD	HST-GO-14216.001-A		116,783	-
Going gently into the night: constraining Type Ia supernova nucleosynthesis using late-time photometry	43.RD	HST-GO-14611.008-A		68,561	-
Measuring the Star Formation History of the Local Universe	43.RD	HST-AR-14557.001-A		147,840	-
SAINTS: Images of SN 1987A	43.RD	HST-GO-13405.001-A		74,741	-
Ultraviolet Flashers in M87: Rapidly Recurring Novae as SNIa Progenitors	43.RD	HST-GO-14618.007-A		817	-
Total for CFDA 43.RD				533,390	-
Total for NASA Direct Awards R&D				6,467,098	702,156
Institute of Museum and Library Services					
Understanding What Constitutes a Vibrant Open-Source Community	45.312	LG-72-18-0147-18		38,682	-
Total for CFDA 45.312				38,682	-
Total for Institute of Museum and Library Services Direct Awards R&D				38,682	-
National Endowment for the Humanities					
Women's Worlds in Qajar Iran (NEH HCRR)	45.149	PW-234647-16		2,679	-
Women's Worlds in Qajar Iran (NEH HCRR)	45.149	PW-259037-18		110,356	-
Total for CFDA 45.149				113,035	-
The Story of 'Ashley's Sack': A Family Heirloom in the Smithsonian's National Museum of African American History and	45.160	FZ-256478-17		35,651	-
Total for CFDA 45.160				35,651	-
Total for National Endowment for the Humanities Direct Awards R&D				148,686	-
National Science Foundation					
Alan T. Waterman Award	47.041	CMMI-1251729		56	-
CAREER: Data-Driven Operational Decisions with Heterogeneous Demand Structures and High-Dimensional Data	47.041	CMMI-1851780		133,395	-
CAREER: Optimization, Control, and Incentive Design for Power Networks with High Levels of Distributed Energy Resources	47.041	ECCS-1553407		70,025	-
Collaborative Research: A Combustion Powered, Flapping, Wing Micro Air Vehicle	47.041	CMMI-1537715		5,309	-
Collaborative Research: Integrated memristor neural networks for in-situ analysis of intracellular neuronal recordings	47.041	ECCS-1915984		11,099	-
Collaborative Research: Mechanics of fusion of dissimilar lipid bilayers and multi-lamellar vesicles	47.041	CBET-1705775		81,635	-
Collaborative Research: Quantum cascade laser sources of high-power, coherent frequency combs	47.041	ECCS-1614631		37,998	-
Collaborative Research: Quantum cascade laser transceivers for terahertz wireless communication	47.041	ECCS-1807323		104,355	-
Collaborative Research: Towards Communication-Cognizant Voltage Regulation and Energy Management for Power Distribution Systems	47.041	ECCS-1608509		67,757	-
CQIS: Coherent Spin-Phonon Interfaces with Diamond Color Centers	47.041	ECCS-1810233		153,611	-
Data-Driven Management of Post-Transplant Medications	47.041	CMMI-1562645		82,681	1,719
E2CDA: Type II: Collaborative Research: Nanophotonic Lithium Niobate platform for next generation energy efficient and ultrahigh bandwidth optical interconnect	47.041	ECCS-1740296		120,002	-

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EAGER: Deterministic Placement of Qubits in Cavities for Strongly Coupled Quantum Repeaters	47.041	ECCS-1748106		114,330	-
EAGER: Real-Time: Learning, Selection, and Control in Residential Demand Response for Grid Reliability	47.041	ECCS-1839632		2,474	-
EFRI 2-DARE: Quantum Optoelectronics, Magnetoelectronics and Plasmonics in 2-Dimensional Materials Heterostructures	47.041	EFMA-1542807		271,090	-
EFRI C3 SoRo: Textile Robotics: Integrative Design, Modeling, Manufacture, and Control of Soft Human-Interactive Apparel	47.041	EFMA-1830896		169,827	-
EFRI NewLAW: Topological Mechanical Metamaterials Science	47.041	EFMA-1741685		372,072	187,074
FW-HTF: Collaborative Research: The Next Mobile Office: Safe and Productive Work in Automated Vehicles	47.041	CMMI-1839870		1,360	-
GOALI: Stable Nanomechanical Oscillators with Large fQ Product	47.041	ECCS-1507508		(20)	-
I/UCRC: Collaborative Research: Center for Spatiotemporal Thinking Computing and Applications	47.041	CNS-1338914		22,642	-
NNCI: The Center for Nanoscale System (CNS) at Harvard University	47.041	ECCS-1541959		934,719	-
NRI: Achieving selective kinematics and stiffness in flexible robotics	47.041	CMMI-1637838		172,435	-
NRI: FND: COLLAB: A Foundational Approach to Muscle Actuators that Lowers Barriers to Muscle-Powered Robotics Research	47.041	CMMI-1830291		86,245	-
NSF 15-022 Fate of aerosolized Nanoparticles: the influence of surface active substances on lung deposition and respiratory effects (NANOaers)	47.041	1530767		105,597	-
NSF EAGER: High-Throughput Bioprinting of Vascularized Living Tissues	47.041	CMMI-1548261		5,165	-
NSF Nanoscale Science and Engineering (NSE) 2018 Grantees Conference, at Westin Alexandria Hotel, Alexandria, VA, on December 6-7, 2018	47.041	ECCS-1842567		113,012	-
OP Collaborative Research: Taking lithium-niobate to the nanoscale: shaping revolutionary material onto photonic microchips for developing next-generation light sources	47.041	ECCS-1609549		2,949	-
PFI:TT Metabolic Imaging to Measure Oocyte Quality	47.041	IIP-1827309		122,380	-
PFI-TT:Development of an efficient fiber interface for Integrated lithium-niobate Modulators.	47.041	IIP-1827720		169,884	-
RAISE TAQS: Towards a Quantum Cloud	47.041	ECCS-1839197		154,270	-
SUSCHEM: Aqueous organic redox chemistry for renewable energy storage	47.041	CBET-1509041		25,280	-
Thermal Decomposition/incineration of Nano-Enabled Products (NEPs): Environmental Health and Safety Implications	47.041	1436450		(827)	-
Understanding How Motile Cells Make Decisions When Subject to Multiple Chemical and Physical Cues	47.041	CMMI-1536616		23,733	-
Total for CFDA 47.041				3,736,540	188,793
Collaborative Research: Developing rural girls' STEM competency and motivation through communicating scientific topics with advanced technology	47.046	DRL-1657017		46,151	-
Total for CFDA 47.046				46,151	-
Algebraic geometric approaches to biological complexity	47.049	DMS-1462629		332,707	-
Analysis, Geometry and Mathematical Physics	47.049	DMS-1607871		115,475	-
Antihydrogen and Antiproton Studies	47.049	PHY-1310079		11,489	-
Arithmetic Geometry	47.049	DMS-1601054		106,925	-
ATD: Collaborative Research: Spectral Interpretations of Essential Subgraphs for Threat Discoveries	47.049	DMS-1737873		105,963	-
CAREER: Adapting the fluid projection method to model elasto-plastic materials	47.049	DMS-1753203		37,993	-
CAREER: Chemically-Enabled Strategies for the Discovery and Characterization of Novel Enzymatic Function	47.049	CHE-1454007		221,110	-
CAREER: Quantum field theory in diverse dimensions, supersymmetry, and quantum gravity	47.049	PHY-1352084		31,978	-
CAREER: Stochastic effects in the microbial cell cycle: from single-cell level variability to population growth	47.049	PHY-1752024		61,531	-
CASPER2019: Heterogeneous Architectures -- FPGA, GPU, and now System on Chip	47.049	AST-1932156		325	-
CDS and E: Collaborative Research: Computational Design of Topological Superconductors and Weyl - Dirac Semimetals	47.049	DMR-1827925		10,373	-
Center for Integrated Quantum Materials	47.049	DMR-1231319		4,524,417	2,197,000
Charge Tunneling in Organic Matter	47.049	CHE-1506993		21,009	-

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Chiral Molecular Beams, Quantum Tunneling and Improved Microwave Spectroscopy	47.049	CHE-1506868		(382)	-
Collaborative Research: Highly Principled Data Science for Multi-Domain Astronomical Measurements and Analysis	47.049	DMS-1811308		18,322	-
Collaborative Research: Biophysical Analysis of Magnetosome Development in Magnetotactic Bacteria Under Ambient Conditions	47.049	PHY-1504610		159,846	-
Collaborative Research: Combined Theoretical/Experimental approach to understanding irradiation-induced morphology evolution	47.049	DMR-1409700		(37)	-
Collaborative Research: Connecting Atomistic and Continuum Amorphous Solid Mechanics via Non-equilibrium Thermodynamics	47.049	DMR-1409560		(8)	-
Collaborative Research: Development of a Green-Orange Astro-comb for Exoplanet and Cosmology Research	47.049	AST-1006503		(64,183)	-
Collaborative Research: Exploring the physics of galaxy clusters with comprehensive cosmological simulations	47.049	AST-1815978		54,464	-
Collaborative Research: Formation of a High Flux Student Research Network (HF-SRN) as a Laboratory for Enhancing Interaction in the PoLS SRN	47.049	1806818		147,054	-
Collaborative Research: Geometric Analysis for Computer and Social Networks	47.049	DMS-1418252		2,075	-
Collaborative Research: Perception and Use of Infrared Radiation by Insects	47.049	PHY-1411123		1,692	-
Collaborative Research: Theoretical and Methodological Frameworks for Causal Inference of Peer Effects	47.049	DMS-1712714		38,883	-
Collective Ecophysiology and Physics of Social Insects	47.049	PHY-1606895		131,286	-
Colloids as Models for Crystals and Glasses	47.049	1611089		97,617	-
Compact wave function methods for chemical systems	47.049	CHE-1464862		20,734	-
Complex Dynamics and Moduli Spaces	47.049	DMS-1608432		165,860	-
Conference: Current Progress in Mathematical Physics	47.049	DMS-1836744		27,172	-
Current Developments in Mathematics Conference	47.049	DMS-1443462		3,925	-
Current Developments in Mathematics Conference	47.049	DMS-1835084		11,647	-
Designer Soft Microparticles for a Changing Environment	47.049	DMR-1708729		140,260	-
Detecting hydrogen in early universe using the Large Aperture Experiment to Detect the Dark Age (LEDA) telescope	47.049	AST-1616709		76,016	-
Discovering New Physics Beyond the Standard Model with Cosmological Data Sets	47.049	AST-1813694		111,949	-
DMREF: Biologically Inspired Optimized Materials And Technologies Transformed by Evolutionary Rules (BIOMATTER)	47.049	DMR-1533985		285,139	46,523
DMREF: Self Assembly with DNA-Labeled Colloidal Particles and DNA Nanostructures	47.049	DMR-1435964		115,643	30,567
DMREF/Collaborative Research: Graphene Based Origami and Kirigami Metamaterials	47.049	DMR-1435999		48,592	-
EAGER: Building a Network of Quantum Diamond Microscope (QDM) Facilities and Researchers	47.049	PHY-1843727		2,959	-
Emerging Statistical and Quantitative Issues in Genomic Research in Health Sciences	47.049	DMS-1833416		34,155	-
Exploring the Galaxy: 3-Dimensional Structure and Stellar Streams	47.049	AST-1614941		48,186	-
Fiber-laser Astro-comb as a Robust Wavelength Calibrator for Astrophysical Spectrographs	47.049	AST-1310981		(63,489)	-
Fluctuations and Control in Cells	47.049	DMS-1517372		126,903	-
Fractional Quantum Hall Physics with Ultracold Atoms	47.049	PHY-1506203		(1,980)	-
FRG: Collaborative Research: Geometric and Topological Methods for Analyzing Shapes	47.049	DMS-1760471		54,748	-
FRG: Collaborative Research: Stability of Structures Large and Small	47.049	DMS-1564473		41,576	-
Gamma-Ray Bursts: Physics, Progenitors, and Probes	47.049	AST-1714498		154,271	-
Gauge Theory and Spatial Graphs	47.049	DMS-1707924		76,838	-
Hidden Components in Modern Applications	47.049	DMS-1925845		57,102	-
Hydrogen at Ultra-High Pressure	47.049	DMR-1308641		149,476	-
In-sequence coding of stochastic gene expression via synonymous mutations	47.049	PHY-1409321		(810)	-
Induced Topological Superconductivity in Two Dimensional Systems	47.049	DMR-1708688		109,895	-
Institute for Theoretical, Atomic, Molecular and Optical Physics	47.049	PHY-1521560		752,724	354,034

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Interactions of Particles, Fields and Strings	47.049	PHY-1719924		65,861	-
Investigating fundamental chemical and physical processes affecting gas-particle partitioning using levitated droplet-mass spectrometry	47.049	CHE-1808084		107,215	-
Investigating Laser-Activation of Structured Polymer Materials for Drug Delivery	47.049	PHY-1806434		124,740	-
Investigating Tunneling Across Self-Assembled Monolayers Using the Eutectic Gall Junction	47.049	CHE-1808361		168,268	-
Lepton Magnetic Moments and Fine Structure Constant	47.049	PHY-1607565		2,049	-
Local and Global Geometric Langlands Correspondence	47.049	DMS-1707662		122,195	-
Materials Research Science and Engineering Center	47.049	DMR-1420570		2,305,024	-
Mathematical methods to infer mechanisms from single cell data	47.049	DMS-1562497		158,636	-
Mechanistic Studies of the Photoactivation of Metal-Hydride, Halide and Oxo Bonds	47.049	CHE-1464232		166,192	-
Microfluidic Printing of Interspersed and Interpenetrating Multicomponent Ceramic Architectures	47.049	DMR-1305284		(19,397)	-
Microscopy of bosonic fractional quantum Hall states in optical lattices	47.049	PHY-1806604		215,525	-
MINERVA: A dedicated observatory for exoplanet science	47.049	AST-1516242		105,540	-
MINERVA: Purchase of Kiwispec, a robotic precision RV spectrograph	47.049	AST-1608203		60,362	-
MRI: Acquisition of an Aberration Corrected Low Energy Electron Microscope (AC-LEEM) for High Resolution Spectroscopic imaging of surfaces	47.049	DMR-1828237		610,000	-
New Algebraic Structures in Topology	47.049	DMS-1510417		44,844	-
New Directions in Homology of Moduli Spaces	47.049	DMS-1803766		34,719	-
New Frontiers in Homotopy Theory	47.049	DMS-1810917		130,253	-
NSF-BSF:Transport, fluctuation, and Nonequilibrium phase transition in atomically thin crystalline van der Waals superconductors	47.049	DMR-1809188		255,391	49,571
NSF-Simons Research Center for Mathematics of Complex Biological Systems	47.049	DMS-1764269		477,962	-
Number Theory and Geometry	47.049	DMS-1502161		2,432	-
Number Theory and its Interaction with Other Disciplines	47.049	DMS-1802365		44,840	-
Number Theory and Related Fields	47.049	DMS-1302409		7,279	-
Observational Studies of Magnetic Fields in Very Low Mass Stars	47.049	AST-1614770		61,141	-
OP: Quantum Physics with Nanaophotonics Systems	47.049	PHY-1506284		312,924	-
Optimal Shrinkage Estimation for Heteroscedastic Data	47.049	DMS-1510446		30,742	-
Order determination for hidden Markov and related models	47.049	DMS-1810914		90,946	-
Particle Physics in the Era of Data	47.049	PHY-1620806		204,917	-
Physics with New Molecular Systems: Quantum Interactions, Cooling and Applications	47.049	PHY-1505961		18,357	-
Probabilistic Underpinning of Imprecise Probability and Statistical Learning with Low-Resolution Information	47.049	DMS-1812063		36,644	-
Quantitative Analysis of Higher Order Chromatin Interactions	47.049	DMS-1748175		(3,577)	-
Random Matrix Theory and Applications	47.049	DMS-1606305		122,099	-
Rational development of next-generation shape memory alloys	47.049	DMR-1808162		129,028	-
Research and Education in Physical Mathematics	47.049	DMS-1411694		56,925	-
Research and Education in Physical Mathematics	47.049	DMS-1715477		96,716	-
REU Site Team Research in Computational and Applied Mathematics (TRICAM)	47.049	DMS-1460870		21,257	-
REU Site: Biomaterials Research Initiative Dedicated to Gateway Experiences	47.049	DMR-1559890		195,144	-
SAVI: Student Research Network in the Physics of Living Systems (PoLS)	47.049	PHY-1219334		4,711	-
Scanning-releasing the full-sky-century database to DASCH for TDA	47.049	AST-1313370		228,493	-

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Set Theory	47.049	DMS-1460238		(13)	-
Special year workshops on Combinatorics and Complexity	47.049	DMS-1742283		5,854	-
Spectroscopy of Two Dimensional Molecular Carbon	47.049	CHE-1800101		105,597	-
State Space Models: A New Look at Smoothing, Parameter Inference, and Model Choice	47.049	DMS-1712872		57,714	-
Strongly Extended Superradiance in Diamond Meta-Materials	47.049	PHY-1720438		199,161	-
Structural transitions, energetics, and folding pathways of colloidal clusters	47.049	DMR-1306410		(399)	-
Studies of Accretion onto Black Holes	47.049	AST-1816420		43,636	-
Study of Plasmon-Assisted Cell Transfection	47.049	PHY-1205465		546	-
SusChEM: Engineered protein-based biofilms as functional advanced materials	47.049	DMR-1410751		26,081	-
Synthesis of New Precursors for Vapor Deposition	47.049	1764338		60,153	-
Synthesizing and harnessing ultracold single molecules for quantum simulations	47.049	PHY-1806595		249,691	-
The MEarth Project: An All Sky Survey of the Closest Low-mass Stars to Uncover the Very Best Terrestrial Exoplanets for Further Study	47.049	AST-1616624		22,296	7,427
The Ultimate L Project	47.049	DMS-1664764		98,811	-
Theoretical Problems in Soft Matter and Quantitative Biology	47.049	DMR-1608501		39,578	-
Theories of Metals with Correlated Electrons	47.049	DMR-1664842		139,516	-
Three-Dimensional Radiation GRMHD Simulations of Accretion Flows Around Black Holes	47.049	AST-1312651		68,079	-
Topology, Geometry and Physics	47.049	DMR-1708310		93,237	-
Ultracold Triatomic Molecules: Collisions and Cooling	47.049	PHY-1806571		502,690	-
Understanding Supernovae for Cosmology and for Themselves	47.049	AST-1516854		25,434	-
Variable Selection via Inverse Modeling for Detecting Nonlinear Relationships	47.049	DMS-1613035		32,044	-
Total for CFDA 47.049				17,283,518	2,685,122
A Comprehensive Coupled Model for Tropospheric Halogen Chemistry: Evaluation of Impacts on Tropospheric Ozone, Hydroxyl Radical (OH), and Mercury	47.050	AGS-1643217		133,174	-
Applying Statistical State Dynamics to Explain Spontaneous Shear/Buoyancy Layering in Stratified Turbulence	47.050	AGS-1640989		99,765	-
Atmospheric blocking: dynamics and responses to climate change	47.050	AGS-1552385		45,745	34,569
Beyond ocean temperature: Extracting new dimensions of paleoclimatic information from archaeal lipids and their isotopic compositions	47.050	OCE-1702262		93,737	-
Carbon isotope fractionation in Archaea using the 3HP/4HB pathway: Prospects for paleo-geochemistry and paleo-barometry	47.050	OCE-1843285		899	-
CAREER: Dynamics of surface rupturing thrust earthquakes	47.050	EAR-1749556		84,683	-
CAREER: Exploring the Earth with high-resolution paleomagnetism	47.050	EAR-1847042		22,761	-
CAREER: Quantifying the flux and isotope effects associated with sulfur-bearing intermediate species within dissimilatory sulfate reduction	47.050	EAR-1149555		14,225	-
Collaborative Proposal - PREEVENTS Track 2: Cascadia Scenario Earthquakes: Source, Path, and implications for Earthquake Early Warning	47.050	ICER-1663827		77,216	-
Collaborative Research: ICECAP (Ice Age Chemistry and Proxies) Phase 3: Investigating Fire Activity and its Implications for Climate Across Multiple Timescales	47.050	AGS-1702814		233,569	-
COLLABORATIVE RESEARCH: A multidimensional approach to understanding microbial carbon cycling beneath the seafloor during cool hydrothermal circulation	47.050	OCE-1635365		51,241	-

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Collaborative Research: A Teleconnection between the Tropical Madden-Julian Oscillation and Arctic Sudden Stratospheric Warming Events in Warm Climates	47.050	AGS-1826635		27,448	-
Collaborative Research: Constraining West Antarctic Ice Sheet elevation during the last interglacial	47.050	OPP-1744927		15,203	-
Collaborative research: Deep eastern ocean boundary currents from local submesoscale potential vorticity dynamics to global climate implications	47.050	OCE-1535800		9,238	-
Collaborative Research: Development of a novel way for understanding ancient Earth atmospheres and marine sulfate using the stable isotope of Oxygen (17O) in marine barite	47.050	OCE-1821958		51,670	-
Collaborative research: Dynamics of unsaturated downdrafts, cold pools, and their roles in convective initiation and	47.050	AGS-1649819		70,373	-
Collaborative Research: Experimental and theoretical characterization of rapid Jurassic true polar wander	47.050	EAR-1723023		33,405	-
Collaborative Research: Functional evolution of the mammalian backbone; insights from the forerunners of mammals	47.050	EAR-1524523		3,778	-
Collaborative Research: Imaging the Beginning of Time from the South Pole: The next Stage of the BICEP Program	47.050	OPP-1638957		519,034	-
Collaborative Research: Integrating GEOS-Chem atmospheric chemistry into the NCAR Community Earth System Model (CESM)	47.050	1914903		520	-
Collaborative Research: P2C2 - Reconstructing rates and sources of sea-level change over the last ~150 thousand years from a new coral database	47.050	OCE-1702684		38,541	-
Collaborative Research: P2C2: Re-assessing Pliocene and Miocene warm climates and identifying the 'missing physics' to explain them	47.050	OCE-1602864		35,528	-
Collaborative Research: P2C2--Recent Northeastern United States Temperature Records in the Context of the Late Holocene	47.050	AGS-1460795		(1)	-
Collaborative research: Sea level responses to sediment erosion and deposition over the past 3 million years	47.050	EAR-1527351		30,065	-
COLLABORATIVE RESEARCH: Testing proposed rapid true polar wander in the Neoproterozoic Zavkhan Volcanics of Mongolia and the Banxi Group of South China	47.050	EAR-1547537		38,894	-
COLLABORATIVE RESEARCH: The role of iron-oxidizing bacteria in the sedimentary iron cycle: ecological, physiological and biogeochemical implications	47.050	OCE-1459252		15,602	-
Collaborative Research: Understanding Multidecadal Changes in the Instrumental Mean Sea Level Record	47.050	OCE-1558939		44,136	-
Collaborative Research: Unmanned aerial vehicles for emissions and chemistry of volatile organic compounds over the Amazon tropical forest	47.050	AGS-1829025		73,481	-
Collaborative Research: Using a hierarchy of models to constrain the temperature dependence of climate sensitivity	47.050	AGS-1622985		15,215	-
Dynamic Exchange and Reactivity in Secondary Organic Aerosol	47.050	AGS-1640378		184,723	-
EAGER: MethaneAIR	47.050	AGS-1856426		81,148	-
EAGER: Unraveling riverine sulfate using minor oxygen isotopes	47.050	EAR1839341		10,086	-
Elucidating the Mechanics of Tsunami Generating Earthquake Rupture with Long Period Seismology	47.050	OCE-1850831		15,491	-
Evaluating the Impact of Future Volcanic Eruptions on Stratospheric Ozone: Influence of Multicomponent Injection, Climate Change, Latitude, and Seasonality	47.050	AGS-1764171		153,425	-
FESD Type I: VOICE - Volcano, Ocean, Ice, and Carbon Experiments	47.050	AGS-1338832		585,487	385,699
Hydrologic controls on temperature extremes in managed landscapes	47.050	EAR-1521210		62,459	-
Immunotoxicity in Humans with Lifetime Exposure in Ocean Pollutants	47.050	OCE-1321612		134,873	-
INSPIRE Track 1: Microbial Sulfur Metabolism and its Potential for Transforming the Growth of Epitaxial Solar Cell Absorbers	47.050	OCE-1344241		13,435	-
Materials physics of rapidly sheared faults and consequences for earthquake rupture dynamics	47.050	EAR-1315447		135,005	-
Near-Surface Structure of the Continental US Using Distant Earthquakes	47.050	EAR-1735960		28,514	-
OTREC: Convective Heating Profiles and the Transition from Shallow to Deep Convection over the Tropical East Pacific and Southwest Caribbean	47.050	AGS-1759255		10,894	-
Petrogenetic Studies of Young Volcanic Rocks	47.050	OCE-1634421		123,765	-
RAPID: Ozone Loss Over the United States in Summer: Advancing Innovative Climate-Chemistry Research via In Situ Observations of ClO and BrO on Solar Powered Stratospheric Aircraft	47.050	AGS-1754785		141,828	-
The Ninth International GEOS-Chem Meeting (IGC9): Cambridge, Massachusetts; May 6-9, 2019	47.050	AGS-1855750		8,000	-
Thermo-Mechanics and Hydrology of Western Antarctic Ice Stream Margins	47.050	OPP - 1341499		96,566	54,705
Use of Artificial Intelligence towards Automation of Analog Seismogram Digitization	47.050	EAR-1822136		46,127	-
Total for CFDA 47.050				3,710,971	474,973

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AF: Large: Collaborative Research: Algebraic Proof Systems, Convexity, and Algorithms	47.070	CCF-1565264		233,420	-
AF: Medium: Algorithmic Complexity in Computation and Biology	47.070	CCF-1509178		166,383	-
AF: Medium: Algorithmic Crowdsourcing Systems	47.070	CCF-1301976		(37,883)	-
AF: Medium: Collaborative Proposal: Foundations of Adaptive Data Analysis	47.070	CCF-1763665		90,075	-
AF: Medium: Collaborative Research: Exploiting Opportunities in Pseudorandomness	47.070	CCF-1763299		178,544	-
AF: Small: Communication Amid Uncertainty	47.070	CCF-1715187		233,294	-
AF: Small: Data Synchronization : Theory, Algorithms, and Practice	47.070	CCF-1320231		29,393	-
AF: Small: Learning and Optimization with Strategic Data Sources	47.070	CCF-1718549		121,208	-
AF:Small: Foundations for Data-driven Algorithmics	47.070	CCF-1816874		43,878	-
AiF: FULL: Collaborative Research: Better Hashing for Applications: From Nuts and Bolts to Asymptotics	47.070	CCF-1535795		63,056	-
BD Spokes: SPOKE: NORTHEAST: Collaborative Research: Integration of environmental factors and causal reasoning approaches for large-scale observational health research	47.070	IIS-1636870		143,031	-
BIGDATA: F: DKA: Randomized methods for high-dimensional data analysis	47.070	IIS-1447471		24,979	-
BIGDATA: IA: DKA: Collaborative Research: High-Throughput Connectomics	47.070	IIS-1447344		55,628	-
CAREER: A Programmable Measurement Architecture for Network Operations	47.070	CNS-1834263		9,448	-
CAREER: Algorithmic Foundations for Social Data	47.070	CCF-1452961		104,628	-
Career: Evolutionary Data Systems	47.070	IIS-1452595		142,151	-
CAREER: Generative Models for Targeted Domain Interpretability with Applications to Healthcare	47.070	IIS-1750358		73,247	-
CAREER: Information-Theoretic Foundations of Fairness in Machine Learning	47.070	CCF-1845852		24,629	-
CAREER: Sketching Algorithms for Massive Data	47.070	CCF-1350670		144,490	-
CIF: NeTS: Medium: Collaborative Research: Unifying Data Synchronization	47.070	CCF-1563710		71,720	-
CIF: Small: High-Dimensional Analysis of Stochastic Iterative Algorithms for Estimation and Learning	47.070	CCF-1718698		285,859	-
Collaborative Research: Computational Photo-Scatterography: Unraveling Scattered Photons for Bio-imaging	47.070	IIS-1730326		114,398	-
Collaborative Research: Molecular Programming Architectures, Abstractions, Algorithms, and Applications	47.070	CCF-1317291		130,245	45,137
CPS: Synergy: Multi-Robot Cyberphysical System for Assisting Young Developmentally-Delayed Children in Learning to Walk	47.070	CNS-1329363		(315)	-
CPS: TTP Options: Synergy: Human-Machine Interaction with Mobility Enhancing Soft Exosuits	47.070	CNS-1446464		467,836	59,603
CRIL: RI: Practical Algorithms for Robust Feedback Motion Planning Through Contact	47.070	IIS-1657186		73,007	-
CSR: Medium: Collaborative Research: Fast and Simple Concurrency Through Data-Abstraction Transactions	47.070	CNS-1513416		(3,798)	-
CSR: Medium: Collaborative Research: Soup: Flexible Storage and Processing for On-Line Applications	47.070	CNS-1704376		161,453	-
CSR: SMALL: Virtualized accelerators for scalable, composable architectures	47.070	CNS-1718160		50,806	-
Deep Annotation: Measuring Human Vision to Improve Machine Vision	47.070	IIS-1409097		175,668	-
EAGER: Developing Markets	47.070	CCF-1841550		57,135	-
EAGER: Identifying Opportunities in Pseudorandomness	47.070	CCF-1749750		30,996	-
EAGER: Making with Understanding	47.070	IIS-1748093		136,295	-
EXP: Collaborative Research: Extracting Salient Scenarios from Interaction Logs (ESSIL)	47.070	IIS-1623124		79,464	-
InTrans: A virtualized SoC platform architecture for mini autonomous drones	47.070	IIS-1551044		16,472	-

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NCS-FO: Analyzing Synapses, Motifs and Neural Networks for Large-scale Connectomics	47.070	IIS-1835231		162,400	-
NeTS: Small: Collaborative Research: Distributed Approximate Packet Classification	47.070	CNS-1829349		29,918	-
NRI-Small: Rapid on site development of soft disposable robots	47.070	IIS-1317744		25,174	-
NRI: Instructional Materials for Soft Co-Robot Design to Improve Motivation and Learning in STEM Classrooms	47.070	IIS-1526327		94,927	-
Phase II IUJCRC Harvard: Center for Spatiotemporal Thinking, Computing and Applications (STCA)	47.070	CNS-1841403		32,408	-
RI: Large: Collaborative Research: Reconstructive Recognition: Uniting statistical scene understanding and physics-based visual reasoning	47.070	IIS-1212928		64,385	63,435
RI: Medium: Collaborative Research: Novel microLIDAR Design and Sensing Algorithms for Flapping-Wing Micro-Aerial Vehicles	47.070	IIS-1514306		32,789	-
RI: Small: Collaborative Research: Hidden Parameter Markov Decision Processes: Exploiting Structure in Families of Tasks	47.070	IIS-1718306		134,902	-
RI: Small: Collaborative Research: Structured Inference for Low-level Vision	47.070	IIS-1618227		122,807	-
RI: Small: Depth from Differential Defocus	47.070	IIS-1718012		59,831	-
RI: Small: Workshop for Women in Machine Learning	47.070	IIS-1649706		22,375	-
S and AS: INT: RoboBees 2.0 towards autonomous micro air vehicles	47.070	IIS-1724197		171,124	-
SHF:Medium:A Cloudless Universal Translator	47.070	CCF-1704834		101,019	-
SI2-SSE: Collaborative Research: A Sustainable Future for the Glue Multi-Dimensional Linked Data Visualization Package	47.070	OAC-1739657		146,671	-
SI2-SSI: Collaborative Research: Bringing End-to-End Provenance to Scientists	47.070	ACI-1450277		132,298	-
TWC: Large: Collaborative: Computing Over Distributed Sensitive Data	47.070	CNS-1565387		377,069	104,949
TWC: Medium: Collaborative: Privacy-Preserving Distributed Storage and Computation	47.070	CNS-1228598		8,834	-
TWC: SMALL: Complexity Assumptions for Cryptographic Schemes	47.070	CNS-1618026		234,686	-
TWC: Small: Language-level Control of Authority	47.070	CNS-1524052		18,193	-
US-Israel Collaboration: Collaborative Research: New Tools for Extracting Neuronal Phenotypes from a Volumetric Set of Cerebral Cortex Images	47.070	IIS-1607800		216,418	-
Women In Theory Conference 2018	47.070	CCF-1830899		4,596	-
XPS: FULL: CCA: Collaborative Research: Automatically Scalable Computation	47.070	CCF-1533737		38,889	-
Total for CFDA 47.070				5,922,553	273,124
1000 species and counting: Harnessing the power of herbarium digitization, crowdsourcing, and phyloforistics to assess and predict phenological responses	47.074	DEB-1754584		146,560	-
BRAIN EAGER: Functional dynamics of whole brain activity, behavior, and development from birth to adulthood	47.074	IOS-1452593		81,630	-
CAREER: Developmental network architecture underlies patterning precision and robustness	47.074	IOS-1452557		84,680	-
CAREER: Testing the contributions of selection, gene-flow, and recombination to reinforcement	47.074	DEB-1844906		16,456	-
CAREER: The evolution of gene regulatory networks for regeneration	47.074	IOS-1652104		228,099	-
CAREER:Quantitative principles of multi-input signaling in eukaryotic cells	47.074	MCB-1349248		75,856	-
CNH-L: Social-ecological traps and interactive dynamics of reef fisheries and human health	47.074	1826668		189,496	42,899
CNH-L:Assessing the potential for climate change and forest insects to drive land-use regime shifts	47.074	DEB-1617075		237,424	104,640
Collaborative Research and NEON: MSB Category 2: PaleoON - a PaleoEcological Observatory Network to Assess Collaborative Research: A Functional Perspective on Adaptive Radiation: Explaining Differences in the Adaptive Radiations of Mainland and Island Anolis Lizards	47.074	EF-1535623		2,599	-
				(19,008)	-

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Collaborative Research: ABI Development: Kurator: A Provenance-enabled Workflow Platform and Toolkit to Curate	47.074	DBI-1356438		50,056	-
Collaborative Research: ButterflyNet--an integrative framework for comparative biology	47.074	DEB-1541560		29,164	-
Collaborative Research: Digitization TCN: Fossil Insect Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change	47.074	DBI-1304992		(1,887)	-
Collaborative Research: Digitization TCN: InvertEBase: Reaching Back to See the Future: Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts	47.074	EF-1401450		737	-
Collaborative Research: Evolving the mammalian forelimb: modeling musculoskeletal transformation in the forerunners	47.074	DEB-1754459		117,475	-
Collaborative Research: IDBR: TYPE A: Development of Squishy Robot Hands for a Delicate, Effective and Non-Intrusive Approach to Studying Deep Coral Reefs	47.074	DBI-1556164		73,127	-
Collaborative Research: NSF/MCB: Kinetic Control of the Transcription Cycle Revealed by Synthetic Enhancers	47.074	1715184		186,196	-
Collaborative Research: Physiology of Long Distance Assimilate Transport	47.074	IOS-1456845		81,200	-
Collaborative Research: The Aquilegia Petal as a Model for the Elaboration and Evolution of Organ Shape	47.074	IOS-1456217		129,639	-
Collaborative Research: The Opliones of New Zealand: Revisionary synthesis and application of species delimitation for testing biogeographic hypotheses	47.074	DEB-1754278		301,550	-
Collaborative Research: Understanding the potential for a climate change-driven critical transition from forest to	47.074	DEB-1353301		10,926	-
Designing and analyzing multi-generational switching in gene circuits for single cell biology	47.074	1615487		109,648	-
Digitization TCN: Collaborative Research: Digitizing endless forms: Facilitating Research on Imperiled Plants with	47.074	DBI-1802209		86,903	-
Digitization TCN: Collaborative Research: Lepidoptera of North America Network: Documenting Diversity in the Largest	47.074	DBI-1601124		44,136	-
Digitization TCN: Collaborative Research: oVert: Open Exploration of Vertebrate Diversity in 3D	47.074	DBI-1702263		51,323	-
Digitization TCN: Collaborative Research: Using Herbarium Data To Document Plant Niches In The High Peaks And High Plains Of The Southern Rockies - Past, Present, And Future	47.074	DBI-1702322		39,398	-
Dimensions US-BIOTA-Sao Paulo: Collaborative Proposal: Traits as predictors of adaptive diversification along the	47.074	DEB-1831560		5,222	-
DIMENSIONS: COLLABORATIVE RESEARCH: The phylogenetic and functional diversity of extracellular electron transfer across all three domains of life	47.074	DEB-1542506		147,741	-
Discovering the Mechanistic Basis of Individual Differences in Sensory Representation and their Effects on Preference Behavior	47.074	IOS-1557913		151,179	-
DISSERTATION RESEARCH: Evaluating the role of thyroid hormone in embryonic limb development in direct-developing frogs	47.074	DEB-1701591		5,607	-
DISSERTATION RESEARCH: Integrative research in gastropods: Phylogeny and shell shape evolution	47.074	DEB-1701648		9,258	-
DISSERTATION RESEARCH: Macroevolutionary drivers of digit reduction in fossil horses	47.074	DEB-1701656		5,607	-
Dissertation Research: Molecular mechanisms underlying striking craniofacial variation in New World Leaf-Nosed bats (Phyllostomidae)	47.074	DEB-1501690		1,979	-
Dissertation Research: Mutant models reveal latent developmental potential with roles in evolutionary change	47.074	DEB-1600920		82	-
DISSERTATION RESEARCH: The Evolution of Crocodylian Cranial Development	47.074	DEB-1701745		8,146	-
Dissertation Research: The genetic and neurobiological basis of nesting behavior in two species of Peromyscus	47.074	IOS-1701805		2,361	-
EAGER: A novel mechanism regulating leaf water transport: Reversible collapse of xylem conduits	47.074	IOS-1659918		72,222	-
EAGER-NEON: Scaling up terrestrial plant phenology from individuals to Continental scale	47.074	DEB-1550740		21,537	-
ERA SynBio: A Unified Nucleic Acid Computation System (UNACS) for Organisms	47.074	MCB-1540214		18,845	-
Functional significance of the competition between vapor and liquid transport in transpiring leaves	47.074	IOS-1456836		26,891	-
HFR LTER V: New Science, Synthesis, Scholarship, and Strategic Vision for Society	47.074	DEB-1237491		798,069	258,633
Ideas Lab Collaborative Research: Using natural odor stimuli to crack the olfactory code	47.074	IOS-1555914		304,529	-
Inductive Mechanisms in Arthropod Germ Line Specification	47.074	IOS-1257217		59,948	-
LTER: From Microbes to Macrosystems: Understanding the response of ecological systems to global change drivers and their interactions	47.074	DEB-1832210		258,786	27,666

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NSF/MCB-BSF: Sub-cellular Localization and Small RNA Regulation of the Outer Membrane	47.074	MCB-1715212		121,700	-
PAPM EAGER: Identifying Small Molecule Inhibitors that Manipulate	47.074	MCB-1650086		(242)	-
RAPID: Is Carbon Starvation a Proximal Cause of Tree Mortality from Defoliation	47.074	DEB-1926052		21,680	-
RCN-SEES: Integrating Land-Use Scenarios, Ecosystem Services, and Linkages to Society (Scenarios, Services, and Society - S3)	47.074	DEB-1338809		129,378	-
Recombination and the Dynamics of Adaptation in Experimental Saccharomyces Cerevisiae (yeast) Populations	47.074	DEB-1655960		261,847	-
Resources for mixed model association mapping of complex traits	47.074	1349449		164,027	-
REU Site: A forest full of Big Data: the Harvard Forest Summer Research Program in Ecology 2015-2019	47.074	DBI-1459519		166,261	-
REU Site: Evolution, Ecology, Environment	47.074	DBI-1757780		26,100	-
Total for CFDA 47.074				5,142,143	433,838
2016 Cooperative Congressional Election Study	47.075	SES-1559125		3,446	-
2018 Cooperative Congressional Election Study	47.075	SES-1756447		554,724	460,900
Bargaining and Network Formation: Equilibrium Medical Provider Networks in Health Care Markets	47.075	SES-1730063		55,377	-
CAREER: Dynamic Decision Theory and Bounded Rationality	47.075	SES-1255062		52,347	-
CAREER: Engineering opportunity: Manipulating choice architecture to attenuate social bias	47.075	BCS-1653188		141,722	-
CAREER: Psychological and Neurodevelopmental Mechanisms of Social Influence on Adolescent Decision-Making	47.075	BCS-1452530		64,746	-
CAREER: Using Field Experiments to Identify Barriers to Labor Market Success and Human Capital Accumulation	47.075	SES-1454476		43,844	-
Collaborative Conference Proposal: Support for Conferences and Mentoring of Women and Underrepresented Groups in Political Methodology	47.075	SES-1922190		28,399	-
Collaborative Proposal: Friendships, Identity Development, and Adolescent Adjustment in High School	47.075	BCS-1745292		128,896	18,220
Collaborative Research: A New Design for Identifying Persuasion Effects and Selection in Media Exposure Experiments via Patient Preference Trials	47.075	SES-1526953		406	-
Collaborative Research: Comprehensive Itelmen [itl] Dictionary	47.075	BCS-1848934		4,429	-
Collaborative Research: Increasing Tax Compliance: Experimental Evidence from Pakistan	47.075	1559419		25,613	-
Collaborative Research: Lay Deployment of Professional Legal Knowledge	47.075	SES-1423729		68,061	-
Collaborative Research: Typology and Theory of Anaphora	47.075	BCS-1424054		15,301	-
Doctoral Dissertation Improvement Award: The Fit between Producers and Consumers in Traditional Society	47.075	BCS-1905092		5,761	-
Doctoral Dissertation Improvement Grant: The Independent Adaptation Of Subsistence Technologies	47.075	BCS-1824983		5,407	-
Doctoral dissertation research: 'Making laboratory practice 'good': Negotiating transnational toxicological standards for	47.075	1754980		4,508	-
Doctoral Dissertation Research: Becoming Part of the City: Place-Belonging in Urbanizing China	47.075	SES-1802612		2,945	-
Doctoral Dissertation Research: Employment of Native Americans with Criminal Records	47.075	SES-1802576		10,560	-
Doctoral Dissertation Research: Identifying Positively-Selected Introgressed Genetic Variants with Regulatory Effects in	47.075	BCS-1847287		1,268	-
Doctoral Dissertation Research: Market concentration, skill segregation, and rising wage inequality	47.075	SES-1702914		289	-
Doctoral Dissertation Research: Spatial Inequality in Birth Outcomes - Testing Classes of Proximate Mechanisms	47.075	SES-1802538		722	-
Doctoral Dissertation Research: The Cultural Significance of Informal American Commemorative Sites	47.075	BCS-1756776		20,764	-
Doctoral Dissertation Research: The Development of Corporate Personhood Law In Comparative Perspective, 1886-	47.075	SES-1519074		4,656	-
Doctoral Dissertation Research: The Moral Foundations of the Big Data Economy	47.075	SES-1802286		11,999	-
Emergent Forms of Expression in Postsocialist Contexts	47.075	BCS-1420937		(2,087)	-
Erbil Plain Archaeological Survey	47.075	BCS-1261118		26,171	-

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Falling Through the Cracks: Unaccompanied Homeless Adolescents in New York City	47.075	SES-1741918		847	-
Identifying cross-disciplinary pathways to translational science	47.075	SMA-1360042		(28)	-
Is Better Access to Information Effective in Improving Labor Market Outcomes Experimental Evidence.	47.075	SES1824465		87,951	14,096
Learning-based motivation of intergroup aggression	47.075	BCS-1551559		139,008	-
Monetary values of increasing life expectancy: sensitivity to shifts of the survival curve	47.075	1824492		40,736	-
Preferences in Matching Market Design	47.075	SES-1459912		4,033	-
RIDIR: Collaborative Research: Portal to Data and Analysis Tools: Enabling Data-Intensive Research in the Urban Sciences on Linked, Large-Scale Records	47.075	SES-1637136		253,336	-
Standard Research Grant: A Comparative Study of Three Models of Innovation in Their Transnational Implementation	47.075	SES-1457011		5,062	-
Standard Research Grant: The Fukushima Disaster and the Politics of Nuclear Power in the United States and Japan	47.075	SES-1257117		8,521	-
Statistical decisions and policy choice	47.075	SES-1354144		611	-
Statistical Methods for Causal Inference in Geographic Regression Discontinuity Designs	47.075	SES-1461435		30,101	2,439
The developmental genetic basis for evolutionary variation in the hominin shoulder	47.075	BCS-1518596		(12,047)	-
The Effects of Sadness Versus Gratitude on Economic Decision Making and Addictive Behavior	47.075	SES-1559511		203,284	-
The importance of confidence in predicting labor market outcomes	47.075	SES-1713752		60,457	-
We walk where the devil dances: Security and rescue on the U.S. - Mexico border	47.075	BCS-1724749		2,481	-
Total for CFDA 47.075				2,104,627	495,655
Bringing Team-Based, Project-Based Learning to Scale	47.076	DUE-1504664		12,251	-
CAREER: Soft Robotics for Upper Extremity Rehabilitation	47.076	CBET-1454472		100,011	-
CAREER:Statistical Modeling of Single Cell States Informative	47.076	DBI-1452964		54,120	-
Collaborative Research: A Study of How Pre-College Informal Activities Influence Female Participation in STEM	47.076	DRL-1612375		26,644	1,769
Collaborative Research: Embedding Public Engagement with Science at Long-Term Ecological Research Sites	47.076	DRL-1713307		132,276	-
Collaborative Research: Innovative Technology-Enabled Astronomy for Middle Schools II (TEAMS II)	47.076	DRL-1433431		146,056	45,063
Collaborative Research: Leveraging Comparison and Explanation of Multiple Strategies (CEMS) to Improve Algebra	47.076	DRL-1561283		303,201	-
Collaborative Research: Thinking Spatially About the Universe- A Physical and Virtual Model for Middle School Science	47.076	DRL-1503395		266,821	4,991
Core Systems for Learning Mathematics	47.076	DRL-1348140		225,770	-
EAGER: Collaborative Research: Framing Learning for MOOC Student Success: Using Pre-Course Survey Interventions to Support Student Persistence and Performance in MOOCs	47.076	DUE-1646978		22,597	-
EcoXPT: Affordances for experimentation in an immersive world to support the learning of ecosystem science and	47.076	DRL-1416781		187,907	25,390
Effects of ADVANCE in the STEM Disciplines: Faculty Diversity, Women in Leadership, and Institutional Transformation	47.076	DGE-1444586		166,453	135,856
Graduate Research Fellowship Program	47.076	DGE-1745303		10,755,094	-
Integrating Computational Thinking in Ecosystem Science Education via Modeling in Immersive Virtual Worlds	47.076	DRL-1639545		801,112	-
IUSE: A Pedagogical Framework for Undergraduate Project-Based Engineering Design Courses	47.076	DUE-1524902		160,944	-
MOSART HSLS: Misconceptions Oriented Standards-based Assessment Resource for Teachers of High School Life	47.076	DRL-1316645		169,052	-
MOSART HSPS: Misconceptions Oriented Standards-Based Assessment Resource for Teachers of High School	47.076	DRL-1621210		375,419	-
Professional Development Models and Outcomes for Science Teachers (PDMOST)	47.076	DRL-1417438		832,716	159,951
Strengthening the Research Base that Informs STEM Workforce and Curriculum Improvement Efforts	47.076	DRL-1348669		40,834	-
SURVEY OF U.S. MIDDLE SCHOOL MATHEMATICS TEACHERS AND TEACHING	47.076	DRL-1417731		348,243	-
The Mathematical Knowledge for Teaching Measures: Refreshing the Item Pool	47.076	DRL-1620914		606,838	21,631
Total for CFDA 47.076				15,734,359	394,651

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Collaborative Research: Imaging the Beginning of Time from the South Pole: Observations with the Full SPUD Array	47.078	OPP-1145172		184,209	120,139
Total for CFDA 47.078				184,209	120,139
Total for National Science Foundation Direct Awards R&D				53,865,071	5,066,295
Department of Veterans Affairs					
MAVERIC Project	64.RD	36C24E18D0048		277,933	-
Total for CFDA 64.RD				277,933	-
Total for Department of Veterans Affairs Direct Award R&D				277,933	-
EPA					
Disparities in Exposure and Health Effects of Multiple Environmental Stressors Across the Life Course	66.509	83615601		459,059	171,485
Effects of Changes in Climate and Land Use on U.S. Dust and Wildfire Particulate Matter	66.509	83587501		215,674	22,500
Integrated Modeling Approaches to Support Systems-Based Ecological Risk Assessment	66.509	RD-83579501-0		68,754	42,703
Regional Air Pollution Mixtures: The Past and Future Impacts of Emission Controls and Climate Change on Air Quality and Health	66.509	83587201		1,936,235	358,779
Total for CFDA 66.509				2,679,722	595,467
Total for EPA Direct Award R&D				2,679,722	595,467
Department of Energy					
A Lagrangian study of the transition from shallow to deep convection using ASR observations and LES simulations	81.049	DE-SC0018120		82,559	-
Catalyst Design for Small Molecule Activation of Energy Consequence	81.049	DE-SC0019144		154,391	-
Correlated Quasiparticles in Graphene	81.049	DE-SC0012260		228,821	-
Dynamic Self-Assembly, Emergence, and Complexity	81.049	DE-FG02-00ER45852		450,813	-
Dynamics of Many-Body Quantum Entanglement	81.049	DE-SC0019030		50,906	-
Energy Transductions in Multimodal Stimuli-Responsive Systems with Information Encoding Capabilities and Non-equilibrium Signal Processing	81.049	DE-SC0005247		510,827	130,173
Exploring New Physics on Cosmological Scales	81.049	DE-SC0019018		47,836	-
Harnessing the power of ab initio calculations, distributed computing and machine learning to efficiently locate extreme molecules for use in Carbon-based solar cells	81.049	DE-SC0015959		43,998	-
Imaging Electron Motion in Two-Dimensional Materials	81.049	DE-FG02-07ER46422		102,535	-
Integrated Mesoscale Architectures for Sustainable Catalysis (IMASC)	81.049	DE-SC0012573		2,496,732	661,243
Microbial Ecology, Proteogenomics and Computational Optima	81.049	DE-FG02-02ER63445		3,781,318	-
Molecular-scale Understanding of Selective Oxidative Transformations of Alcohols Promoted by Au and Au-based Alloys	81.049	DE-FG02-84ER13289		26,145	-
Physical and Thermodynamic Properties of Secondary Organic Materials for Modeling	81.049	DE-SC0012792		124,060	-
Proton-Coupled Electron Transfer Studies of Homogeneous and Heterogeneous Energy Conversion Catalysts	81.049	DE-SC0017619		402,270	-
Pursuing Dark Energy with Large Galaxy Redshift Surveys: Baryon Acoustic Oscillations and Beyond	81.049	DE-SC0013718		96,120	-
QPress: Quantum Press for Next-Generation Quantum Information Platforms	81.049	DE-SC0019300		791,375	98,346
Quantum Field Theory and Theoretical Particle Physics	81.049	DE-SC0013607		281,071	-
Research in High Energy Physics	81.049	DE-SC0007881		1,256,305	-
SISGER: Transport and Imaging of Mesoscopic Phenomena in Novel Low-Dimensional Materials	81.049	DE-SC0001819		165,566	18,156
State-to-State Molecular Reactions in the Ultracold Regime	81.049	DE-SC0019020		245,806	-
Theoretical Research in High Energy Physics	81.049	DE-SC0007870		202,282	-
Total for CFDA 81.049				11,541,736	907,918

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From Z to Planets: Phase II	81.112	DE-NA0002937		159,432	136,416
High Pressure Metallic Hydrogen	81.112	DE-NA0003346		121,128	-
Total for CFDA 81.112				280,560	136,416
Mining the deep sea for microbial ethano- and propanogenesis	81.135	DE-AR0000963		289,932	18,651
Transistor-less Power Supply Technology Based On UWBG Nonlinear Transmission Line	81.135	DE-AR0000858		6,247	-
Total for CFDA 81.135				296,179	18,651
Total for Department of Energy Direct Award R&D				12,118,475	1,062,985
Department of Education					
National Resource Centers for Davis Center for Russian and Eurasian Studies	84.015A	P015A140087 - 17		46,018	-
Total for CFDA 84.015A				46,018	-
Fulbright Hays Group Projects Abroad - CASA MOROCCO	84.021A	P021A170018		240,399	-
Total for CFDA 84.021A				240,399	-
Partnering in Education Research (PIER): A Predoctoral Interdisciplinary Training Program	84.305	R305B150010-16		885,669	-
Student Outcomes of Integrative Mental Health Services	84.305	R305A140253-16		963,277	-
Total for CFDA 84.305				1,848,946	-
Digital Messaging for Improving College Enrollment and Success	84.305A	R305A140121-17		293,220	206,199
The language of written argumentation and explanation: Individual developmental trajectories from 4th to 8th	84.305A	R305A170185 - 18		280,334	94,113
Total for CFDA 84.305A				573,554	300,312
National Center on Rural Education Research Networks	84.305C	R305C190004		82,619	-
Total for CFDA 84.305C				82,619	-
Understanding and Measuring Treatment Effect Heterogeneity in Large Scale Experiments and Pseudo-Experiments in	84.305D	R305D150040-17		202,779	133,062
Total for CFDA 84.305D				202,779	133,062
Project READS: Using Data to Promote Summer Reading and Close the Achievement Gap for Low-SES Students in	84.396B	U396B100195		(3,341)	-
Total for CFDA 84.396B				(3,341)	-
Total for Department of Education Direct Award R&D				2,990,974	433,374
Millennium Challenge Corporation					
Growth Diagnostics: Building New Methods to Identify and Address Constraints to Accelerate Growth	85.002	95332418T0020		176,147	-
Total for CFDA 85.002				176,147	-
Total for Millennium Challenge Corporation Direct Award R&D				176,147	-
DHHS					
Impact Evaluation of Combination HIV Prevention Interventions in Botswana	93.067	6U2GGH001911-04-01		2,381,069	1,262,725
Total for CFDA 93.067				2,381,069	1,262,725
E-Cigarette Vaping in Advertising Portrayals and Behavioral Outcomes Research (E-VAPOR Study)	93.077	5R03CA212544-02Revised		110,347	14,448
Total for CFDA 93.077				110,347	14,448
Image Forensics: Manipulation-Robust Image Duplicate Identification	93.085	1 ORIIR180043-01-00		141,980	-
Total for CFDA 93.085				141,980	-
Scaffolds mimicking antigen presenting cells	93.103	1R01FD006589-01 REVISED		456,236	-
THE MDEPINET MEDICAL COUNTER MEASURES STUDY	93.103	1U01FD004493-01 REVISED		3,415	-
Total for CFDA 93.103				459,651	-

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Epidemiological MCH/SPH Institute	93.110	6T03MC07648-12-05		19,734	-
Training Grant in Maternal and Child Health	93.110	5T76MC00001-64-00		354,777	-
Total for CFDA 93.110				374,511	-
A big data approach to phthalates, hormones, and ADHD	93.113	1R21ES028900-01A1 REVISED		63,294	-
Air Particulate, Metals, and Cognitive Performance in an Aging Cohort- Roles of Circulating Extracellular Vesicles and Non-coding RNAs	93.113	5R01ES027747-02		338,956	71,156
Air Pollution and Autism in Israel: A Population-Wide Study	93.113	5R21ES026900-02		120,388	41,912
Arsenic Exposure, ER stress and Type 2 Diabetes	93.113	5R01ES022230-05		(3,158)	-
Cardiovascular Health and Air Pollution: A National Study	93.113	3R01ES024332-04S1		551,307	44,716
Causal Inference with Interference for Evaluating Air Quality Policies	93.113	5R01ES026217-03 REVISED		55,952	-
Comprehensive Translational Science Analytics Tools for the Global Health Agenda	93.113	5DP1ES025459-04Revised		41,881	8,593
COPD and Response to Traffic Related Particles	93.113	4R01ES019853-05 REVISED		114,118	93,003
Data-Driven identification of environmental factors in cardiovascular disease	93.113	5R00ES023504-05		241,148	-
Early and late-life metal exposures and Alzheimer's disease	93.113	5R01ES024165-05		683,001	249,305
Effects of Environmental Phthalates and Chemical Mixtures on Male Puberty and Semen Quality	93.113	5R01ES014370-13		467,583	182,710
Engineered Nanomaterial Synthesis, Characterization and Method Development Center for Nano-safety Research	93.113	5U24ES026946-04		761,818	176,199
Environmental Chemicals, Exosomal miRNAs in Ovarian Follicles, and IVF Success	93.113	5R21ES024236-02REVISED		67,672	-
Environmental Obesogens and Weight Change in the POUNDS LOST Trial	93.113	5R01ES022981-04		51,889	-
Glucose Metabolism in Adults Prenatally Exposed to Diabetogenic Pollutants	93.113	5R01ES021477-05 REVISED		184,293	(22,240)
Graduate Training in Biostatistics	93.113	2T32ES007142-36		404,769	-
Graduate Training in Biostatistics	93.113	5T32ES007142-35Revised		127,575	-
Gut Microbiome in Adults with Early Life Exposures to Environmental Chemicals	93.113	5R21ES023376-03 REVISED		190,801	146,693
Harvard Chan School NIEHS Center for Environmental Health	93.113	2P30ES000002-56		168,424	-
HSPH NIEHS Center for Environmental Health	93.113	5P30ES000002-55		1,118,241	-
Human Exposure to Bisphenol A, Phthalates and Fertility, Pregnancy Outcomes	93.113	5R01ES009718-20		359,433	25,261
Immunotoxicity in Humans with Lifetime Exposure to Ocean Pollutants	93.113	4R01ES021993-05REVISED		45,410	19,245
Impact of Obesity on Airway Responses to Air Pollution	93.113	5R01ES013307-15		294,247	42,791
Increasing the power of GxE detection by using multi-locus genome-wide predictors	93.113	5R21ES025052-03 REVISED		(1,461)	-
Inflammation and metabolic abnormalities in pollutant-exposed children	93.113	5R01ES026596-02		161,327	110,072
Interdisciplinary Training in Genes and the Environment	93.113	5T32ES016645-10REVISED		342,560	-
Lipoprotein Corona Fingerprints: Implications for Pulmonary Clearance and Toxicity of Engineered Nanoparticles	93.113	5K99ES025813-02 REVISED		17,673	-
Manganese Transport and Toxicity	93.113	2R56ES014638-13		102,398	-
Manganese Transport and Toxicity	93.113	5R01ES014638-12		(11,773)	-
Maternal and Paternal Flame Retardant Exposure, Impact on Fertility and Pregnancy	93.113	5R01ES022955-05		417,029	82,019
Maternal and Paternal Preconception Environmental Exposures and Children's Health	93.113	5R01ES027408-02		616,055	191,133
Maternal Exposure to Air Pollution and Early Pregnancy Outcomes	93.113	5K99ES026648-02REVISED		63,976	-
Multi-Pathway DNA Repair Capacity Measurements in Lung Cancer Patients and Healthy Controls	93.113	5U01ES029520-02		459,044	25,569
New Tools for the interpretation of Pathogen Genomic Data with a focus on Mycobacterium tuberculosis	93.113	5K01ES026835-06		274,602	-
Novel markers of exposure and pathways of response to Chromium	93.113	3R01ES027981-02S1		271,463	21,922
Nurses Health Study 3: A multiple exposure environmental epidemiology cohort of young adults	93.113	5R24ES028521-02		139,450	20,898
Organ on chip technology to evaluate engineered nanomaterial toxicity	93.113	5U01ES027272-03 REVISED		511,705	-
PCA-based selection scans in very large samples	93.113	5R03ES027902-02		65,589	9,191

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Phthalates, Gestational Diabetes, and Markers of Type 2 Diabetes Risk in Women	93.113	5R01ES026166-04Rev		728,964	131,532
Pollutant-related diabetes in the Nurses' Health Study II	93.113	5R01ES021372-05		150,015	46,275
Prenatal Programming and Toxicity (PPTOX) V1	93.113	1R13ES029385-01		7,783	-
Relationship Between Multiple Environmental Exposures and CVD Incidence and Survival: Vulnerability and Susceptibility	93.113	5R01ES028033-02		839,978	428,410
SPP1, Oxidative Stress, and Lead Toxicity	93.113	1R01ES029097-01A1		224,806	85,247
The role of beta-endorphin in cutaneous inflammation	93.113	5F31ES027301-02		3,974	-
The role of UV-induced neoantigens and exogenous neopeptides in enhancing response to immune checkpoint blockade in melanoma and other cancers.	93.113	5F30ES028995-02		38,284	-
Theory and methods for interaction	93.113	2R56ES017876-06A1		1,414	-
Training Program in Environmental Epidemiology	93.113	5T32ES007069-40		579,751	-
Total for CFDA 93.113				12,453,648	2,231,612
Anti-Inflammatory Mesenchymal Stem Cell Therapy for Dental Applications	93.121	5K08DE025292-04		135,845	-
Chemical Approaches to Rescue Human Mitochondrial Disease Mutations	93.121	1F30DE028206-01A1		30,677	-
Dynamics of the bacterial type IX secretion system and its effect on subgingival biofilm formation by bacteria of the human oral microbiome	93.121	5K99DE026826-02 REVISED		136,217	-
Engineering Skeletal Muscle With Biodegradable Hydrogels	93.121	5R01DE013349-18		443,793	-
Gas-Hedgehog signaling in intramembranous bone formation and expansion	93.121	5R01DE025866-04		434,396	-
Leveraging Novel Multivariate Methods of Subphenotypes in Genetic Association Studies of Sjogren's Syndrome	93.121	5R03DE025665-02		231,159	208,800
Nicotinamide Mononucleotide (NMN) as a Novel Therapeutic in the Treatment of Oral Mucositis	93.121	1R21DE027490-02 REVISED		153,983	-
Polymeric Matrices With Defined Cell Adhesion	93.121	5R01DE013033-21		450,196	-
Probing the cAMP signaling microdomain of the primary cilium	93.121	5R21DE025921-02 REVISED		106,451	-
Programming dendritic cells in concert with morphagen delivery for periodontal regeneration	93.121	5R01DE019917-05		(4,092)	(4,092)
Regulation of Inflammation in T2D-Associated Periodontitis.	93.121	5R00DE024575-04		281,275	-
Targeting the source: bacterial specific pain mechanisms in dental pulp	93.121	7R56DE027368-02		115,776	-
The Role of Salivary Mucin in Preventing Cariogenic Streptococcus Biofilm Formation	93.121	5F30DE024917-04		37,724	-
Tooth Movement derived by PDL Cellular Manipulations	93.121	5K99DE025053-02 REVISED		163	-
Tooth Movement derived by PDL Cellular Manipulations	93.121	5R00DE025053-04		215,397	-
Total for CFDA 93.121				2,768,960	204,708
Safety and Health Management of Hazards Associated with Emerging Technologies	93.143	5R25ES023635-07		114,058	5,682
Total for CFDA 93.143				114,058	5,682
Center for Genomically Engineered Organs	93.172	5RM1HG008525-05		2,666,873	159,589
Computational methods to advance from genetic association to biological insight	93.172	5F31HG009850-02		31,473	-
Coordinating Center for the Undiagnosed Disease Network Phase II	93.172	5U01HG007530-06		2,262,319	13,650
Fast and accurate phasing using the positional Burrows-Wheeler transform (PBWT)	93.172	5R21HG009513-02		96,517	-
Flybase: A Drosophila Genomic and Genetic Database	93.172	5U41HG000739-25 REVISED		381,626	381,626
Flybase: A Drosophila Genomic and Genetic Database	93.172	5U41HG000739-27		3,383,822	1,127,786
From common to rare variant functional architectures of human diseases	93.172	5K99HG010160-02		72,540	-
Functionally specialized components of disease heritability in ENCODE data	93.172	5U01HG009379-03		514,748	275,742
Global measurement of splicing kinetics	93.172	5R21HG009264-02		85,406	-
HMMER and Infernal: Finding distant homologs of sequences and RNA structures	93.172	5R01HG009116-04		356,255	-
Identifying Genome-scale Interaction Effects in Human Traits and Diseases	93.172	5R21HG007687-02REVISED		(2)	-

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Large-Scale High-Confidence Binary Protein Interaction Network for Drosophila	93.172	5R01HG007118-05		199,475	51,501
Leveraging histone modification heritability to understand complex disease genetics	93.172	5F32HG009615-02		55,742	-
Leveraging molecular QTL to understand the genetic architecture of disease	93.172	1F32HG009987-01A1		46,814	-
Leveraging Tissue-Specific Regulatory Grammar to Interpret Human Evolution and Non-coding Variation	93.172	5F32HG009226-03		57,902	-
Mechanisms of Transcriptional Control Revealed by Nascent Transcript Sequencing	93.172	5R01HG007173-05 REVISED		36,807	-
Mechanisms of Transcriptional Control Revealed by Nascent Transcript Sequencing	93.172	5R01HG007173-07		511,765	-
Methods for disease mapping in multi-ethnic populations	93.172	5R01HG006399-08		348,938	142,040
Pathway Commons: Research Resource for Biological Pathways	93.172	5U41HG006623-07 REVISED		705,855	317,019
Patient-Centered Information Commons (PIC)	93.172	3U54HG007963-05S1 REVISED		2,786,887	25,008
Population-Based Approaches to Genome Structure and Structural Variation	93.172	5R01HG006855-08		739,616	-
Powering whole genome sequence-based genetic discovery for common human diseases	93.172	5U01HG009088-04		1,045,193	740,509
Preparing Association Analysis Software Tools for Next Generation Sequencing Data	93.172	5R01HG008976-03		372,452	49,897
Systematic Exploration of the Human Interactome	93.172	5U41HG006673-05 REVISED		(2,381)	-
Systematic Exploration of the Human Interactome III	93.172	5U24HG006673-08		727,810	-
The Flybase Diversity Action Plan	93.172	3R25HG007630-03S1		105,840	105,840
Training in Bioinformatics and Integrative Genomics	93.172	2T32HG002295-16		556,187	-
Training in Bioinformatics and Integrative Genomics	93.172	5T32HG002295-15 REVISED		178,623	-
Visualization of (Epi)Genomic Data for Discovery of Disease-Associated Variants	93.172	5R00HG007583-05 REVISED		78,915	-
Total for CFDA 93.172				18,404,017	3,390,207
Afferent-efferent interactions in the developing cochlea	93.173	5R01DC015974-03		598,945	-
Atomic Structure of Sensory Transduction Proteins	93.173	5F32DC016210-03		55,899	-
Characterizing the Functional Architecture of the Necklace Olfactory System	93.173	5R01DC016222-03		665,265	-
Cortical feedback and olfactory processing	93.173	5R01DC016289-02		529,881	-
Development and refinement of functional properties of adult-born olfactory bulb neurons	93.173	5F31DC016482-02 REVISED		23,565	-
Development of computational models to diagnose mechanical lesions of the ear	93.173	5F31DC016761-02		31,379	-
Dissecting sensory to motor transformations in Drosophila melanogaster	93.173	5F31DC015701-03		30,913	-
Emergence of valence coding in the ventral striatum	93.173	1R01DC017311-01A1		92,632	-
Force Dependent Unbinding of Mammalian Inner Ear Tip Link Proteins	93.173	5F31DC016199-03		31,918	-
Functional integration of adult-born neurons into the mammalian brain	93.173	5R01DC013329-05		305	-
Gene Therapy for Hearing and Balance Disorders	93.173	5R01DC016932-02		416,417	39,635
Genetic Dissection of Auditory Circuit Assembly	93.173	5R01DC009223-10		561,200	-
Identification of Novel Small Molecule Inhibitors for Vestibular Schwannoma and NF2	93.173	1F31DC017047-01A1 REVISED		16,392	-
Improving round window stimulation via moldable coupler and impedance modeling	93.173	5F31DC015911-02		5,961	-
Information Coding in Individual Olfactory Sensory Axons	93.173	5F32DC015938-03		60,515	-
Mechanisms of apraxia of speech in primary progressive aphasia	93.173	5F31DC015703-02		4,199	-
MOLECULAR AND CELLULAR MECHANISMS OF A NEURONAL NETWORK FOR OLFACTORY LEARNING	93.173	5R01DC009852-09		60,613	-
Molecular Basis of Inherited Deafness	93.173	5R01DC002281-21		451,753	58,731
Molecular Mechanisms of Auditory Transduction	93.173	5R01DC000304-34		560,706	50,790

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Neural Mechanisms for Olfactory and Gustatory Integration in the Drosophila Larva	93.173	5F31DC015704-03 REVISED		29,481	-
Neuromodulation of sensory processing by the serotonin system	93.173	5R01DC014453-05		451,730	-
Non-sensory cells as a potential source for signaling molecules in the cochlea	93.173	5R21DC014916-02		406	-
Olfactory circuits that control behavior	93.173	5R01DC013289-05 REVISED		414,395	-
Sensory processing of social and defensive chemosignals	93.173	5R01DC013087-05		(4,085)	-
Spatial and sensorimotor encoding for goal-directed navigation	93.173	1F30DC017698-01		17,953	-
Subcortical auditory feedback mechanisms in speech: Function and structure	93.173	5F31DC015695-02		3,974	-
Synaptic and Circuit Mechanisms of Olfactory Processing	93.173	5R01DC008174-13		290,514	-
The mechanism of inner ear pressure homeostasis by the endolymphatic sac	93.173	5R01DC015478-03		282,909	-
The role of inhibition in higher olfactory processing	93.173	5F31DC016471-03		32,754	-
Training for Speech and Hearing Sciences	93.173	5T32DC000038-28		646,963	-
Use of new measurements to develop a model of bone conduction in animal and human	93.173	5F31DC015915-02 REVISED		8,381	-
Why are interneurons within the same brain region so diverse	93.173	5F31DC016196-03		31,474	-
Total for CFDA 93.173				6,405,307	149,156
Sensory receptors of the vagus nerve	93.212	5DP1AT009497-04		1,357,730	-
Total for CFDA 93.212				1,357,730	-
Chemical biology of bacterial symbionts	93.213	5R01AT009874-11		361,237	-
Identification and characterization of gut microbial bioactive molecules that determine predisposition to autoimmune disease and atopy	93.213	5R01AT009708-03		622,980	235,118
Inequities in Health Outcomes in the Twenty-First Century: Understanding New Causes and the Impact of Delivery System Reforms on Health Care Disparities	93.213	5DP5OD024564-02		444,934	-
Neurobiological and Clinical Phenotypes in OEF OIF OND Veterans with mTBI or Blast	93.213	5R21AT009430-02		18,072	-
Sensory Neuron-Bacteria Interactions in Modulating Pain and the Host Microbiota	93.213	1DP2AT009499-01		279,137	-
Total for CFDA 93.213				1,726,360	235,118
Health Policy Training Program	93.225	5T32HS000055-24		16,212	-
Total for CFDA 93.225				16,212	-
Comparing Targeted and Non-Targeted Approaches to Improving the Value of Cancer Care Services	93.226	1R01HS026498-01		17,475	-
Engineering highly reliable learning lab	93.226	5P30HS024453-04		969,882	606,148
Health Policy Training Program	93.226	5T32HS000055-26		370,324	-
Identifying Predictors of Hospital Admission from the ED Among the Elderly	93.226	5R01HS025408-02		418,494	55,690
Medicaid Policy, Coverage, and Access to Care Among Low-Income Americans Under Health Reform	93.226	4K02 HS021291-04		4,933	-
Quality and Outcomes under Medicaid Managed Care: Evidence from Random Plan Assignment	93.226	5K01HS025786-02		153,941	-
The Impact of Resource Constraints on Provider Behavior and Health Outcomes in Childbirth	93.226	1R36HS024898-01A1		5,595	-
Total for CFDA 93.226				1,940,644	661,838
Innovations in Genome Wide Association Testing Inspired by Obstructive Sleep Apnea Phenotypes	93.233	5F31HL140822-02		31,357	-
Total for CFDA 93.233				31,357	-
A General Approach for the Development of New Cell-Type-Specific Viral Vectors	93.242	1RF1MH114081-01		858,005	-
Basal forebrain purinergic P2 receptor mechanisms of sleep-wake regulation	93.242	5R03MH107650-02 REVISED		12,049	-
Brain-wide correlation of single-cell firing properties to patterns of gene expression	93.242	1RF1MH117402-01		161,750	-
Cerebellar network mapping with a high-throughput TEM platform	93.242	1RF1MH114047-01		663,443	-
Child Trauma and the Development of Neural Systems Underlying Emotion Regulation	93.242	7R01MH103291-05		437,413	-

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Comparative Safety of commonly prescribed Psychotropic Drugs in pregnant Women	93.242	5R01MH100216-03		(18,713)	(18,713)
Comprehensive Classification Of Neuronal Subtypes By Single Cell Transcriptomics	93.242	5U01MH105960-03 REVISED		84,895	84,895
Context dependent modulations of dopamine signaling	93.242	5R01MH110404-04		727,068	-
CRCNS: Leveraging decision-making variability to identify underlying computations	93.242	5R01MH115554-03		177,735	-
Decision-making and suicidal behavior	93.242	1F31MH116649-01A1		24,800	-
Deprivation and Threat: Dimensions of Early Experience and Neural Development	93.242	7R01MH106482-04		200,037	-
Developmental origins of mental illness: evolution and reversibility	93.242	5P50MH094271-07		1,500,754	302,629
Dissecting the assembly of vertebrate neurotransmitter release sites	93.242	5R01MH113349-03		836,216	-
Dissecting the role of anterior cingulate cortex projections to the amygdala in observational learning	93.242	5F31MH107151-02		22,459	-
Effects of a single-session implicit theories of personality intervention on recovery from social stress and long-term psychological functioning in early adolescents	93.242	5F31MH108280-02 REVISED		2,366	-
ESSENCE (Enabling translation of Science to Service to ENhance Depression CarE)	93.242	5U19MH113211-02 REVISED		632,688	303,826
Event-related Neuroimaging of Human Memory Formation	93.242	5R01MH060941-19		278,045	-
Exploring a Novel Paradigm of Schizophrenia and Bipolar Disorder	93.242	5R01MH113279-04		1,182,636	-
Functional analysis of schizophrenia-associated genes	93.242	5K99MH110603-02 REVISED		97,059	-
Functional roles of long noncoding RNAs during neuronal development	93.242	5R01MH102416-05 REVISED		163,656	-
Genomic mechanisms of firing rate homeostasis	93.242	5R01MH116223-02		960,207	-
Health Policy Training Program	93.242	5T32MH019733-23 REVISED		61,694	-
Health Policy Training Program: Promoting Outcomes, Quality, and Diffusion of Medical Advances	93.242	5T32MH019733-25		252,731	-
Healthy Options: Group psychotherapy for HIV-positive depressed perinatal women	93.242	5R01MH100338-05 REVISED		151,771	40,968
Hidden State Inference in the Midbrain Dopamine System	93.242	5F30MH112242-02		44,770	-
Identifying Risk Factors for PTSD by Pooled Analysis of Current Prospective Studies	93.242	7R01MH101227-02Revised		153,985	124,045
Impact of Telemedicine on Medicare Beneficiaries with Mental Illness	93.242	5R01MH112829-02		585,404	42,896
In situ transcriptional analysis of brain circuits at single cell resolution	93.242	5R01MH111502-03		1,113,447	145,550
In situ transcriptome imaging in single cells	93.242	5R01MH113094-03		978,300	-
Intensive longitudinal study of suicidal behaviors and related health outcomes	93.242	5U01MH116928-02		429,672	-
Intercellular TWEAK/Fn14 Cytokine Signaling in Sensory-Dependent Circuit Refinement	93.242	1K99MH120051-01 REVISED		30,866	-
Modeling ASD-linked genetic mutations in 3D human brain organoids	93.242	5R01MH112940-02		721,525	278,869
Neuropsychiatric Genome-Scale and RDOC Individualized Domains (N-GRID)	93.242	5P50MH106933-05 REVISED		3,080,654	1,290,921
New approaches to understand neuronal microcircuit dynamics for working memory	93.242	5R01MH107620-05 REVISED		729,815	-
Non-invasive targeted neuromodulation via focused ultrasound BBB permeabilization	93.242	5R01MH116858-02		275,215	111,462
Optical measurement of causal functional connectivity in posterior parietal cortex	93.242	1F32MH118698-01		30,012	-
Optimizing Delivery of ART/PRP for HIV Prevention through Qualitative Research	93.242	4R01MH101027-04		30,092	17,818
Pathogenic mechanisms in post-bereavement psychopathology: Contributions of gene-environment interplay, psychosocial factors, and cognitive ability in two population-based cohorts	93.242	1K23MH117278-01A1		50,953	-
Peptide Modulation of Striatal Patch and Matrix Subdivisions	93.242	5R01MH100568-05		4,570	-

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Ph.D. Training in Neuroscience	93.242	3T32MH020017-21S1		638,659	-
Ph.D. Training in Neuroscience	93.242	5T32MH020017-20 REVISED		59,692	-
Post Traumatic Stress Disorder and Accelerated Aging in Women	93.242	5R01MH101269-06		540,376	238,348
Real-time fMRI Neurofeedback as a Tool to Mitigate Auditory Hallucinations in Patients with Schizophrenia	93.242	5R61MH113751-02		465,094	203,489
Real-time Intervention for Reducing Suicide Risk	93.242	1R34MH113757-01A1 REVISED		41,663	-
Regional and Genetic Diversity of Cortical Interneurons	93.242	5R01MH071679-15		990,667	522,849
Regulation of Neuronal Calcium Dynamics and Learning by Mental Disease-Associated miRNAs	93.242	1R21MH117386-02		167,226	-
Synaptic Basis of Sleep Cycle Control	93.242	5R01MH039683-32 REVISED		295,347	-
Technology Diffusion and New Delivery Models	93.242	5U01MH103018-05 REVISED		152,965	-
Temporal Specification of Basal Forebrain Circuitry	93.242	1R56MH119156-01		204,955	-
The biochemical correlates of sleep homeostasis	93.242	4R01MH099180-04 REVISED		57,053	-
Training Program in Psychiatric Genetics and Translational Research	93.242	5T32MH017119-33		360,945	-
Using ambulatory physiological monitoring to improve detection of harmful behaviors on adolescent inpatient psychiatry units	93.242	5R21MH115293-02 REVISED		120,384	54,216
VENTRICLES, CORPUS CALLOSUM, SYMPTOMS and MIR137 IN LARGE N STUDY OF SCHIZOPHRENIA	93.242	5R21MH109819-02		147,231	109,045
Total for CFDA 93.242				21,972,301	3,853,113
Lung Disease in Chinese Textile Workers	93.262	5R01OH002421-22REV		10,443	-
Lung Disease in Chinese Textile Workers	93.262	6R01OH002421-23M001		280,882	33,570
The Harvard TH Chan School of Public Health Center for Work, Health and Wellbeing	93.262	6U19OH008861-11M002		1,355,822	1,007,774
The HSPH Education and Research Center of Occupational Safety and Health	93.262	5T42OH008416-13REVISED		23,872	-
The HSPH Education and Research Center of Occupational Safety and Health	93.262	5T42OH008416-15-00		1,394,076	-
Total for CFDA 93.262				3,065,095	1,041,344
Alcohol and Cell Adhesion	93.273	4R01AA012974-15 REVISED		134,193	-
Chronic disease risk and genetic risk factors in fetal alcohol spectrum disorder	93.273	5F31AA025254-02		30,314	-
Data-Based Methods for Just-In-Time Adaptive Interventions in Alcohol Use	93.273	5R01AA023187-04		556,953	-
Mechanisms of Hippo signaling in Alcoholic liver disease	93.273	5R21AA025725-02		222,233	-
Total for CFDA 93.273				943,693	-
Developmental gene networks of 5HT neurons in addiction, aggression, and anxiety	93.279	5R01DA034022-05 REVISED		442,990	-
Precision pharmacology of the opioids	93.279	1DP1DA046586-01		239,970	-
Substance Abuse at the Schizophrenia International Research Congress	93.279	5R13DA036925-05		8,543	-
Syringe Injectable Electronics Platform for Chronic Mapping and Modulation of Neural Circuits in Addiction	93.279	3R21DA043985-02S1		175,040	-
Total for CFDA 93.279				866,543	-
In vivo Handheld Coherent Raman Scattering (CRS) Microscopy for Glioma Imaging	93.286	5R01EB017254-05		153,507	106,193
Mechanotransduction analysis in a microengineered lung-on-a-chip	93.286	5R01EB020004-04 REVISED		537,508	236,873
MSC Encapsulation with Thin Gel Coating	93.286	5R01EB023287-03		985,697	438,857
Total for CFDA 93.286				1,676,712	781,923
Disparities in Exposure and Health Effects of Multiple Environmental Stressors Across the Life Course	93.307	5P50MD010428-05		617,245	394,080
Harvard School of Public Health MHIRT Training Program Grant	93.307	5T37MD001449-21REVISED		153,284	-
Health Reform and Oral Health Disparities: a Mixed Methods Evaluation	93.307	5K99MD012253-02		69,222	-
Trends in Racial Disparities in Surgical Readmissions and Strategies to Narrow the Gap	93.307	5R21MD011701-02REVISED		255,959	84,086
Total for CFDA 93.307				1,095,710	478,166

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Antibody therapeutics for human viral hemorrhagic fevers and prevention of late neurological syndromes	93.310	5DP5OD023084-03		380,457	-
Biomedical Data Science Online Curriculum on HarvardX	93.310	5R25GM114818-03		65,083	64,298
Coordinating Center for the Undiagnosed Diseases Network	93.310	3U01HG007530-04S2		900,155	255,306
Dissecting bacterial cell wall synthesis using in vivo single molecule tracking	93.310	1DP2AI117923-01		434,562	-
Exploring the unknown protein universe using evolutionary information	93.310	1DP5OD026389-01		203,253	-
High-throughput single-molecule protein identification via super-resolution imaging	93.310	5DP1GM133052-02		488,363	-
High-Throughput, Highly Multiplexed In Situ Proteomic Imaging of Human Tissues	93.310	1UG3HL145600-01 REVISED		276,231	-
HuBMAP HIVE Tools Component	93.310	3OT2OD026677-01S1		240,241	-
Investigating Organ Formation and the Emergence of Complexity in the Visual System Using Comparative Developmental Approaches	93.310	5DP5OD023111-03		514,560	-
Leveraging Single-Cell Analysis to Elucidate Mechanisms of Vertebrate Limb Regeneration	93.310	7DP2HD087953-02		176,485	-
Machine Learning for Health Outcomes and Quality of Care in Low-Income Populations	93.310	1DP2MD012722-01		694,036	-
Mechanisms of arousal threshold and sleep homeostasis	93.310	1DP2AT009498-01 REVISED		368,796	-
Molecular mechanisms of adiponectin signaling and PAQR function	93.310	5DP5OD021345-04		427,193	-
New tools for understanding the blood brain barrier	93.310	5DP1NS092473-05		558,784	-
NIH Data Commons	93.310	1 OT3 OD025466-01		352,598	-
Pharmac Response Signatures and Disease Mechanism	93.310	5U54HL127365-05 REVISED		2,174,123	184,742
Physician Determinants of Health Care Spending, Quality, and Patient Outcomes	93.310	5DP5OD017897-05		349,943	-
Probing Dynamics of The Human Genome by Single Cell Sequencing	93.310	5DP1CA186693-05 REVISED		214,206	-
Psychological functions of music in infancy	93.310	5DP5OD024566-02		347,771	-
Quantification and prediction of treatment efficacy for HIV cure strategies	93.310	5DP5OD019851-05		194,596	-
Single cell analysis of metabolism using genetically-encoded fluorescent sensors	93.310	4DP1EB016985-05		29,125	-
Small-Molecule Catalysts for the Stereoselective Synthesis of Oligosaccharides	93.310	3U01GM116249-02S2 REVISED		111,292	-
Subcellular RNA-Proteome Mapping in Subtype- and Circuit-specific Growth Cones: Development, Cell Biology,	93.310	5DP1NS106665-02		1,620,525	-
Super-resolution imaging via programmable autonomous blinking	93.310	5R01EB018659-05		158,144	54,979
Syringe Injectable Mesh Electronics for Seamless Integration with the Central Nervous System	93.310	5DP1EB025835-03		1,563,172	-
Towards a FAIR Digital Ecosystem in the Cloud	93.310	3OT3OD025456-01S1		407,908	279,247
Transporting established insights from classical experimental design to address causal questions in environmental epidemiology, including the understanding of biological mediating mechanisms	93.310	5DP5OD021412-04		515,585	-
Uncovering molecular effectors of mammalian aging	93.310	5DP1AG063419-02		826,325	-
Using mobile phones for social and behavioral sensing of mood disorder patients	93.310	1DP2MH103909-01REVISED		(8,631)	-
Total for CFDA 93.310				14,584,881	838,572
Harvard Clinical and Translational Science Center	93.350	5KL2TR001100-05 REVISED		472,875	462,328
Harvard Clinical and Translational Science Center	93.350	5TL1TR001101-05 REVISED		93,255	-
Harvard Clinical and Translational Science Center	93.350	5UL1TR001102-05 REVISED		(517,690)	(287,847)
Human Cardio-Pulmonary System on a Chip	93.350	5UH3TR000522-05 REVISED		42,451	-
Institutional Career Development Core	93.350	5KL2TR002542-02		1,671,089	1,556,872
NRSA Training Core	93.350	5TL1TR002543-02		425,294	-
Robotic Apparel to Enable Low Force Haptic Cueing for Improving Parkinson's Gait	93.350	1U01TR002775-01		127,727	-
The Harvard Clinical and Translational Science Center	93.350	5UL1TR002541-02		24,160,026	7,430,193
Total for CFDA 93.350				26,475,027	9,161,546

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ARC-GT in situ transcriptome sequencer for tissue FISSEQ	93.351	1S10OD021692-01 REVISED		149,700	-
ARC: Building Awareness, Respect, and Confidence through Genetics	93.351	5R25GM129172-04		320,697	10,985
Drosophila resources for modeling human diseases	93.351	5R24OD021997-04		304,396	-
Next-generation Drosophila cell lines to elucidate the cellular basis of human diseases	93.351	5R24OD019847-02		714,879	342,729
Using CRISPR technology to study the function of paralogous genes	93.351	5R24OD026435-02		465,112	80,865
Total for CFDA 93.351				1,954,784	434,579
Area A: High Precision Single Cell Genomes: Linear Amplification and Digital Haplotypes	93.353	1R33CA225344-01 REVISED		471,258	290,822
The pre-cancer atlases of cutaneous and hematologic origin (PATCH Center)	93.353	1U2CCA233262-01 REVISED		639,988	201,110
Total for CFDA 93.353				1,111,246	491,932
4D Nucleome Network Data Coordination and Integration Center	93.393	5U01CA200059-04 REVISED		2,735,190	147,323
Bone metabolism and bone metastases in prostate cancer	93.393	5R01CA179129-05Revised		47,839	1,243
Cancer Epidemiology Cohort in Male Health Professionals	93.393	5U01CA167552-07 REVISED		2,136,064	177,175
Circadian Disruption and Risk of Prostate Cancer in a Multiethnic Cohort	93.393	5R01CA202690-04		438,007	88,613
Clustered semi-competing risks analysis in quality of end-of-life care studies	93.393	5R01CA181360-04REVISED		77,711	-
Colorectal carcinogenesis and Fusobacterium nucleatum: oncomicrobe, oncometabolites, and oncoimmunology	93.393	5R01CA154426-08		357,716	-
Comparative Modeling to Inform Cervical Cancer Control Policies	93.393	5U01CA199334-05		1,397,115	927,245
Genomic targets of oncoproteins and tumor suppressors	93.393	5R01CA107486-12		707,325	-
Inference of variable chromatin loops in glioblastoma tumors and single-cells	93.393	5F31CA232670-02		29,001	-
Integrating diet and tissue whole exome sequencing data to study processed meat and colorectal cancer	93.393	5R21CA222940-02		217,692	51,323
Integrating diet, lifestyle and tumor tissue molecular subtyping to study the role of adolescent calcium intake on the risk of early onset colorectal neoplasia	93.393	5R21CA230873-02		154,208	60,367
Life Course Cancer Epidemiology Cohort in Women	93.393	2U01CA176726-06		1,268,277	788,912
Life Course Cancer Epidemiology Cohort in Women	93.393	5UM1CA176726-05Revised		556,470	318,938
Marine omega-3 fatty acid, gut microbiome and colorectal cancer prevention	93.393	4R00CA215314-02		45,420	-
Metabolic Recycling and Compartmentalization in Tumor Progression	93.393	1F99CA234839-01 REVISED		18,041	-
Molecular Biology of Oncogenic Papillomaviruses	93.393	5R35CA197262-04		987,324	-
Reducing Skin Cancer Risk in Childhood Cancer Survivors	93.393	5R01CA175231-05REVISED		147,357	32,793
Risk Factors for Breast Cancer in Younger Nurses	93.393	5R01CA050385-30		1,154,434	886,390
Single-cell analysis of tumor-microenvironment interactions in follicular lymphoma	93.393	5R21CA220147-03		40,865	10,131
Statistical Informatics for Cancer Research	93.393	5P01CA134294-10Revised		340,737	9,424
Statistical Methods for Analysis of Massive Genetic and Genomic Data in Cancer Research	93.393	5R35CA197449-04		1,072,193	22,324
Statistical methods for analysis of pooled continuous biomarker data arisen from multiple studies	93.393	5R03CA212799-02REVISED		52,957	-
The Boston Lung Cancer Survival Cohort	93.393	5U01CA209414-03		1,117,636	356,511
The Genetic Architecture of Breast Parenchymal Textural Features and its Implications for Breast Cancer Risk	93.393	5R03CA224196-02		99,235	-
The Obesity Paradox in Renal Cell Carcinoma	93.393	5R03CA195098-02Rev		26,184	10,780
Theory and methods for mediation and interaction	93.393	5R01CA222147-02		423,141	68,966
Understanding the Mechanism of a Gut Microbial Genotoxin Involved in Colorectal Carcinogenesis	93.393	5R01CA208834-04		295,602	26,826
Weight cycling and total and site-specific cancer incidence and mortality	93.393	5R03CA204825-02REVISED		42,973	-
Total for CFDA 93.393				15,986,714	3,985,284

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Droplet microfluidic technology for single cell cancer genomics	93.394	5R33CA212697-03		283,105	-
Effective Training Models for Implementing Health-Promoting Practices Afterschool	93.394	5R21CA201567-02 Revised		27,422	-
Total for CFDA 93.394				310,527	-
A p53/NFkB-mediated metabolic mechanism for chemotherapy protection	93.395	5R01CA183074-05 REVISED		158,379	-
Biomaterial Cancer Vaccines that Generate Patient-Specific Antigen In Situ	93.395	5R01CA223255-02		446,100	-
Regulation of Apoptotic Priming and Competence in Healthy and Cancerous Cells	93.395	5R00CA188679-05		197,692	-
Synthesis and Study of Natural and Non-natural Antiproliferative Agents	93.395	5R01CA047148-32		542,872	-
Target MDM2/MDMX for reducing normal tissue toxicity induced by chemotherapy	93.395	1R01CA233558-01A1		15,347	-
Total for CFDA 93.395				1,360,390	-
(PQ7) A multi-fluorescent intravital microscopy approach to study osteosarcoma	93.396	1R21CA208618-01A1 REVISED		5,044	1,515
3D Models of Immunotherapy	93.396	5U01CA214369-03		675,365	178,011
Analysis of Intratumoral Crosstalk in Clonal Populations of Ovarian Tumor Cells	93.396	5R01CA181543-05 REVISED		309,182	-
Cellular and molecular mechanism of Hippo signaling in suppressing liver tumor formation	93.396	5R01CA222571-02		298,717	-
Decoding and targeting the PI3K-mTOR signaling network in cancer	93.396	5R35CA197459-05		663,229	47,187
Elucidating chromatin organization with molecular rulers	93.396	1R21CA235421-01		15,861	-
Epithelial layer jamming in breast cancer cell migration	93.396	5U01CA202123-04		720,793	179,297
Molecular mechanisms of Nutrient sensing in cancer	93.396	5R01CA213062-03		331,087	-
Notch Signaling in Cancer	93.396	5R35CA220340-03		997,529	-
Roles of Eukaryotic Translation Initiation Factors in Gene Expression	93.396	5R01CA200913-04		636,848	-
SCH: INT: Collaborative Research Intelligent Information Sharing: Advancing Teamwork in Complex Care	93.396	5R01CA204585-02 REVISED		63,300	60,667
Single Cell Genome-Wide Myeloid Response Profiling in Immunotherapy	93.396	5R01CA218579-02		376,268	121,422
Unraveling the Complexities of Risk and Mechanism in Cancer	93.396	1R35CA220523-01A1		595,631	-
Visual Analysis of Genomic and Clinical Data from Large Patient Cohorts	93.396	5U01CA198935-03 REVISED		119,737	46,099
Visualizing healthcare system dynamics in biomedical Big Data	93.396	5U01CA198934-03 REVISED		302,637	84,972
Total for CFDA 93.396				6,111,228	719,170
Systems Pharmacology of Therapeutic and Adverse Responses to Immune Checkpoint and Small Molecule Drugs	93.397	5U54CA225088-02 REVISED		2,281,782	361,945
Total for CFDA 93.397				2,281,782	361,945
Alternative End-Joining in DNA Repair and Chromosomal Translocations	93.398	5F30CA189740-05 REVISED		47,457	-
Analysis of tumor-stroma signaling that mediates HER2-therapy resistance in breast cancer	93.398	5K99CA222554-02		163,174	-
Behavioral Economics and Improving Chemotherapy Decisions for Advanced Cancer	93.398	5K24CA181510-05		115,919	9,815
Characterization of a novel RNA-guided endoRNase and applications towards genome-wide screening for non-coding RNA roles in melanoma resistance	93.398	5F30CA210382-02 REVISED		4,122	-
Collective cellular migration, cell jamming, and matrix adhesion in breast cancer model systems	93.398	5F32CA210447-02		308	-
Defining and manipulating quiescence associated DNA damage resistance in single cells	93.398	5K99CA207727-02 REVISED		12,173	-
Defining the Novel mTORC-ATF4 Axis in Cancer	93.398	5F31CA228332-02		35,761	-
Development of covalent Pin1 inhibitors for the treatment of triple negative breast cancer	93.398	5F31CA225066-02		35,138	-
Drug Tolerant Persisters in EGFR-mutant Non-small Cell Lung Cancer: Epigenetic Landscape and Therapeutic	93.398	5F30CA213726-03		49,524	-
Effects of Brca1 Heterozygosity on Mammary Gland Biology	93.398	5F31CA228200-02		31,756	-

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Elucidating Oncogenic Mechanisms of CBL RING Domain Mutations	93.398	1F30CA236112-01A1		6,204	-
Elucidating Reversible Drug Resistance in Glioblastoma	93.398	5F31CA224536-02		35,436	-
Estrogen signaling and epigenetics in breast tumorigenesis	93.398	5F30CA192477-03 REVISED		39	-
Genome-scale CRISPR activation screening to identify lung-specific metastatic pathways	93.398	1F30CA232407-01		33,734	-
Harvard Education Program in Cancer Prevention Control	93.398	5R25CA057711-25		494,893	-
Interrogating the role for ATP-dependent chromatin remodeling complexes in immune response	93.398	1F30CA239317-01 REVISED		6,204	-
Investigating metabolic adaptations of Myc-dependent cancers	93.398	5F31CA210310-03		30,718	-
Investigating the Functional Consequences of SMARCE1 loss in Clear Cell Meningioma	93.398	5F31CA228441-02		34,004	-
Investigating the Novel Function of ATR Checkpoint Kinase in R-Loop Responses	93.398	5F31CA210311-02		3,974	-
Investigating the role of Strada signaling in promoting AML chemoresistance	93.398	1F31CA213902-01A1		24,023	-
MCV ST activates specific gene transcription by redirecting the activity of the Tip60/p400 complex	93.398	1F31CA239345-01		4,136	-
Mechanically mediated genomic changes during the metastatic cascade	93.398	5F30CA224588-02		30,325	-
Metabolic regulation of anti-tumor T cell responses	93.398	5F31CA224601-02		36,509	-
Molecular regulation and therapeutic targeting of the TSC signaling network	93.398	5F32CA221080-02		59,132	-
Novel Cannabinoid and Terpene Admixture can Reverse Bile Acid-Induced Carcinogenesis in the Esophagus	93.398	1K01CA226375-01A1 REVISED		114,791	-
Optimal BET inhibitor combination therapies in triple negative breast cancer	93.398	5F30CA228208-02		35,680	-
Program for Training in Cancer Epidemiology	93.398	5T32CA009001-43		608,850	-
Proinflammatory and hyperinsulinemic dietary patterns and colorectal cancer risk: role of the metabolome	93.398	5K99CA207736-02REVISED		33,424	-
Redefining the Molecular Landscape of Melanoma	93.398	1F31CA239347-01		4,136	-
Regulation of arginine metabolism as a therapeutic target in breast cancer	93.398	5F31CA213460-03		31,837	-
Role of Akt isoforms in PTEN-deficient breast cancer	93.398	5F31CA195701-03 REVISED		28,407	-
Role of DHX29 in the regulation of Hippo pathway effectors YAP/TAZ in cancer	93.398	1F31CA235893-01 REVISED		17,871	-
Statistical Methods for Characterizing Tumor Heterogeneity at the Single Cell Level	93.398	5K00CA222750-03		59,658	-
T antigens inhibit Notch to promote Merkel cell carcinoma in skin stem cells	93.398	5F31CA213464-02 REVISED		20,350	-
The Molecular Atlas Project	93.398	5F32CA204038-03 REVISED		46,150	-
The role of Folliculin, tumor suppressor mutated in BHD, in mTOR nutrient sensing	93.398	5F30CA180754-04 REVISED		47,497	-
Training Grant in Quantitative Sciences for Cancer Research	93.398	5T32CA009337-38		526,514	-
Tumor suppressor role of the DREAM complex	93.398	5F31CA220800-02		32,688	-
Total for CFDA 93.398				2,902,516	9,815
Supporting Families of Preterm Infants to Access Supplemental Security Income	93.647	90PD0302-01-03		(2,515)	-
Total for CFDA 93.647				(2,515)	-
A defend and destroy approach to curing HIV	93.837	5U19HL129903-05 REVISED		1,856,231	1,146,825
Assessing the effects of antihypertensive medication adherence through bayesian dynamic linear models	93.837	7R21HL121366-03 REVISED		22,278	-
Characterizing the mechanism of loss-of-function mutations in ALPK3 in the pathogenesis of cardiomyopathy	93.837	1F30HL147389-01		2,068	-
Complement Activation and Initiation of Heart Regeneration	93.837	5R01HL137710-02		406,866	-
CVD Epidemiology Training Program in Behavior, the Environment and Global Health	93.837	5T32HL098048-10		344,722	-

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Deconstructing Roles of Sensory Neuron Subtypes in Respiration and Airway Defense	93.837	5F31HL132645-03 REVISED		27,633	-
Defining Genetic Architecture and Pathways of DCM	93.837	5R01HL080494-12		602,847	-
Developing Standardized Intraoperative Process Models to Enhance Surgical Safety	93.837	5R01HL126896-03		372,166	276,696
Diet quality and cardiometabolic disparities among Latino ethnic subgroups	93.837	5K01HL120951-05		153,811	-
Dietary Etiologies of Heart Disease	93.837	5R01HL035464-29		958,325	227,592
Genetic Determinants of Chagas Cardiomyopathy	93.837	5R01HL133165-03		457,514	-
Genetic Signals in Ventricular Hypertrophy	93.837	5R01HL084553-09		14,578	-
HDL Proteins and Coronary Heart Disease	93.837	5R01HL123917-04		101,279	2,158
HIV-induced transcriptional changes in alveolar macrophages in susceptibility to M. tuberculosis infection	93.837	5F30HL134566-03		49,444	-
Integrating lifecourse approaches, biologic and digital phenotypes in support of heart and lung disease epidemiologic research	93.837	1U01HL145386-01		111,043	3,072
Investigating the role of the complement system in cardiac regeneration	93.837	1F32HL146000-01A1		4,230	-
Mechanisms of DNA interstrand cross-link repair	93.837	5R01HL098316-08		277,886	-
Mediterranean diet, Metabolites, and cardiovascular Disease	93.837	3R01HL118264-07S1		879,683	410,295
Molecular Architecture Of The Mitochondrial Calcium Uniporter	93.837	5R01HL130143-03		771,499	418,747
Multi-scale modeling of inherited pediatric cardiomyopathies	93.837	5UG3HL141798-02 REVISED		1,747,990	1,052,906
NHLBI Summer Training Experience to Increase Diversity in Health-Related Research	93.837	5R25HL121029-05		11,587	-
Preterm delivery and risk of maternal cardiovascular disease in the Nurses' Health Study II	93.837	5F31HL131222-03REV		996	-
Regulation of Cardiac Development in Health and Disease	93.837	5UM1HL098166-10		746,806	541,608
Reprogramming Non-myocytes to Cardiomyocytes in vivo	93.837	5R01HL119230-04		346,062	120,612
Role of interleukin-3 in autoimmune and viral myocarditis	93.837	1F31HL147364-01		2,068	-
Sensory biology of respiratory control neurons in the vagus nerve	93.837	5R01HL132255-04		589,544	-
Simulation Modeling and Disparities in Obesity and Chronic Disease	93.837	1R01HL146625-01		38,022	-
Single cell molecular network mechanisms of cardiotoxicity induced by tyrosine kinase inhibitors	93.837	1F32HL142231-01 REVISED		272	-
Statistical methods for analysis of single-cell variability	93.837	5R01HL131768-05		433,842	185,201
The Integration of Trans-omics for Precision Medicine (TOPMED) and Other Heart, Lung, Blood and Sleep (HLBS) Data Sets with the Data Commons	93.837	1OT3 HL142480-01		1,716,545	-
The role of immunometabolic pathways in atherosclerosis	93.837	5R01HL125753-04 REVISED		214,541	-
The role of the enteric microbiome in chronic HIV pathogenesis and cardiovascular disease in HIV-infected individuals	93.837	5F30HL136257-02		40,546	-
Training in Interdisciplinary Pulmonary Sciences	93.837	5T32HL007118-43REVISED		515,239	-
Total for CFDA 93.837				13,818,163	4,385,712
Dissecting the Lineage and Function of the Airway Brush Cell	93.838	5F31HL136128-02		29,477	-
Lung-on-a-Chip Disease Models for Efficacy Testing	93.838	5UG3HL141797-02 REVISED		1,861,640	-
Lung-on-a-chip pulmonary fibrosis model for drug discovery	93.838	1F32HL146070-01		24,840	-
Mechanics of Monolayer Migration	93.838	5R01HL107561-05Revised		19	-
Mechanism and Function of Beta-2 Adrenergic Receptor Degradation in the Lung	93.838	4R01HL114769-04		18,835	18,835
MicroRNA-10a in Airway Smooth Muscle and Asthma	93.838	5R01HL139496-02		573,877	157,845
Physics of collective cellular migration in lung health and disease	93.838	5P01HL120839-05		2,669,329	870,112
Trial of Vitamin D Supplementation to Prevent TB Infection in Schoolchildren	93.838	3R01HL122624-05S1Revised		666,494	489,837
Whole Blood MicroRNAs as Risk and Survival Biomarkers for ARDS	93.838	1R56HL134356-01		18,955	-
Total for CFDA 93.838				5,863,466	1,536,629

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A novel program of ubiquitination in global remodeling of the erythroid proteome	93.839	5R01HL125710-04		365,945	123,626
Characterizing the clonal dynamics and origins of the developing hematopoietic system	93.839	5F30HL137235-02		36,002	-
Functional analysis of red blood cell determinants of Plasmodium invasion	93.839	5R01HL139337-03		570,535	-
Investigating the role of ZBTB33 loss in clonal hematopoiesis and hematologic malignancies	93.839	5F31HL143844-02		29,566	-
Red cell determinants of premature hemolysis of Plasmodium infected red cells	93.839	5F32HL136173-02REVISED		50,072	-
Total for CFDA 93.839				1,052,120	123,626
Project Title: PROSPECT: Puerto Rico Observational Study of Psychosocial, Environmental, and Chronic Disease Trends	93.840	5R01HL143792-02		462,593	274,446
Total for CFDA 93.840				462,593	274,446
A mechanism for tyrosine phosphorylation of extracellular matrix proteins	93.846	5R21AR072192-02		187,718	-
Adult Bone Mass Regulation by Type 2 BMP Receptors	93.846	5R01AR064227-05		411,225	-
Assessment and Evaluation of Hill-type Muscle Models for Predicting In Vivo Force	93.846	5R01AR055648-08		83,735	78,306
Biogenesis of Extracellular Matrix	93.846	2R56AR036819-33A1		305,430	-
Biogenesis of Extracellular Matrix	93.846	4R01AR036819-32		(939)	-
Characterization of the Insulin to Autophagy Pathway in Muscles	93.846	5R01AR057352-10		364,961	-
Epigenetic regulation of skeletal patterning and morphogenesis during development	93.846	5K01AR069197-04		110,258	-
Hypertrophy and Inflammation in Osteoarthritis: epistasis or synergy	93.846	5R01AR069671-04		538,753	-
Interdependence of lineages within the mammalian skin	93.846	5R01AR070825-04		281,970	-
Mechanisms and function of the microtubule podosome connection in osteoclasts	93.846	4R01AR062054-05		(71)	-
Molecular Mechanism of Wnt/Planar Cell Polarity Signaling	93.846	5R01AR070877-03		320,202	-
Muscle Tregs in health and disease	93.846	5R01AR070334-04		310,871	-
R-Spondin3 as a target for anabolic bone therapy	93.846	5R01AR064724-05		400,585	-
Regulation of Skin Inflammation by Nociceptive Sensory Neurons	93.846	5R01AR068383-05		320,541	-
Role of GATA6 in regulating hedgehog signaling in the growth plate	93.846	5R01AR060735-05 REVISED		3,106	-
Role of the first secreted tyrosine kinase in bone development, homeostasis, and repair.	93.846	5R01AR066717-05		773,761	-
Transcriptomics in synoviocytes defines pathogenesis of rheumatoid arthritis	93.846	5F31AR070582-02		4,653	-
Uncovering the Genetic Mechanisms Behind Joint-Specific Osteoarthritis	93.846	5R01AR070139-02		636,991	121,783
Total for CFDA 93.846				5,053,750	200,089
Adipose-tissue Tregs: important players in immunological control of metabolism	93.847	5R01DK092541-08		329,280	-
Adjusting for selection bias due to missing data in electronic health records-based research	93.847	1F31DK118817-01REVISED		31,462	-
Aire, a zinc-finger protein that controls autoimmunity	93.847	5R01DK060027-19		371,655	-
Automated Glucose Regulation to improve Diabetes Control and Outcomes for Pregnant Women with Type 1 Diabetes and Fetus	93.847	5R01DK120358-02		115,714	25,232
Bacterial Metabolites controlling Th17 cells	93.847	5R01DK110559-04		514,316	26,995
Biomarkers for diabetes using stem cell-derived beta cells	93.847	1UC4DK104159-01		10,609	-
Cell and Molecular Dynamics of Hematopoiesis In Vivo	93.847	5R24DK103074-04		716,763	259,739
Cellular signaling in muscle metabolic adaptation and energy metabolism	93.847	5R01DK113791-03		457,197	-
Central circuitry controlling micturition	93.847	5R01DK114834-03		246,045	55,557
Charting vagal circuits containing glucagon-like peptide 1 receptor	93.847	5R01DK103703-04		257,699	-
Control of metabolic homeostasis in diabetes by sirtuins	93.847	5R01DK103295-04 REVISED		219,475	-
Deciphering the molecular basis of T1D in human cells using functional genomics	93.847	1DP3DK111898-01 REVISED		826,348	489,677
Dietary Interventions, Metabolites, and Risk of Type 2 Diabetes	93.847	5R01DK102896-04		522,727	400,004

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Effect of mitochondrial mutations on ion channel activity and cytoskeletal homeostasis	93.847	5F30DK112477-03		38,000	-
Elucidating mechanisms of SIRT1 activation	93.847	5R01DK100263-04		423,797	-
Empowerment as a mechanism for change in childhood obesity prevention	93.847	5R01DK108200-04		671,734	209,253
FOOD-BASED BIOMARKERS, DIET QUALITY, AND CARDIOMETABOLIC HEALTH	93.847	1R01DK120870-01 REVISED		6,438	-
Generating novel sources of functional human insulin-secreting cells for T1D modeling	93.847	1UC4DK116280-01 REVISED		367,401	122,256
Identification of Novel Regulators of Fetal Hemoglobin Expression	93.847	5F30DK103359-03 REVISED		78	-
Identifying the Neural circuit for presystemic control of vasopressin release	93.847	5F31DK109575-03		31,837	-
Inflammatory and stress signaling networks in metabolic disease	93.847	5R01DK052539-20		(65,464)	-
Investigating Renal Reabsorption Physiology in 3D-Printed Human Kidney Tissues	93.847	1F32DK117575-01A1 REVISED		30,358	-
Investigating the physiological mechanisms that allow the blind cavefish <i>Astyanax mexicanus</i> to thrive in a low nutrient environment	93.847	5F32DK108495-03		66,702	-
Investigating the role of natural and engineered curli fibers in mediating interactions with the gut epithelium	93.847	5R01DK110770-03		544,965	-
Linking hypothalamic and amygdalar circuits underlying attention to food cues	93.847	5F31DK105678-03 REVISED		3,974	-
Lipid-dependent regulation of human Th17 cell function	93.847	5R01DK106351-05		518,643	-
Mapping protein communication between organs in homeostasis and disease	93.847	5R01DK121409-02		824,798	491,443
Mechanisms of dietary control of the transsulfuration pathway and increased endogenous hydrogen sulfide production	93.847	5R01DK090629-07		444,384	-
Mediterranean Diet, Polyphenol-Rich Foods, Gut Microbiota and Type 2 Diabetes	93.847	1K99DK119412-01		71,675	-
Metabolomics and Type 2 Diabetes in a Cohort of Older Puerto Ricans	93.847	5K01DK107804-04		183,597	-
Microbial Iron Metabolism and Its Regulation by Cannabinoids	93.847	5R01DK064750-10		267,882	-
Molecular mechanisms of sensory transduction in the gut	93.847	5R00DK115879-03		374,450	-
Molecular pathways underlying organ-specific targeting by the vagus nerve	93.847	1F32DK117798-01A1		33,635	-
NKT cell mediated immunoregulation by symbiotic gut microbial glycosphingolipids	93.847	5K01DK102771-03 REVISED		16,925	-
Pediatric Artificial Pancreas System for Enhanced Diabetes Management In Young Children with Type 1 Diabetes	93.847	7DP3DK104057-02 REVISED		657,419	359,255
Physiology of Lipid Droplets and Triglyceride Storage	93.847	5R01DK101579-06		430,044	-
Production of clinical-grade diabetes patient-specific induced pluripotent stem cell lines intended for autologous beta cell replacement therapy	93.847	3UC4DK104165-01S1 REVISED		2,042,031	857,160
PTH resistance and marrow adipogenesis	93.847	5R01DK112374-02		541,658	156,983
Quantification of genetic circuits for detection of intestinal inflammation	93.847	5F32DK112640-03		62,044	-
Radial patterning of smooth muscle in the vertebrate gut	93.847	5F31DK111059-02		5,172	-
Regulation of Fructose Transport by Thioredoxin-Interacting Protein	93.847	5R01DK107396-04		417,733	-
Reprogram gastric tissue to functional insulin-secreting cells	93.847	5R01DK106253-03 REVISED		259,349	-
Resolving the role of nicotine-mediated phosphorylation on pancreatic fibrosis	93.847	5K01DK098285-05		48,372	-
Saliva and Plasma Metabolomic Signatures of Diabetes Progression in a Hispanic Cohort	93.847	1R01DK120560-01		10,590	-
Training Grant in Academic Nutrition	93.847	5T32DK007703-24REV		313,540	-
Trial of Vitamin D in HIV Progression	93.847	5R01DK098075-05REVISED		342,585	200,476
Total for CFDA 93.847				14,605,636	3,654,030
A Facility to Generate Connectomics Information	93.853	1U24NS109102-01 REVISED		131,005	-
A new molecular code for the development of synapse specificity	93.853	1R01NS110713-01		114,627	-

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A quantitative framework for understanding endosomal trafficking networks in Alzheimer's disease	93.853	1R01NS110395-01		247,290	-
Action and interaction of ionotropic and metabotropic neurotransmission	93.853	5R37NS046579-15		823,266	-
Architecture and function of striatal dopamine release machinery	93.853	5R01NS103484-03		619,035	-
Big data screening for associations between medication use and ALS	93.853	5R21NS099910-02 REVISED		197,509	79,434
C9ORF72 in Motor System Biology and ALS	93.853	5R01NS089742-05		380,247	-
Cell type-specific vulnerability of neurons to axonal injury: comprehensive mapping of types and gene expression analyzed by high throughput single cell RNAseq	93.853	5R21NS104248-02		214,607	-
Cerebellar Outputs	93.853	5F32NS101889-03		58,174	-
Circuits, serotonergic neurons, and the modulation of behavior: Characterization of a specialized serotonergic neuron subtype responsive to dopamine and central to social behavior	93.853	1F99NS108515-01 REVISED		26,340	-
Circuit-specific transcriptional mechanisms underlying the precision of synaptic connectivity	93.853	1R01NS103905-01A1		106,563	-
Contribution of Peripheral Mechanoreceptor Subtypes to the Functional Organization of Mouse Primary Somatosensory Cortex	93.853	5F32NS105324-02 REVISED		59,275	-
Control of long gene expression as a novel therapeutic approach for Rett syndrome	93.853	5K08NS101064-03		178,248	-
Controlling the spatial extent of light-based monitoring and manipulation of neural activity in vivo	93.853	1UF1NS108177-01		420,860	39,825
Core Facilities for Analysis of Neural Circuit Structure and Function	93.853	5P30NS062685-09 REVISED		258,124	-
Corticospinal modulation of tactile information processing in the spinal cord dorsal horn	93.853	5F31NS101843-02 REVISED		31,681	-
Defining a Role for the Entopeduncular Nucleus in Motivated Behavior	93.853	5K99NS105883-02		56,935	-
Defining Synapse-Regulatory Functions of the Microtubule +TIP TACC in Drosophila	93.853	5F31NS101756-03		29,769	-
Defining the cellular metabolic responses to brain activity using fluorescent biosensors	93.853	5F32NS100331-03		63,972	-
Development of novel transsynaptic tracers for use in the central nervous system	93.853	5R01NS083848-05 REVISED		245,995	-
Development, Validation, and Application of a Stroke Policy Simulation Model	93.853	5R01NS104143-02		298,502	79,737
Electrical Stimulation of Immediate Early Genes	93.853	5R37NS028829-30		642,358	-
Elucidating cutaneous mechanosensory circuits, from development to disease	93.853	5R35NS097344-03		886,275	-
Epigenetic Regulation of Cortical Neuronal Lineage Progression	93.853	5R01NS102228-02		307,587	-
Extracellular matrix dependent maintenance of cortical neuron identity	93.853	5F31NS098539-03		31,514	-
Formation of a neuron-glia contact at single-cell resolution in C. elegans	93.853	5F31NS103371-02		31,541	-
Functional Genomic Analysis of Neural Activity-Regulated Enhancer Deactivation	93.853	5F30NS095458-03 REVISED		35,502	-
Growth cone RNA-proteome mapping in subtype-specific cortical circuit formation	93.853	5F31NS103262-03		30,394	-
HMS/BCH Center for Neuroscience Research	93.853	5 P30 NS072030-07		484,528	-
Imaging cellular energy metabolism in vivo using fluorescent biosensors	93.853	5F32NS093784-03 REVISED		700	-
Investigating the Role of Long Gene Misregulation in Rett Syndrome	93.853	5F32NS101739-02 REVISED		51,752	-
Lagging or Leading Linking Substantia Nigra Activity to Spontaneous Motor Sequences	93.853	3U01NS094191-03S1		266,637	-
Mammalian circadian clock: genetics of PERIOD complex composition and structure.	93.853	5R01NS095977-03		552,648	-
Mapping serotonergic neuron subtypes protective for seizure-induced neurological and neurobehavioral changes	93.853	1F31NS108406-01		25,774	-
Mechanisms and functions of synapses and circuits	93.853	5R35NS097284-02 REVISED		708,975	-
Mechanisms of seizure resistance in a mouse genetic model with altered metabolism	93.853	5R01NS102586-02		445,449	-
Mechanisms of Vesicle Docking and Priming for Striatal Dopamine Release	93.853	1F31NS105159-01A1 REVISED		22,007	-
Mechanosensory feature extraction for directed motor control	93.853	5R01NS101157-03		302,409	-
Metabolomics and risk of Parkinson's Disease	93.853	3R01NS089619-05S1		638,055	369,809

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MicroRNA-Dependent Regulation of Synaptic and Behavioral Plasticity in Drosophila	93.853	5P01NS090994-04		1,251,790	556,206
Molecular Controls over Neurogenesis, Subtype Development, and Diversity of Cortical Output Projection Neurons	93.853	5R01NS045523-15		379,152	-
Molecular Dissection of Active Zone Functions in Neurotransmitter Release	93.853	5R01NS083898-05 REVISED		392,868	-
Molecular mechanisms of neuron motility and axon guidance	93.853	5R01NS069913-09		375,595	-
Molecular principles of neuronal maturation and integration in the adult and aging brain	93.853	5R01NS103758-02		486,496	208,724
Motion Sequencing for All: pipelining, distribution and training to enable broad adoption of a next-generation platform for behavioral and neurobehavioral analysis	93.853	1U24NS109520-01		10,314	-
Multiple timescales of motor planning and execution in mouse cortex	93.853	1F31NS108450-01A1		4,136	-
Neural circuits in zebrafish: form, function and plasticity	93.853	5U01NS090449-03 REVISED		(47,122)	(3,224)
Neural circuits underlying the acquisition and control of motor skills	93.853	5R01NS099323-04		422,356	-
Neuroimaging and Neuropsychological Biomarkers of Vascular Risk Factors	93.853	5R01NS086882-05		262,998	30,113
Neuronal Activity-Dependent Regulation of MeCP2	93.853	5R01NS048276-15		499,275	-
Neurotrophic Factor Regulation of Gene Expression	93.853	5R01NS045500-31		617,123	-
Novel BEAM and R26-BEACON recombinase-based systems for mosaic analysis of gene function	93.853	5R21NS104733-02		270,992	-
Novel lipoprotein particles, brain abnormalities, and risk of dementia and stroke	93.853	5R01NS089638-04		469,681	128,920
Novel molecular genetic tool for large-scale labeling and modulating activity of neurons associated with particular physiological processes and behaviors	93.853	3R21NS106406-01A1S1 REVISED		173,388	-
Novel optrodes for large-scale electrophysiology and site-specific stimulation	93.853	3U01NS094190-03S1 REVISED		151,435	93,104
Parietal cortex networks for sensorimotor processing during navigation	93.853	5R01NS089521-05		525,169	-
Principles of multi-whisker stimulus integration in rodent somatosensory cortex	93.853	4K00NS105186-02		28,964	-
Projection neuron control over interneuron positioning into neocortical circuitry	93.853	5R01NS078164-05		(1,205)	-
Prospective study of biomarkers and risk factors for ALS incidence and progression	93.853	4R01NS045893-11 REVISED		45,114	1,476
Prospective study of vitamin D and MS risk in African Americans	93.853	1R01NS103891-01A1		141,562	-
Regulation of Synapse Morphogenesis in Drosophila	93.853	5R01NS069695-09 REVISED		263,292	-
Regulation of synaptic specificity by two Ig-domain containing families	93.853	5K01NS094545-03		6,472	-
Role of nNOS cortical neurons in slow wave activity production and cognition	93.853	5R21NS092926-02		4,636	-
Seizure Prediction in a Rodent Model of Focal Epilepsy	93.853	5F31NS105161-02 REVISED		37,586	-
Sensorimotor processing, decision making, and internal states: towards a realistic multiscale circuit model of the larval zebrafish brain	93.853	5U19NS104653-02		3,816,156	663,394
Sensory-motor processing in a developing nervous system	93.853	5R01NS082525-04		807,956	459,304
Somatosensory and Autonomic Circuit Modulation by Brainstem Serotonergic Neurons	93.853	5F32NS106762-02 REVISED		58,028	-
State-dependent interaction of antiepileptic drugs with voltage-dependent sodium channels and differential regulation of excitatory and inhibitory central neurons	93.853	1R01NS110860-01		109,433	-
Statistical methods for censored and dependently truncated data	93.853	5R01NS094610-03 REVISED		112,610	47,770
Stimulus Selectivity in Drosophila Primary Mechanosensory Neurons	93.853	5F31NS106982-02		33,015	-
Structural and functional development of touch sensory neurons	93.853	5F32NS106807-02		59,983	-
Structure and function of the mouse parafascicular and entopeduncular nuclei	93.853	5R01NS103226-03		468,448	54,026

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Studying perceptual decision-making across cortex by combining population imaging, connectomics, and computational modeling	93.853	1R01NS108410-01		791,802	95,513
Synaptic Choices in the Retinotectal System	93.853	5R37NS029169-29		271,813	-
Synaptic connectivity of Basal Forebrain neurotransmitter systems	93.853	5K99NS102429-02		76,081	-
Systematic discovery and functional analysis of the PARKIN modified proteome	93.853	5R37NS083524-15		400,472	-
The Development and Integration of Early Born SST-Expressing	93.853	4R01NS081297-4		(4,956)	-
The Development and Integration of Early Born SST-Expressing	93.853	5R01NS081297-07		531,547	-
The diversity of dopamine neurons: from connectivity and activity to functions	93.853	1R01NS108740-01		584,747	-
The Impact of Telestroke on Patterns of Care and Long-Term Outcomes	93.853	1R01NS111952-01		53,004	-
The Organization and Molecular Mechanisms of Touch Circuits During Development	93.853	1F32NS108507-01 REVISED		30,275	-
Training in Neurostatistics and Neuroepidemiology	93.853	5T32NS048005-15REVISED		174,939	-
Transgenic zebrafish for neurobiology	93.853	5R24NS086601-04 REVISED		48,250	-
Understanding Somatosensory Deficits in Autism Spectrum Disorders	93.853	5K99NS101057-02 REVISED		35,445	-
vGLUT2-Tomato mice: a novel tool to study Basal Forebrain Glutamate Neurons	93.853	5R21NS093000-02 REVISED		28,719	-
Voltage-Dependent Ion Channels Controlling Firing Patterns of Central Neurons	93.853	2R01NS036855-22 REVISED		376,652	-
Voltage-Dependent Ion Channels Controlling Firing Patterns of Central Neurons	93.853	5R01NS036855-21 REVISED		61,198	-
Total for CFDA 93.853				25,723,813	2,904,131
2018 Boston Bacterial Meeting (2018)	93.855	1R13AI138540-01		1,445	-
A clinical trial to evaluate the impact of broadly neutralizing antibody VRC01 on HIV viral reservoir and maintenance of suppression in a cohort of early-treated children in Botswana	93.855	5U01AI135940-02REVISED		1,163,331	687,613
A Non-Canonical Translation Mechanism for Vesicular Stomatitis Virus	93.855	5F31AI138448-02		37,698	-
Accompanying HIV-positive adolescents through the transition into adult care: a feasibility study	93.855	1R21AI143365-01		22,269	-
Bacteriology PhD Training Program	93.855	5T32AI132120-03		379,548	-
Bioenergetic control in immune cell function	93.855	5R21AI131659-02		309,780	-
Biostatistics/Epidemiology Training Grants in AIDS	93.855	5T32AI007358-30REVISED		457,841	-
Botswana-Harvard School of Public Health AIDS Initiative Partnership CTU	93.855	5UM1AI069456-13REVISED		2,441,612	2,187,561
Cell surface biogenesis in Streptococcus pneumoniae	93.855	1R01AI139083-01A1 REVISED		136,711	-
Characterization of 3.47, a NPC1-targeting inhibitor of Ebola GP-mediated entry	93.855	5F31AI131452-03		29,027	-
Characterization of a novel interaction between intracellular T. cruzi amastigotes and host mitochondria	93.855	1R21AI135520-02		216,431	-
Chemical genetic screening to identify synergistic inhibitors of malaria parasite cell cycle regulators	93.855	5R21AI128480-02		116,486	-
Chemogenomic Interrogation of Non-Genetic Drug Resistance in Plasmodium falciparum	93.855	5F31AI129412-02REVISED		26,610	-
Coordinate Regulation of Bacterial Virulence Factors	93.855	5R01AI026289-29		363,014	-
CRISPR/Cas9 based antivirals for treatment of latent and lytic Herpesvirus-1 and -2 infection in vivo	93.855	5R21AI135423-02		187,822	-
Cytotoxic T Cell Mediated Immunity to Chlamydia	93.855	5R01AI039558-23		669,563	-
Decoding the roles of critical genes of unknown function in M. tuberculosis	93.855	5U19AI107774-05Rev		608,676	479,950
Deep sequencing of pathogens to precisely define transmission networks using rare variants	93.855	5R01AI128344-03		508,369	23,698

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Defining physiological correlates of the human malaria infectious reservoir	93.855	5R21AI117304-02REVISED		87,043	23,916
Defining regulators of immunity to acute infection using CRISPR screens	93.855	5U19AI133524-02 REVISED		2,524,896	1,846,323
Detecting Infection at Its Onset: The Site of RIG-I Signaling	93.855	5F31AI131469-03 REVISED		31,837	-
Developing a microfluidic platform for single virus genomics and virus discovery	93.855	5R21AI128623-02		116,116	6,385
Developing in vitro assays to identify small molecules that inhibit human prions	93.855	5F31AI122592-03 REVISED		28,885	-
Disentangling the Death Decision: How Living Cells Release Interleukin-1	93.855	1F31AI138369-01A1 REVISED		16,643	-
Dissecting the role of Escherichia coli peptidoglycan synthase activators	93.855	5F31AI122363-03 REVISED		23,526	-
Doctoral Training Program in Tropical Diseases	93.855	5T32AI049928-15		198,066	-
Dynamic Strategies for the clinical management of HIV disease	93.855	5R01AI102634-05REVISED		(22,978)	-
Dynamic Strategies for the clinical management of HIV disease	93.855	5R01AI102634-07		575,081	-
Early Infant Treatment	93.855	5U01AI114235-05		913,609	867,262
Ecological and genetic contributions to the spread of resistance in pneumococcus	93.855	5R01AI106786-05 REVISED		385,473	-
Elucidating a role for Calcium signaling in activation of the Nlrp3 inflammasome	93.855	5R01AI102964-05		69,927	-
Elucidating ligand-receptor interactions required for Plasmodium vivax blood-stage infection	93.855	5R01AI140751-02		424,704	-
Elucidating novel mechanisms controlling cell envelope biogenesis in Streptococcus Pneumoniae	93.855	5F32AI136431-02 REVISED		60,192	-
Epidemiology of Infectious Diseases	93.855	5T32AI007535-20		186,720	-
Expansion of research and mentoring to improve birth outcomes and treatment outcomes among HIV-affected children in Botswana	93.855	5K24AI131924-02		148,992	11,967
Exploring metabolic resistance to small molecule inhibitors in Trypanosoma cruzi	93.855	1R21AI146815-01		15,113	-
Exploring the roles of acquired immunity and functional constraint in sculpting malaria antigenic diversity in a longitudinal cohort	93.855	1R01AI141544-01		218,418	-
Forward genetic overexpression screens to identify parasite determinants of antimalarial susceptibility	93.855	5R21AI139973-02		227,019	-
Functional analysis of epigenetic regulators of malaria blood-stage proliferation and transmission	93.855	5R01AI138551-02		453,039	-
Functional analysis of Plasmodium vivax drug resistance polymorphisms	93.855	5R21AI126154-02		45,965	-
Functional characterization of HtrA, an essential mycobacterial protease	93.855	5F31AI131502-02 REVISED		7,009	-
Functional regulation of an arenavirus polymerase by the viral matrix protein and RNA ligands	93.855	5F31AI133689-02		34,369	-
Generation and Function of NK Cell Memory (Project 1 - Disaggregated project)	93.855	5R01AI111595-05		909,087	-
Genetic Analysis of Toxinogenesis in Vibrio Cholerae	93.855	2R37AI018045-39 REVISED		211,964	-
Genetic Analysis of Toxinogenesis in Vibrio Cholerae	93.855	5R01AI018045-38		926,610	-
Genetically-encoded fluorescent RNA sensors for measuring transport of antibiotics into the cytoplasm of Gram-negative pathogens and development of efflux pump inhibitors	93.855	5R01AI136789-02		872,388	305,643
Genomics approaches to elucidating pathways to antibiotic resistance in Neisseria gonorrhoeae	93.855	5R01AI132606-03		437,951	-
Harvard University Center for AIDS Research	93.855	5P30AI060354-15		4,348,342	3,134,363
HIV cure studies: risk, risk perception, and ethics	93.855	5R01AI114617-05		512,792	233,175
Human Cytomegalovirus Nuclear Egress: Molecular Mechanisms and Drug Targeting	93.855	5R01AI026077-31		518,811	-
Identification and Inference for Longitudinal Causal Mediation Analysis in HIV Research	93.855	5R01AI104459-05REVISED		56,096	56,096
Identification of Adipose Tissue Factors that Induce Regulatory iNKT Cells	93.855	5F31AI138353-02		31,918	-
Identifying and validating new antibiotic targets in cell wall synthesis pathways	93.855	4R01AI099144-05 REVISED		338,466	-
ImmGen: Gene Expression and Regulation in Immune Cells	93.855	5R24AI072073-12		1,467,870	445,596
In vivo role of CTLA-4 in Costimulation and Autoimmunity	93.855	5R01AI040614-20		664,243	-
Inactivation of ambient viruses using Engineered Water Nanostructures	93.855	5R21AI119481-02		(1,333)	-
Innovative Platforms for Antimicrobial Therapy and Vaccine Development	93.855	5U19AI109764-05 REVISED		3,193,160	224,678
Integrated Development and Discovery of Diagnostics for Drug Resistant Tuberculosis	93.855	1U19AI142793-01		62,583	-
Integrated discovery and development of innovative TB Diagnostics	93.855	5U19AI109755-05 REVISED		4,026,278	2,641,596
Interferon-induced IFITM recruitment of ZMPSTE24 blocks viral endocytic entry	93.855	5R01AI121288-04		548,511	17,672

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Malaria Genomic Epidemiology for Identifying Sources of Malaria Infection and Transmission	93.855	1R21AI141843-01		35,322	-
Mechanisms and Immunological consequences of Host-Virus Interactions	93.855	5P01AI112521-05		1,677,718	653,346
Mechanisms and Population Genomics of Pneumococcal Antigenic Diversity	93.855	4R01AI048935-15REVISED		113,042	41,959
Mechanisms of itch and neural regulation of inflammation in Staphylococcus aureus infection	93.855	1F31AI138384-01A1 REVISED		15,443	-
Methods to Advance the HIV Prevention Research Agenda	93.855	5R37AI051164-17		306,979	89,116
Molecular Basis of Viral Infectivity	93.855	5T32AI007245-35		373,804	-
Molecular biology of trichomonasviruses	93.855	5R01AI132445-02		183,729	-
Molecular Genetics of HSV DNA Polymerase Gene	93.855	2R56AI019838-31 REVISED		211,833	-
Naive T cell homeostasis: Treg selection and survival	93.855	5R37AI051530-16		219,432	-
New methods for the design and evaluation of large HIV prevention interventions	93.855	5R01AI112339-04 REVISED		128,205	96,522
Novel Genetic Mechanism of Artemisinin Resistance for Malaria	93.855	5R01AI099105-06		589,246	-
Novel Nutrient-sensing Pathway Suppresses Pathologic Tissue Remodeling	93.855	1R21AI142343-01		138,474	-
Novel Statistical Methods for Cluster-Randomized HIV Prevention Trials	93.855	5F31AI141030-02		33,734	-
Nuclear Sensing of Herpesviral DNA	93.855	5R01AI106934-04 REVISED		51,428	-
Nuclear Sensing of Herpesviral DNA	93.855	5R01AI106934-06		527,341	-
Outer Membrane Biogenesis: New Antibiotic Targets	93.855	5R01AI081059-10		259,056	-
Outer Membrane Biogenesis: New Antibiotic Targets	93.855	2R01AI081059-11		575,764	-
Pain and Neuro-immune Signaling in S. pyogenes pathogenesis	93.855	5R01AI130019-02		528,416	221,316
Peptidoglycan Biogenesis in Escherichia Coli	93.855	5R01AI083365-10		341,016	-
Pilot Study to Monitor HIV Cluster Dynamics and Active HIV sub-Epidemics in Real Time	93.855	1R21AI138812-01REVISED		51,616	15,603
Plasma Gelsolin as Immunotherapeutic for Antibiotic-Resistant Pneumonia	93.855	5R01AI125152-03REVISED		898,313	575,468
Poliovirus Cell Entry Pathways	93.855	5R01AI020566-34		660,937	-
Program for AIDS Clinical Research Training (PACRT)	93.855	2T32AI007433-26REVISED		76,067	-
Program for AIDS Clinical Research Training (PACRT)	93.855	3T32AI007433-25S1		59,834	-
Regulation of HLA-C in Human Trophoblasts and its Impact on Preterm Birth	93.855	1R21AI138019-01A1		108,953	-
Regulation of P. aeruginosa fitness by small non-coding RNAs	93.855	5R21AI125972-02		(4,042)	-
Release of Extracellular DNA during Biofilm Formation in Staphylococcus aureus	93.855	5R01AI139011-02		842,393	-
Repair of Incorporated Ganciclovir During Drug-Resistant Human Cytomegalovirus Replication	93.855	1R03AI140048-01A1		24,669	-
RNA Processing in Non-Segmented Minus-Strand RNA Viruses	93.855	5R37AI059371-15		479,955	-
Role of host fatty acid metabolism in Trypanosoma cruzi amastigote growth	93.855	5R01AI114622-05		321,808	-
SDMC - IMPACT Leadership Group	93.855	5UM1AI068616-13REV		10,394,868	4,689,057
Sensory Transduction in Bacterial Chemotaxis	93.855	5R01AI016478-40		848,420	-
Small Molecule Inhibitors of Enveloped Virus Entry	93.855	5U19AI109740-05 REVISED		3,226,986	1,922,279
Social Epidemiology of Ebola Virus Disease	93.855	1K08AI139361-01A1		44,465	-
Specification of Treg cells: FOXP3 functional facets	93.855	5R01AI116834-05		418,553	-
Staphylococcus Aureus Carriage and the Nasal Microbiome	93.855	5R21AI112991-02REVISED		1,241	-
Statistical and Data Management Center (SDMC), AIDS Clinical Trials Group	93.855	5UM1AI068634-13REV		15,307,598	7,520,835
Structural Basis of Immune Cell Receptor Function	93.855	5R01AI037581-23		378,554	-
Structural studies of herpesvirus DNA polymerases	93.855	1R21AI141940-01		79,767	-
Structure and Mechanism of Programmed Ribosomal Frameshifting in SARS coronavirus	93.855	5R01AI104711-05		194,451	-
T Cell Costimulatory Pathways: Functions and Interactions	93.855	5P01AI056299-15		2,017,853	1,441,310

The accompanying notes are an integral part of this schedule.

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
T regulatory cell subsets at the microbial interface: determinism and function	93.855	5R01AI125603-03		298,204	-
Targeting cell separation systems of gram-negative bacteria	93.855	5R33AI111713-05		474,867	-
Targeting steroid hormone signaling in Anopheles mosquitoes for malaria control	93.855	5R01AI124165-04		770,957	151,056
Targeting the Mitochondrion of P. falciparum	93.855	5R01AI093716-08		414,253	38,794
Targeting the reproductive interactome of the malaria vector Anopheles gambiae	93.855	5R01AI104956-05		154,342	-
The molecular mechanism of Aire	93.855	5R01AI088204-08		267,227	-
The role of fatty acid binding protein aP2 in the pathogenesis and treatment of asthma	93.855	5R01AI116901-04		113,348	-
The role of Fc function in broadly neutralizing antibody efficacy against HIV	93.855	5F31AI131747-03		31,554	-
The Role of PI3K in the Maintenance and Function of T Follicular Regulatory Cells	93.855	5F31AI126687-03		30,799	-
The Role of the Nuclear Envelope in Antiviral Signaling and HSV-1 Restriction	93.855	5F31AI129207-02 REVISED		30,314	-
The translation apparatus of Leishmania: from basic analysis to pursuit of novel drug targets	93.855	5R01AI108718-04		182,941	68,492
Training Program in Immunological Tolerance and Autoimmunity	93.855	5T32AI118692-05		191,543	-
Using agent-based modeling to estimate the effectiveness of the Miami Getting to Zero HIV campaign	93.855	5K01AI138863-02		87,696	-
Using genome engineering to study mosquito biology and combat malaria	93.855	5F31AI120480-02REVISED		9,891	-
Viral and host mechanisms that tilt the HSV lytic/latent balance	93.855	5P01AI098681-05		792,753	150,145
Zika Virus in Pregnancy in Nigeria	93.855	1R21AI137840-01A1		43,077	-
Total for CFDA 93.855				80,208,641	30,868,792
A Dual Catalytic Strategy for Enantioselective Pyridinium Photochemistry	93.859	5F32GM125187-02		56,754	-
A synchronized circadian clock in gut bacteria, using control theory	93.859	5F32GM125108-03		58,727	-
Accelerated Determination of 3D Structures of Proteins and Complexes	93.859	7R01GM106303-04 REVISED		47,119	-
Advanced Tools for Reconstructing Population History	93.859	5R01GM100233-08		376,829	153,122
Aggression in Drosophila: circuitry involved; learning and memory accompanying aggression; and establishing the circuitry of high-level aggression in the brain	93.859	5R35GM118137-04		650,127	-
Amyloid aggregation and prion formation in bacteria	93.859	5R01GM115941-04		408,337	-
Analysis of the Essential Transcription Factors Spt5 and Spn1/lws1	93.859	5R01GM120038-03		706,458	-
Bayesian Methods for Comparative Effectiveness Research with Observational Data	93.859	5R01GM111339-04 REVISED		440,274	-
Biochemical characterization of LMW PBPS with novel transpeptidase activity	93.859	5F32GM123579-03 REVISED		63,598	-
Biochemical Studies of Mitosis	93.859	5R01GM026875-42		895,095	-
Bioinformatics and Chemical Biology Approaches for Identifying Bioactive Natural Products of Symbiotic Actinobacteria	93.859	1F32GM128267-02		58,282	-
Biological Diversity: Generation, Control, and Exploitation	93.859	5P50GM068763-10 REVISED		(2,688)	-
Biophysical mechanisms of proteomic and fitness effects of synonymous substitutions	93.859	5R01GM124044-03		405,112	-
Bmal1 and Hif1 alpha partition metabolic regulation in inflammatory macrophages	93.859	5F31GM117854-03 REVISED		26,420	-
Broadly Applicable, Small Molecule Catalysts for Stereoselective and Site-Selective Glycosylation Reactions	93.859	1R01GM132571-01		61,220	-
Calibration and Simulation of the Botswana Combination Prevention Project	93.859	5R01GM116525-03		244,641	12,901
Cell and Chemical Biology of Microtubules	93.859	1R35GM131753-01		39,316	-
Cell Envelope Homeostasis in Bacillus subtilis	93.859	1R01GM127399-01A1		88,007	-
Characterizing the Co-evolution of Protein-protein and Regulatory Interactions	93.859	5F32GM116217-03		5,247	-
Characterizing the regulation of co-transcriptional splicing rates in human cells	93.859	5F31GM122133-02 REVISED		18,529	-
Chiral Catalysts Designed to Catalyze Organic Reactions	93.859	3R01GM043214-29S1		833,571	-
Chromosome Dynamics in Bacillus Subtilis	93.859	5R01GM086466-08 REVISED		39,871	-

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Chromosome Dynamics in Bacillus Subtilis	93.859	5R01GM086466-10		236,200	-
Correlation of electronic structure to iron catalyzed C-H bond functionalization	93.859	5R01GM115815-04 REVISED		283,881	-
Decoding chromosome structure with multiplexed super-resolution microscopy	93.859	1R01GM124401-01 REVISED		378,763	-
Defining the cellular functions of the conserved transcription complex Spt6/lws1 in the control of gene expression	93.859	5F32GM119291-03		59,125	-
Designing Biological Circuits	93.859	4R01GM036373-32		354	-
Determination of the molecular basis of choanoflagellate multicellularity induction by bacteria	93.859	5F32GM116205-03		10,236	-
Determining the source of missing heritability	93.859	5R01GM120122-04		324,352	-
Discovering the regulatory roles of transcription during erythropoiesis, one nucleotide at a time	93.859	5F32GM125238-02		59,781	-
Discovery of Small Molecule Immunomodulators from Disease-Associated Microbiome Members	93.859	5F32GM122233-02		60,313	-
Dissecting the establishment and regulation of human pluripotency	93.859	5P01GM099117-08		2,383,160	887,005
Diversity in Biomedical Sciences Via Personalized Research and Education Programs for Post-Baccalaureates	93.859	5R25GM109436-04		226,033	-
DNA-corrallated nanodiscs for study of large membrane proteins and their complexes	93.859	1R01GM131401-01 REVISED		245,018	-
Drosophila Transgenic RNAi Resource Project	93.859	5R01GM084947-12		788,605	-
Dual Hydrogen-Bond Donor and Cation- π Catalysis: Enantioselective Cycloadditions of Strained Donor-Acceptor Ring Systems	93.859	5F32GM126636-02 REVISED		56,657	-
Dynamic regulatory mechanisms of robust pattern formation in the neural tube	93.859	5R01GM107733-04 REVISED		210,872	-
Dynamics of Cellular Senescence in Single Cells	93.859	5R01GM116864-03		351,871	-
Dynamics of Signaling Pathways: Mechanism and Function	93.859	5R01GM083303-12		421,732	-
Elucidating a physiological role for ARRDC-1 Mediated Microvesicles (ARMMs): A versatile platform for the delivery of biological therapeutics	93.859	1F31GM131567-01		19,346	-
Elucidating the function of mammalian autophagy receptors in selective autophagy	93.859	5K99GM117218-02		9,410	-
Elucidating the role of an immunomodulator from a gut microbe in inflammatory bowel disease	93.859	5F32GM126650-02		58,390	-
Engineering Protein Stability Through Phage-Assisted Continuous Evolution	93.859	5F32GM119228-03 REVISED		51,288	-
Enhancement of Protein Breakdown through PKG-mediated Phosphorylation of the Proteasome	93.859	1F32GM128322-01A1		48,050	-
Enhancing Diversity in Academic Medicine through Faculty Networks	93.859	5R01GM111563-04 REVISED		163,039	2,745
Epigenetic Inheritance of Heterochromatin	93.859	5R01GM072805-15		308,856	-
Feedback Control of the Cell Cycle	93.859	5R01GM043987-28		606,493	-
Function and mechanism of the HCV p7 channel and its therapeutic potential	93.859	5R01GM116898-04		506,584	-
Functional characterization of an insulin-like peptide network that regulates learning	93.859	5R01GM108962-04		436,921	246,289
Functional Genomic Analysis by RNAi Screening in Drosophila Cells	93.859	5R01GM067761-16		1,380,491	-
Furshpan and Potter Native American High School Summer Program	93.859	1R25GM129830-01		77,185	-
Genetic Mechanisms of Axis Formation in Vertebrates	93.859	5R37GM056211-21		333,813	-
Genetics and Genomics PhD Training Grant	93.859	5T32GM096911-09		284,443	-
Genome-wide validation of posttranscriptional variation in selection and disease	93.859	5F30GM114940-03		23,981	-
Harvard Chemical Biology Graduate Program	93.859	3T32GM095450-09S1		467,442	-
Harvard Systems Biology Graduate Program	93.859	5T32GM080177-10		281,374	-
High Resolution Analysis of Transcription-Splicing Coupling	93.859	5R01GM117333-03		458,369	-
High-throughput optimization of genetically-encoded fluorescent biosensors	93.859	5R01GM124038-03		200,335	-
HMS Laboratory of Systems Pharmacology	93.859	5P50GM107618-05		1,750,594	141,608
Human microbiome metabolites in health and disease	93.859	1R35GM128618-02		350,562	-
Illegitimate Recombination by Drug Resistance Elements	93.859	5R01GM025326-39		710,389	-
Illuminating molecular mechanisms of cellular functions by single-molecule and super-resolution imaging	93.859	5R35GM122487-03		522,810	-
Information Integration and Energy Expenditure in Eukaryotic Gene Regulation	93.859	5R01GM122928-03		461,634	-

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Information Processing by Post-translational Modification	93.859	5R01GM105375-04 REVISED		187,468	49,500
Interdisciplinary training: Statistical Genetics/Genomics and Computational Biology	93.859	5T32GM074897-14		426,780	-
Joint Program in Molecules, Cells and Organisms	93.859	3T32GM007598-41S1		940,870	-
Kinetic control of transcription in animals	93.859	5F32GM128310-02		57,971	-
Limits and trade-offs of feedback control	93.859	5R01GM081563-09		233,060	-
Mapping the assembly pathways for viral capsids by direct single-particle measurements	93.859	1K99GM127751-01A1		32,338	-
Mapping vertebrate differentiation hierarchies with high-throughput single cell transcriptomics	93.859	5K99GM121852-02 REVISED		70,777	-
Maximizing Investigator's Research Award	93.859	5R35GM127136-02		877,164	-
Measuring and modeling the dynamics of patterning in human stem cells	93.859	1R01GM131105-01		170,766	-
Measuring the statistics of pleiotropic and epistatic fitness effects of beneficial mutations during microbial adaptation across environments	93.859	5F32GM122360-02 REVISED		51,870	-
Mechanism and Inhibition of Enzymes that Assemble Bacterial Cell Wall	93.859	5R01GM076710-12		509,391	-
Mechanism of Divalent Metal Transport By Nramp-Family Transporters	93.859	3R01GM120996-03S1		280,910	-
Mechanism of NEIL3-dependent ICL repair	93.859	1K99GM129422-01		63,612	-
Mechanisms of Lipid Droplet Formation	93.859	5R01GM124348-03		397,402	-
Mechanisms of Lipid Droplet Protein Targeting	93.859	5R01GM097194-09		338,181	105,932
Mechanisms of Selective Autophagy	93.859	5R01GM095567-08 REVISED		374,983	212,864
Mechanisms of yeast transcriptional initiation	93.859	5R01GM030186-37		1,045,831	-
Mechanistic Analysis of the Ubiquitin-Proteasome System	93.859	5R35GM127032-02		477,977	-
Mechanistic and proteomic studies of a proteasome-associated ubiquitin ligase	93.859	5F32GM125355-02		57,234	-
Medical Scientist Training Program	93.859	3T32GM007753-41S1		2,553,897	-
Meiotic Chromosome Synapsis and Recombination in Yeast	93.859	5R01GM044794-29		798,326	38,833
Microbial Adaptation and the Statistics of Epistasis and Pleiotropy	93.859	5R01GM104239-07		369,933	-
Microbial adaptation and the statistics of epistasis and pleiotropy	93.859	5R01GM104239-05		(9,834)	-
Microtubule Dynamics and Mitotic Mechanism	93.859	5R01GM039565-31		531,918	-
Microtubule Integrity Response	93.859	3R01GM122784-02S1		357,422	-
MIDAS Center for Communicable Disease Dynamics	93.859	5U54GM088558-10REVISED		1,755,842	344,709
Modeling individual-to-collective behavior in mound-building termites	93.859	5R01GM112633-05		418,097	101,902
Modeling scientific workforce dynamics using social network analysis	93.859	5U01GM112623-04 REVISED		312,930	131,615
Molecular Biophysics Training Grant	93.859	5T32GM008313-30		754,087	-
Molecular Chaperones and Protein Degradation	93.859	5R01GM051923-23		474,726	-
Molecular Genetic Analysis of Extracellular RNAs in C. elegans	93.859	5R01GM089795-08 REVISED		(9,635)	-
Molecular Genetic Analysis of Extracellular RNAs in C. elegans	93.859	5R01GM089795-10		485,593	-
Molecular Genetics of Biofilm Formation	93.859	5R01GM058213-20 REVISED		241,205	-
Molecular Genetics of the Bithorax Complex	93.859	5R01GM028630-31 REVISED		190,378	-
Molecular mechanisms by which mild elevation of mitochondrial superoxide extends lifespan	93.859	1R01GM121756-01		245,590	-
Molecular mechanisms of germline DNA repair and DNA damage response	93.859	5R01GM105853-04 REVISED		1,316	-
Molecular Mechanisms of Lipopolysaccharide Transport Driven by ABC Transporters	93.859	5R01GM122797-03		431,246	-
Molecular Mechanisms of SCUBE2-Mediated Sonic Hedgehog Release and Delivery	93.859	5F31GM120833-02		3,974	-
Molecular mechanisms of sigma receptor signaling	93.859	5R01GM119185-03		334,399	-
Molecular mechanisms of spore germination	93.859	1F32GM130003-01		49,080	-
Molecular, Cellular and Developmental Dynamics PhD Program	93.859	5T32GM007226-44		845,074	-
mRNA Capping Enzyme	93.859	5R01GM056663-20		573,696	-
Multiscale study of the phenotypic consequences of protein folding intermediates in dihydrofolate reductase	93.859	5F32GM126651-02		58,682	-
New and Disruptive Technologies to Study Ubiquitin Biology through Sample Multiplexing	93.859	5R01GM067945-16		557,685	-

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New approaches to measuring and containing the spatial spread of human pathogens	93.859	5R35GM124715-02		311,648	-
Next Generation Solution NMR Techniques for GPCR Structure, Dynamics and Function	93.859	1R01GM129026-01		411,309	-
NMR and Computational Studies of Biomolecules	93.859	5P01GM047467-25 REVISED		216,075	-
Novel platforms for development of optimized genetically encoded fluorescent biosensors	93.859	5F32GM123577-03		64,211	-
Nuclear-mitochondrial co-regulation during mitochondrial biogenesis	93.859	5R01GM123002-02		313,824	-
Organogenesis of the Pharynx in C Elegans	93.859	5R37GM056264-22 REVISED		68,384	-
Pipelines into Biostatistics: Training in Quantitative Public Health	93.859	5T36GM093773-05REVISED		105,068	-
Polynuclear iron complexes as functional mimics of the nitrogenase FeMo-cofactor	93.859	5R01GM098395-07		332,034	-
Predictive biophysical models of evolution	93.859	5R01GM068670-15		525,138	-
Protein Transport Across Membranes	93.859	2R01GM052586-25		169,110	-
Protein Transport Across Membranes	93.859	5R01GM052586-24 REVISED		455,730	-
Proton Coupled Electron Transfer Mechanism of Ribonucleotide Reductase	93.859	5R01GM047274-27		476,043	-
Reconstituting heterochromatin and gene silencing in vivo	93.859	1F32GM131438-01		25,634	-
Regulation of translesion synthesis by the bacterial replisome	93.859	5R01GM114065-05		343,508	-
RNA Processing Machines in Biology and Disease	93.859	5R35GM122524-03		603,481	-
Role of RNA polymerase in bacterial differentiation	93.859	5R01GM018568-46 REVISED		160,607	-
Sending and receiving Hedgehog signals	93.859	5R01GM122920-02		717,584	-
Spatiotemporal Regulation of Liquid-like Condensates in the Germline	93.859	1R01GM132286-01		15,870	-
Structural and Kinetic Characterization of the Flavivirus Membrane Fusion Mechanism	93.859	1F32GM129940-01		36,037	-
Structure, Function and Inhibition of Human O-GlcNAc Transferase	93.859	5R01GM094263-08		420,295	-
Studies on the Biological Mechanisms of Antibiotics	93.859	5R01GM066174-16 REVISED		409,624	-
Study of phenotypic and fitness effects of non-functional protein interactions in crowded cellular milieu	93.859	5R01GM111955-04		68,989	-
Studying the mitochondrial motor/adaptor complex by misdirecting it to peroxisomes	93.859	5F31GM126681-02		29,567	-
Substrate recognition and processing by the proteasome	93.859	5R01GM043601-26		634,910	-
Synaptonemal complex assembly and function in meiosis	93.859	5R01GM072551-13		264,348	-
Technologies for visualizing the genome in situ	93.859	5R01GM123289-03		819,848	-
The 3D architecture of the mitochondrial nucleoid and its role in organelle regulation	93.859	1F32GM130028-01		43,297	-
The Effect of Multicellularity on Bacterial Interactions and Diversity	93.859	5K99GM121873-02		80,981	-
The Effects of Glucokinase Polymerization During Metabolic Transitions	93.859	5F31GM116441-03		835	-
The first secreted Tyrosine kinase	93.859	5R01GM115417-04		381,376	33,608
The genetic mechanisms and dependent pathways of insulin/IGF-like signaling that contribute to ovariole number in the Drosophila ovary	93.859	5F32GM119299-02 REVISED		67,257	-
The mechanism of vertebrate DNA replication termination	93.859	5R01GM080676-12		340,749	-
The molecular mechanism of relaxin receptor signaling	93.859	5F31GM128233-02		37,617	-
The of Role DNA LigIV and Its Accessory Factors in the NHEJ Synaptic Complex	93.859	1F32GM129913-01		49,554	-
The RNA polymerase II transcription complex	93.859	5R01GM046498-28		415,087	13,048
The role of fitness epistasis and gene network interactions in bacterial evolution	93.859	5F32GM120839-03 REVISED		13,340	-
Training in Pharmacological Sciences	93.859	5T32GM007306-43		376,546	-
Ubiquitylation and Helicase Unloading in Eukaryotic DNA Replication Termination	93.859	5F31GM122277-02		30,394	-
Uncovering kinase cascade mechanisms that target organelles for destruction by selective autophagy	93.859	5R01GM121419-02 REVISED		31,262	-
Using a new regenerative model system to elucidate mechanisms for stem cell regulation	93.859	5R35GM128817-02		104,606	-
Using Quantitative Proteomics to Elucidate the Signaling Consequences of Microtubule Disruption	93.859	5F31GM117882-03 REVISED		1,836	-
Using Quantitative Proteomics to Understand Mitotic Spindle Composition and Function	93.859	5F31GM116451-03		3,918	-

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Vesicular Trafficking of RNA from the Soma to the Germline	93.859	1F32GM125345-01		24,495	-
Visualizing DNA break repair: single-molecule studies of non-homologous end joining	93.859	5R01GM115487-04		168,351	-
Total for CFDA 93.859				50,220,198	2,475,681
A population-based online study of the transition of young adults with perinatal HIV infection to adult clinical care	93.865	5R01HD089853-04		391,740	68,382
Absolute risks of adverse of pregnancy outcomes according to maternal age and inter-pregnancy interval: interpretable results to guide clinical practice and patient decision-making	93.865	5F31HD086970-02Revised		4,013	-
Archiving and Documenting Health and Human Development Data Sets from	93.865	1R03HD094985-01A1		11,535	-
Birth Outcomes Surveillance in Botswana	93.865	5R01HD080471-05		406,053	340,626
Botswana Birth Outcomes Surveillance Extension	93.865	5R01HD095766-02		438,463	319,017
Causal Event Categories in Infancy: The Origins and Consequences of Causal Perception	93.865	5F32HD089595-03		57,839	-
Chemically Modified Peptide Agents for Next-Generation Conjugate Therapies to Treat Duchenne Muscular Dystrophy	93.865	5F30HD093358-04		51,170	-
Control of placental infection by decidual NK cell secreted granulysin	93.865	5R21HD087689-02 REVISED		(1,305)	-
Creation of Public Use Datasets for the Pediatric HIV/AIDS Cohort Study	93.865	1R03HD092138-01		77,330	66,875
Culling the human genome of disease variants using ultraconserved elements	93.865	5R01HD091797-04		1,069,189	105,256
Descending engagement of brainstem neuronal circuits that govern orofacial motor behaviors	93.865	1K99HD096512-01		56,430	-
Development and function of a neural circuit underlying sex-specificity of social behaviors	93.865	5K99HD092542-02 REVISED		135,210	-
Development of a Modular Soft Exosuit Platform Suitable for Community-Based Neurorehabilitation	93.865	5R01HD088619-03		982,840	157,070
Development of Children's Language Comprehension Using ERPs During Natural Listening	93.865	1R03HD097629-01		10,015	-
DNA-mediated recording of cellular history	93.865	5DP1HD094764-03		1,202,215	-
Embryonic gene regulatory networks from spatially resolved transcriptomes	93.865	5R01HD085905-04		492,311	-
Error Correction in Early Embryos	93.865	5K99HD091291-02 REVISED		97,255	-
Finding Genes for Infertility through the Developmental Genome Anatomy Project	93.865	5F31HD090780-02 REVISED		25,733	-
Genetic regulation of ovariole development in Drosophila	93.865	5R01HD073499-05		160,734	-
Genetics of long non-coding RNAs in zebrafish	93.865	5R01HD076708-05		202,936	-
How infants use the affiliations of their caregivers to evaluate others	93.865	1F32HD096829-01 REVISED		40,685	-
Identifying the role of dynamic ECM-derived forces in zebrafish semicircular canal morphogenesis	93.865	1K99HD098918-01		8,952	-
Integrating Forces and Signals in Tissue-Level Patterning of the Developing Digestive Tract	93.865	5R01HD087234-04		310,604	-
Integration of Mechanical Forces and Signaling in the Morphogenesis of the Gut	93.865	5R01HD089934-03		401,716	-
Long-term health consequences of birth by cesarean section	93.865	5R01HD093761-02		247,021	52,867
Mapping the signaling landscape of vertebrate development at single cell resolution	93.865	5R01HD096755-02		520,784	-
Maternal Exposure to Childhood Abuse and Disparities in Offspring Neurodevelopment: Identifying Mechanisms	93.865	1R01HD094725-01A1		25,695	-
Maternal Traumatic Stress and Child Development: Epigenetic Links	93.865	5R21HD085849-02		51,196	51,196
Mechanisms of Morphogen Transport and Interpretation in Early Embryos	93.865	1K99HD097297-01		46,455	-
Metabolic control of global gene expression during the Maternal-to-Zygotic Transition	93.865	1F32HD095590-01 REVISED		33,359	-
Microcircuits underlying murine parental behavior	93.865	5R01HD082131-05		456,333	-
Pediatric HIV/AIDS Cohort Study (PHACS) Data and Operations Center	93.865	5U01HD052102-14Rev		19,563,050	15,872,705
Pregnancy Registries Nested in International Pooled Health Care Databases	93.865	1R21HD092879 - 01		284,253	97,244
Proteomics of Cell Signaling in Embryogenesis	93.865	5R01HD091846-07		603,261	-
Recapitulating the Placental Microenvironment to Improve Models of the Maternal-Fetal Barrier for Toxicity Screening	93.865	5F31HD095594-02		32,232	-
SCH: Flexible Electronics For Assessment fo Planning By Children Born Prematurely	93.865	5R01HD090985-04		622,484	47,075
Social determinants of corticolimbic development and aggressive behavior	93.865	5F31HD096820-02		25,779	-

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Studies of Direct Pluripotent Stem Cell Programming	93.865	5R21HD087723-02 REVISED		11,606	-
Systems Analysis of cell type differentiation in Xenopus development	93.865	5R01HD073104-08		686,793	23,894
The biophysical and genetic basis of robust pattern formation and morphogenesis in zebrafish spinal cord	93.865	5K99HD092623-02		111,755	-
The effects of girl child marriage on women and children's health and well-being in sub-Saharan Africa	93.865	5F31HD090939-02		26,243	-
The Impact of Microfinance on Health: Experimental Evidence from India	93.865	5R01HD069546-05		122,344	7,413
The reprogramming of limb progenitor cells	93.865	5R01HD032443-23		636,941	-
The role of iron deficiency and supplementation in pediatric HIV infection and disease	93.865	1F31HD093514-01A1 REVISED		22,333	-
The Ventral Medulla and the Sudden Infant Death Syndrome	93.865	5P01HD036379-20		632,845	583,914
Trial of Vitamin D in Maternal HIV Progression and Child Health	93.865	5R01HD083113-05		222,435	120,297
Uncovering mechanisms and progenitors responsible for limb regeneration	93.865	7F32HD092120-02		5,240	-
Total for CFDA 93.865				31,624,100	17,913,831
(R37 Merit Extension) SIRT1 as a regulator of health and lifespan of mammals	93.866	5R37AG028730-13		344,746	-
A New Pathway for Reversing Cardiac Aging	93.866	5R01AG047131-06		328,666	-
A scalable multi-level physical activity intervention for elderly persons with chronic obstructive pulmonary disease: First steps	93.866	1R56AG052580-01		4,327	-
Aging Memory	93.866	5R01AG008441-27		406,556	-
Aging, Stress Resistance and REST/spr transcription factors	93.866	5K99AG050830-02 REVISED		19,629	-
An Innovative Language Controlled Tablet-Based Cognitive Test: Harmonizing Dementia Screening across High and Low Literacy Countries	93.866	3R01AG051144-02S1		37,961	37,687
Brain Aging Studies with Single-Neuron Resolution Using Syringe-Injectable Electronics	93.866	5K99AG056636-02 REVISED		30,604	-
Cell Non-autonomous Regulation of Aging via Neuronal TORC1	93.866	5R01AG059595-02		308,202	-
Characterizing the mechanisms behind the association between purpose in life and health	93.866	5K99AG055696-02		112,632	-
Cognitive Function, Alzheimer's Disease and Related Disorders in the HAALSI Cohort	93.866	5R01AG054066-02		417,523	111,604
Deciding about Dialysis: Improving Decision-Making Among Older Adults with ESRD	93.866	5K23AG049088-05		113,627	-
Defining Functional Outputs of Mitochondrial Networks in Longevity	93.866	5R21AG056930-02		150,870	-
Dietary restriction promotes vascular health through hydrogen sulfide-mediated angiogenesis	93.866	2R56AG036712-06A1		76,612	-
Disability among Older Low-Skilled Workers	93.866	5R01AG056239-04		453,465	60,513
Dissociating Intrinsic and Extrinsic Motor Learning in Alzheimer's Disease	93.866	4R01AG041878-05 REVISED		98,200	94,871
Epidemiology of Alzheimer's Disease and Cognition: Innovative Approaches to Global Harmonization	93.866	1R56AG054066-01Rev		181,202	140,095
Examining Trajectories of Lifestyle Factors Associated with Healthy Aging and Longevity Using a Novel Mixture Model	93.866	5R03AG060247-02		62,549	12,000
Exploring Mechanisms of Pathogenicity in C9ORF72 Frontotemporal Dementia and Amyotrophic Lateral Sclerosis	93.866	5K99AG057808-02		79,300	-
Frailty, Statins, and Cardiovascular Disease Burden in Older Adults	93.866	1R03AG060169-01		21,083	12,040
Gene Therapy for Alzheimer's Disease	93.866	5R21AG059157-02		120,385	32,807
Genome Engineering an iPSC Model of Alzheimer's Disease	93.866	1RF1AG048056-01 REVISED		770,571	28,051
Health and Aging in Africa: Longitudinal Studies of an INDEPTH Community	93.866	5P01AG041710-06		1,608,947	605,692
Health and Human Capital over the Life Course	93.866	5R01AG056238-04		408,959	154,532
Human Capital of Disabled Workers	93.866	5R01AG046290-06		466,400	51,318
Impact of social cohesion on functional recovery after earthquake and tsunami	93.866	5R01AG042463-07		282,439	59,922
Improving the quality of care provided through bundled payments for patients with Alzheimer's Disease or Other Forms of Dementia or Frailty	93.866	1R01AG060935-01 REVISED		33,101	-
Investigating GDF11 and MSTN as candidate circulating geronic factors	93.866	5R01AG057428-03		407,743	-
Investigating the neuroinflammatory role of RIP1 kinase	93.866	3R01AG047231-05S1		567,089	-

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Investigating the role and mechanism of RIPK1 in mediating cerebrovascular pathology of AD	93.866	5R21AG059073-02		304,572	-
MD-PhD Training Program in Aging and the Social/Behavioral Sciences	93.866	5T32AG051108-05		201,707	-
Mechanisms Specific to the Beneficial Effects of Dietary Restriction	93.866	5R01AG044346-05		42,571	-
Medicare in a Restructured Delivery System	93.866	3P01AG032952-09S1 REVISED		1,967,112	113,394
Myocardial Effects of Caloric Restriction in Primates	93.866	5R03AG059129-02		53,882	-
Novel Age-Dependent DNA Modifications	93.866	5R01AG063341-02 REVISED		250,848	45,792
On-Demand Stem Cell Delivery Systems for Tendon Healing Throughout Aging	93.866	5F32AG057135-03		56,796	-
Optimism and Exceptional Longevity	93.866	5R01AG053273-04		398,133	254,228
Regulation and function of Growth Differentiation Factor 11 during development and aging	93.866	3R01AG048917-02S1		604,146	92,962
Role of epigenetic decay in cell senescence and aging	93.866	3R01AG019719-13S1		491,698	-
Single cell RNA-seq analyses of age-related changes in glial cells and in AD	93.866	1RF1AG055521-01A1		573,575	-
Slow-wave activity as a modifier of the progression of neurodegeneration in Alzheimer's disease	93.866	1R01AG061774-01		46,903	-
Specialization in Nursing Home Care	93.866	5R01AG047194-03 REVISED		122,263	-
Studying methionine flux and its role in aging and neurodegeneration	93.866	5K99AG057792-02		92,972	-
Targeting a Novel Regulator of Brain Aging and Alzheimer's Disease	93.866	5R01AG046174-05		902,294	554,109
Targeting mechanisms of inter-organelle communication to promote healthy aging	93.866	5K99AG052666-02Rev		45,842	-
Targeting RNA homeostasis to promote healthy aging	93.866	5R01AG051954-03		464,382	-
The Center for the Global Demography of Aging	93.866	5P30AG024409-14 REVISED		369,123	-
The Changing Landscape of Post-Acute Care and Health Outcomes for Older Adults	93.866	5K23AG058806-02		184,579	-
The Impact of Employee Wellness Programs	93.866	5R01AG050329-02Revised		2,454	-
The Impact of Employee Wellness Programs	93.866	5R01AG050329-03 REVISED		223,979	-
The Longitudinal Aging Study in India	93.866	5R01AG042778-05		1,458,184	1,172,717
The role of epigenetics in age-related cognitive decline and Alzheimer's disease	93.866	5K99AG055683-02 REVISED		126,452	-
Training in the Molecular Biology of Neurodegeneration	93.866	3T32AG000222-25S1		39,091	-
Training in the Molecular Biology of Neurodegeneration	93.866	5T32AG000222-28		742,796	-
Transgenerational Inheritance of Protein Aggregates in Animals	93.866	1R21AG061850-01A1		231,395	-
Ubiquitin-mediated proteolysis and cell cycle control	93.866	5R01AG011085-24 REVISED		22,058	22,058
Ubiquitin-mediated proteolysis and cell cycle control	93.866	5R01AG011085-26		423,009	233,759
Uncovering the Human Secretome	93.866	5DP1AG058605-03		1,341,039	-
Understanding how physician cognitive biases affect the treatment of older adults with dementia and other vulnerable populations	93.866	1F32AG060650-01 REVISED		66,151	-
Utilizing DNA Methylation Age to Understand The Effects of Fine Particles on Cognition	93.866	5F31AG056124-02		49,484	-
Vascular mechanisms and tDCS treatment of gait and posture in aging and age related disease	93.866	5K99AG051766-03 REVISED		107,188	-
Welfare Effects of Balancing the Federal Social Security and Health Care Budgets	93.866	5R01AG048037-05		399,590	117,209
Total for CFDA 93.866				20,319,656	4,007,360
AAV Induced Toxicity in the Eye	93.867	1R01EY029348-01A1		29,426	-
Cell-Cell Signaling in Development and Regeneration of Visual Connections	93.867	4R01EY011559-24		(68)	-
Characterizing training-related neuroplasticity in developmental prosopagnosia	93.867	5R01EY026057-04		434,548	19,120
Combinatorial roles of cadherins in retinal circuit assembly	93.867	5R01EY022073-08		284,839	-
CORE GRANT FOR VISION RESEARCH	93.867	2P30EY012196-21		717,569	141,561
CORE GRANT FOR VISION RESEARCH	93.867	5P30EY012196-20 REVISED		92,170	32,009
Cortico-Cortical Feedback	93.867	5R01EY011379-22		639,979	-
Defining cell types of foveal and peripheral retina by high-throughput, single-cell transcriptional profiling	93.867	5R21EY028633-02		248,759	26,166

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Determinants of type-dependent retinal ganglion cell resilience: potential targets for neuroprotection and axon regeneration	93.867	1K99EY029360-01		77,052	-
Determination of Cone Photoreceptor Fate	93.867	1R01EY029771-01		73,806	-
Dissecting sensory and circadian circuitry that control the timing of sleep	93.867	5F31EY027252-03		31,514	-
Elucidation of cellular reprogramming processes that drive lens regeneration in axolotl as a basis for future therapeutic approaches	93.867	1K99EY029361-01A1		10,304	-
Mechanisms of Morphogen Secretion in Visual System Development and Disease	93.867	5R01EY024093-05 REVISED		245,725	-
Molecular control of neuronal shape and connectivity in the developing retina	93.867	5R01EY024884-04		437,656	-
Regulation of Cell Type Identity in Retinal Bipolar Cell Precursors	93.867	5K99EY028215-02 REVISED		79,917	-
Research Training in Visual Neuroscience	93.867	5T32EY007110-30		198,291	-
Reverse Correlation Mapping in Face Patches	93.867	5R01EY016187-13		657,721	-
Subtype-specific Retinal Ganglion Cell Degeneration and Regeneration following Optic Nerve Crush	93.867	1F32EY028448-01 REVISED		6,668	-
The normal development of inferotemporal cortex	93.867	5R01EY025670-04		526,501	-
Total for CFDA 93.867				<u>4,792,377</u>	<u>218,856</u>
Boston-Area Research Training Program in Biomedical Informatics	93.879	3T15LM007092-25S1		(8,049)	-
Boston-Area Research Training Program in Biomedical Informatics	93.879	5T15LM007092-28		1,097,822	-
Bridges to Health Information for Individuals with Serious Mental Illness	93.879	(08) GLM012154B		76,868	53,299
Development of a Best Practices in Research Data Management Massive Open Online Course (MOOC)	93.879	1R25LM012284-01		191	-
On the Origins of Therapies: Innovation, Imagination, and the Evolution of Coronary Artery Surgery, 1910-1970	93.879	5G13LM012053-03		16,534	-
Statistical and Quantitative Training in Big Data Health Science	93.879	5T32LM012411-04		280,144	-
Total for CFDA 93.879				<u>1,463,510</u>	<u>53,299</u>
Academic Units for Primary Care Training and Enhancement	93.884	UH1HP299620400		751,693	208,187
Primary Care Training and Enhancement Program	93.884	5 T08HP299970400		416,221	59,584
Total for CFDA 93.884				<u>1,167,914</u>	<u>267,771</u>
Dietary Patterns and Risk of Cardiovascular Disease	93.897	5R01HL060712-17		426,225	222,025
Total for CFDA 93.897				<u>426,225</u>	<u>222,025</u>
Dental Reimbursement Program	93.924	1 T22HA322980100		18,484	-
Total for CFDA 93.924				<u>18,484</u>	<u>-</u>
2/2-Air Pollution and Health GeoHealth Hub Research and Capacity Building-US	93.989	5U2RTW010108-04 REVISED		303,136	-
Building Research Capacity to Improve Mental Health in China across the Lifespan	93.989	5D43TW009081-05 REVISED		23,840	11,394
Development Initiative for Ethical Review and Oversight of Health Research Involving Human Subjects in Rwanda	93.989	5R25TW010298-02 REVISED		185,402	-
Employing genetic and genomic surveillance to reveal mechanisms of malaria parasite persistence	93.989	5K01TW010496-02REVISED		8,874	-
Fogarty HIV Research Training Program for Low and Middle-Income Countries	93.989	5D43TW009610-05REVISED		4,668	-
Novel therapeutic agents from the bacterial symbionts of Brazilian invertebrates	93.989	3U19TW009872-05S1		667,682	396,910
Partnership for Global Health Research Training Program	93.989	5D43TW010543-02		857,521	177,218
Tanzania Infectious Disease Research Training Program	93.989	5D43TW007886-10REVISED		175,507	9,058
Telemedicine to improve the diagnosis of surgical site infections post-cesarean delivery in rural Rwanda	93.989	5R21TW011229-02		56,772	-
Training in HIV/AIDS Prevention and Treatment Research in Botswana	93.989	5D43TW009610-07		272,417	-
Training Tanzanian Researchers for HIV/AIDS Implementation Science	93.989	5D43TW009775-05		467,752	309,819
Total for CFDA 93.989				<u>3,023,571</u>	<u>904,399</u>
Address Selection Bias Issues with the Use of Treatment Information for Outcomes Analyses from Population-based SEER Cancer Registries	93.RD	HHSN261201700047A		16,156	-
Identifying Information Needs and communication Channels for researching at-risk populations during Emergencies	93.RD	75D30118C03566		135,356	-
Inter-professional Case-based Pain Medicine Curriculum for Students of Dentistry, Medicine, Pharmacy, Psychology, and Nursing in Boston, MA	93.RD	HHSN271201500075C		102,088	-
Laser printer-Emitted engineered Nanoparticles (PEP)s Research Specific to In-Vivo Biotentic, Cardiovascular, and other targeted Organ Studies	93.RD	200-2017-95465		55,977	-
Total for CFDA 93.RD				<u>309,577</u>	<u>-</u>
Total for DHHS Direct Award R&D				<u>411,536,279</u>	<u>100,323,560</u>

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Corporation for National and Community Service					
PFS Government Performance Lab	94.019	16PSHMA001		959,536	-
Total for CFDA 94.019				<u>959,536</u>	<u>-</u>
Harvard Kennedy School SIB Lab	94.024	14PSHMA001		52,510	-
Total for CFDA 94.024				<u>52,510</u>	<u>-</u>
Total for Corporation for National and Community Service Direct Award R&D				<u>1,012,046</u>	<u>-</u>
Department of Homeland Security					
Feeding America's Bravest: Mediterranean Diet-Based Interventions to Change Firefighter's eating Habits and Improve	97.044	EMW-2014-FP-00612		173,978	99,854
Total for CFDA 97.044				<u>173,978</u>	<u>99,854</u>
Total for Department of Homeland Security Direct Award R&D				<u>173,978</u>	<u>99,854</u>
Agency for International Development					
Advancing Economic Diversification in Ethiopia: Addressing Constraints to Sustained Growth and Job Creation	98.001	72066319CA00005		43,601	-
Total for CFDA 98.001				<u>43,601</u>	<u>-</u>
Total for Agency for International Development Direct Award R&D				<u>43,601</u>	<u>-</u>
Total for Direct Award Research and Development Cluster (R & D)				<u>537,930,931</u>	<u>116,985,522</u>
Research and Development Cluster (R & D)					
Pass-through Awards					
Department of Agriculture					
Tufts University - The impact of the monthly SNAP issuance cycle on sugar-sweetened beverage purchasing and implications for policy change	10.253		101383-00001	11,576	-
Tufts University - Understanding the impact of changes to the Child and Adult Care Food Program on food expenditures, food quality, and young children's dietary intake in urban family child care homes.	10.253		101383-00001	12,666	-
Total for CFDA 10.253				<u>24,242</u>	<u>-</u>
Trustees of Boston University - Fragmentation effects on forest productivity across managed ecosystem gradients	10.310		4500002411	94,889	-
Total for CFDA 10.310				<u>94,889</u>	<u>-</u>
Total for Department of Agriculture Pass-through Awards R&D				<u>119,131</u>	<u>-</u>
Department of Commerce					
Georgetown University - Formal Privacy Models and Title 13	11.016		AWD7772402-GR205353	391,294	-
Total for CFDA 11.016				<u>391,294</u>	<u>-</u>
Total for Department of Commerce Pass-through Awards R&D				<u>391,294</u>	<u>-</u>
Department of Defense					
Carnegie Mellon University - Dimensionality Reduction and Randomized Linear Algebra: Foundations and New Directions	12.300		1141311-400502	74,719	-
Columbia University - Imaging how a neuron computes	12.300		1 (GG008784)	67,233	-
Cornell University - Event-based Integrated Sensorimotor Planning and Control for Insect-scale Robots	12.300		80480-10878	142,195	-
Drexel University - Learning to swim: principles for the neural control and coordination of multiple fins and segmented bodies for effective swimming and maneuvering	12.300		840026	49,062	-
Drexel University - Neuromechanics of sensory-mediated gait control in fish swimming	12.300		204135-Harvard	37,214	-
Regents of the University of California - A Computational Cognitive Neuroscience Approach to Understanding Event Representation and Episodic Memory	12.300		N00014-17-1-2961	213,662	-
Regents of the University of California - Berkeley - Carbon-based Hierarchically Integrated Synthetic Electronics (CHISEL)	12.300		9294	277,807	-
University of Maryland, College Park - SEA-STAR: Soft Echinoderm-Inspired Appendages for Strong Tactile Amphibious Robots	12.300		43637-Z8665002	188,933	-
University of Virginia - EN-MAE Bio-Inspired Flexible Propulsors for Fast, Efficient Swimming: What Physics are we missing	12.300		GG13311 146905	129,691	-
Total for CFDA 12.300				<u>1,180,516</u>	<u>-</u>
Regents of the University of Michigan - Topobiological Targeting of the Blood Brain Barrier	12.351		3004717569	315,705	-
Total for CFDA 12.351				<u>315,705</u>	<u>-</u>

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Brigham and Women's Hospital, Inc - Extremity regeneration of soft tissue injury using growth factor impregnated gels	12.420		115662	136,026	-
Children's Hospital Boston - Development of novel local analgesics for management of acute tissue injury pain	12.420		GENFD0001351061	21,152	-
Dana-Farber Cancer Institute - Identify the metabolic dependencies of obesity- associated aggressive prostate cancer to develop tailored imaging and therapeutic approaches	12.420		3083201	470	-
Dana-Farber Cancer Institute - Ultra-Sensitive Detection of Subclinical Lung Cancer by Statistical Analysis of Plasma-cfDNA-Derived Whole-Genome Sequencing Data	12.420		3084501	31,091	-
Johns Hopkins School of Medicine - Developing a PTEN-ERG Signature to Improve Molecular Risk Stratification in	12.420		2003162452	5,781	-
Johns Hopkins University - Defining IL-4-Activated Monocytes as Viable Cellular Immunotherapy in Acute Lung Injury	12.420		2003770543	139,662	-
Memorial Sloan Kettering Cancer Center - SLCO2B1 and SLCO1B3 as new targets for enhancing androgen deprivation therapy for prostate cancer	12.420		BD524801	18,640	-
Texas Tech University - Enhancing Identification of Suicide Risk among Military Service Members and Veterans: A Machine Learning Approach to Suicidality	12.420		210336-01	17,360	-
The Metis Foundation - A Platform for Burn Treatment and for Delayed Evacuation of Service Members	12.420		S-W81XWH-16-1-0784-001	41,442	-
Total for CFDA 12.420				<u>411,624</u>	-
Board of Regents of the University of Wisconsin System - OPTION 1: Qubits in Gate-Defined Silicon Quantum Dots	12.431		752K205	467,810	-
California Institute of Technology - Nonlinearity beats Damping: A New Class of Soft Active Metamaterials for Mechanical Logic, Signal Processing, and Autonomous Systems	12.431		S384025	132,956	-
Duke University - Evolutionary Mechanics of Impulsive Biological Systems: Guiding Scalable Synthetic Design	12.431		313-0588	303,448	-
Massachusetts Institute of Technology - Ab-Initio Solid-State Quantum Materials: Design, Production, and Characterization at the Atomic Scale	12.431		S4667 - PO 226099	193,342	-
Massachusetts Institute of Technology - Managing Uncertainty: Principles for Robust and Dextrous Continuum	12.431		5710003877	131,028	-
Massachusetts Institute of Technology - Multi- Qubit Enhanced Sensing and Metrology	12.431		5710003135	87,007	-
Massachusetts Institute of Technology - Novel States of Light and Matter Mediated by Collective Rydberg Excitations	12.431		5710003824	(4,683)	-
Princeton University - The Physics of Surface States with Interactions mediated by Bulk Properties, Defects and	12.431		SUB0000145	57,155	-
Regents of the University of California - San Diego - Dynamic Artificial Cells Composed of Synthetic Bioorthogonal	12.431		28401353 (MP invoice S9000469)	192,197	-
Regents of the University of California - Santa Barbara - Exotic Transport Properties and Unique Applications of Intercalated van der Waals Materials	12.431		KK1913	144,835	-
Regents of the University of Minnesota - MJRI: Multiscale Mathematical Modeling and Design Realization of Novel 2D	12.431		A004135001	671,634	-
Stanford University - Precision Measurements of Transverse Transport Coefficients by Torque Magnetometry	12.431		61651086-127442	130,604	-
University of Maryland, College Park - Center for Distributed Quantum Information	12.431		26234-Z8401003	292,880	-
University of New South Wales Australia - OPTION 1: Donor-based Silicon Quantum Computing	12.431		RG162743	165,661	-
University of Pittsburgh - Adaptive Self-assembled Systems: Exploiting Multifunctionality for Bottom-up Large-scale Engineering (ASSEMBLE)	12.431		CNVA0056411 (413469-1)	567,392	-
University of Rochester - Giant Nonlinear Response of ENZ Metastructures	12.431		417359 / URFAO: GR510802	109,486	-
University of Southern California - Closed-Loop Multisensory Brain-Computer Interface for Enhanced Decision Accuracy	12.431		79575749	63,648	-
Total for CFDA 12.431				<u>3,706,400</u>	-
Henry M. Jackson Fdn for the Advancement of Military Med - Army Study to Assess Risk and Resilience in Service Members (STARRS 2)	12.750		2878	2,451,086	30,000
Henry M. Jackson Fdn for the Advancement of Military Med - Identifying Predictors of Treatment Response in Servicemembers with Post traumatic Stress Disorder-Related Sleep Disturbances:Use of Large Datasets to Improve	12.750		65476	117,932	-
Total for CFDA 12.750				<u>2,569,018</u>	<u>30,000</u>
Cornell University - Plant-mimetic functional materials for thermal management and suppression of freezing	12.800		87230-11088	46,844	-
Massachusetts Institute of Technology - Advanced Quantum Materials: A New Frontier for Ultracold Atoms	12.800		5710003646	597,560	-
Massachusetts Institute of Technology - Foldable and Adaptive Two-Dimensional Electronics	12.800		5710003988	212,327	-
Massachusetts Institute of Technology - Optimal Measurements for Scalable Quantum Technologies	12.800		5710003649	87,749	-
University of Illinois at Urbana - Champaign - TEMPLATE-DIRECTED DIRECTIONALLY SOLIDIFIED EUTECTIC METAMATERIALS	12.800		2012-02298-04 (A0080)	(654)	-
University of Maryland, College Park - Photonic Quantum Matter	12.800		42692-Z8183002	557,522	-
University of Texas - Austin - Ultralow power, Ultrafast, Integrated Nano-Optoelectronics	12.800		UTA16-001252	547,866	-
Total for CFDA 12.800				<u>2,049,214</u>	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Board of Regents of the University of Arizona - Global Reading and Assembly for Semantic, Probabilistic World Models (GRASP)	12.910		431715	232,511	-
Columbia University - Development and Application of Silicon-Chip-Based Mid-infrared Frequency Combs	12.910		3-GG012379-03	62,697	-
International Business Machines Corporation - Harvard-IBM RFP for DARPA HR001117S0055 (DSSoC)	12.910		CW2913640	324,403	-
Massachusetts Institute of Technology - Daisy drive systems for editing local populations	12.910		S4473	104,614	-
Massachusetts Institute of Technology - Many-body atomic clocks based on non-equilibrium correlated quantum matter	12.910		S4759 - PO 303791	69,268	-
Regents of the University of California - Berkeley - Driven Quantum Matter for Metrology (DQM2)	12.910		9965	98,630	-
Regents of the University of California - San Diego - Non-equilibrium Order Parameter Optoelectronics for Quantum Information Processing	12.910		111684807	139,533	-
Regents of the University of Michigan - A Mathematical Theory of Learning Guided by the Immune System	12.910		SUBK00009294	55,120	-
Regents of the University of Michigan - Towards a Definition of Emergence	12.910		3004298846	25,410	-
University of Illinois at Urbana - Champaign - Cognitively-Based Unsupervised Grammar Induction for Low-Resource Languages	12.910		077825-15608	2,555	-
Total for CFDA 12.910				<u>1,114,741</u>	-
HRL Laboratories, LLC - Hybrid Forecast Competition	12.RD		16102-172910-QS	294,531	-
Institute for Systems Biology - PTSD Inflammatory Mediators Testing	12.RD		2017.0003	39,862	-
Southern Methodist University - Obtaining Multipath and Non-line-of-sight Information by Sensing Coherence and Intensity with Emerging Novel Techniques	12.RD		G001534-7510	88,387	-
UES, Inc. - Soft Responsive Structures Enabled by AM Direct Ink Writing	12.RD		S-111-041-003	62,957	-
Applied Tissue Technologies LLC - Prolonged Field Care with Platform Wound Device	12.RD		S-W81XWH-18-2-0002	22,172	-
Charles Stark Draper Laboratory, Inc. - Draper Team Felix Proposal	12.RD		SC001-0000001214	363,217	-
Charles Stark Draper Laboratory, Inc. - SHRIMP is SHort-Range Independent Micro-robotic Platforms	12.RD		SC001-0000001267	35,042	-
Charles Stark Draper Laboratory, Inc. - Thin-film lithium niobate (LN) Y-junction phase-modulator development	12.RD		SC001-0000001245	45,609	-
MITRE Corporation - Development of NV Diamond Integrated Circuit (IC) Imager	12.RD		124787	92,492	-
Total for CFDA 12.RD				<u>1,044,269</u>	-
Total for Department of Defense Pass-through Awards R&D				<u>12,391,487</u>	<u>30,000</u>
Department of the Interior					
Southern California Earthquake Center - SCEC5 Research Collaboration with Harvard - USGS Year 2	15.807		104713742	105,000	-
Total for CFDA 15.807				<u>105,000</u>	-
Total for Department of the Interior Pass-through Awards R&D				<u>105,000</u>	-
Department of State					
New America Foundation - A blockchain-based indexing system for factories	19.345		SLMAQM18GR2203	90,538	-
Total for CFDA 19.345				<u>90,538</u>	-
NASA					
California Institute of Technology - Collaborative Research: MAG Planning for the analysis of Proximal Orbit Data	43.001		S407433	31,832	-
Georgetown University - Agnostic Biosignatures for Extant Life	43.001		AWD7773186-GR205803	1,133	-
Jet Propulsion Laboratory - Consortium for Cold Atoms in Space	43.001		1592883	6,373	-
Jet Propulsion Laboratory - Consortium for Ultracold Atoms in Space	43.001		1608525	40,434	-
Jet Propulsion Laboratory - Infrared Technology Assessment and Analysis for Atmospheric Composition Remote Sensing	43.001		1610362	100,000	-
Jet Propulsion Laboratory - Science With the Euclid Mission	43.001		1598828	26,520	-
Massachusetts Institute of Technology - Foundations of Complex Life: Evolution, Preservation, and Detection on Earth and Beyond	43.001		5710003359	39,467	-
Ohio State University - Seeing in the dark: revealing dark matter microphysics with substructure lensing	43.001		60067579	34,815	-
Planetary Science Institute - An Integrated Atmospheric and Subsurface Investigation of the Evolution of the Early Martian Hydrosphere: Implications for the Occurrence and Duration of Potentially Habitable Liquid Water Environment	43.001		1599	30,276	-
Regents of the University of California - Irvine - Quantifying and reducing uncertainty in future global and local sea-level estimates: linking physics, observations, and risk analysis to inform climate adaptation	43.001		2017-3520	40,336	-
Regents of the University of California - San Diego - Testing Gravity via Lunar Laser Ranging: Maximizing Data Quality	43.001		91028280	18,058	-
Smithsonian Astrophysical Observatory - pyTrax: an Efficient System for Discovering Near-Earth Objects (NEOs) under the Minor Planet Center Operations Program	43.001		SV6-86014	(47,839)	-
Smithsonian Astrophysical Observatory - pyTrax: an Efficient System for Discovering Near-Earth Objects (NEOs) under the Minor Planet Center Operations Program (New Prime)	43.001		SV8-88020	47,839	-

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Smithsonian Astrophysical Observatory - Resolving the High Energy Universe with Gravitational Lensing	43.001		PF5-160132	5,667	-
Smithsonian Astrophysical Observatory - SEEJ: Smallsat Exploration of the Exospheres of Nearby Hot Jupiters Orbiting X-ray Bright Stars	43.001		SV9-89011	19,198	-
University Corporation for Atmospheric Research - Socioeconomic Benefits of Improved Forecasts on Decision-Making in Public Health and Air Quality	43.001		Z16-20895	82,675	-
University of Chicago - Ocean and cryosphere dynamics and the habitable zone: through thick and thin ice	43.001		FP062796-A	110,747	-
University of Colorado at Boulder - Airborne seasonal survey of CO2, CH4 and CO across the ABoVE Domain	43.001		1556305	2,936	-
University of Washington - The Virtual Planetary Laboratory: Advancing the Search for Life Beyond the Solar System	43.001		UWSC10439	28,827	-
WGBH Educational Foundation - Bringing the Universe to America's Classroom	43.001		K201800924	12,935	-
Total for CFDA 43.001				632,229	-
Baylor College of Medicine - Omics in space (OIS): Technology Development for Omics Instrumentations and	43.003		T0101	83,020	-
Total for CFDA 43.003				83,020	-
Arizona State University - High dimensional biology to understand the functional response of Salmonella to long-term multigenerational growth in the chronic stress of microgravity	43.007		17-034	(558)	-
Total for CFDA 43.007				(558)	-
Board of Regents of the University of Arizona - JWST Near Infrared Camera (NIRCam)	43.RD		152977	142,316	-
California Institute of Technology - Impacts of Droughts on Carbon Stocks and Fluxes of Amazonian Forest	43.RD		1598815	113,851	-
Massachusetts Institute of Technology - REXIS for OSIRIS-Rex Mission Phase E	43.RD		5923-006	466,322	-
Total for CFDA 43.RD				722,489	-
Total for NASA Pass-through Awards R&D				1,437,180	-
National Endowment for the Humanities					
Columbia University - Relocating Heart Disease in the Tropics: Race, Risk and Modernization Post-Independence India	45.161		1(GG008407-01)	4,052	-
Total for CFDA 45.161				4,052	-
Total for National Endowment for the Humanities Pass-through Awards R&D				4,052	-
National Science Foundation					
Massachusetts Institute of Technology - DMREF: Computational Design of Next-generation Nanoscale DNA-based Materials	47.041		74850	85,175	-
Massachusetts Institute of Technology - EFRI ACQUIRE: Scalable Quantum Networks with Error-Corrected Semiconductor Qubits	47.041		5710004174	150,659	-
Massachusetts Institute of Technology - EFRI C3 SoRo: Soft, Strong, and Safe Configurable Robots for Diverse Manipulation Tasks	47.041		S4649 - PO 217699	75,194	-
Stanford University - RAISE TAQS: Engineering high quality, practical qubits in diamond	47.041		62035117-137164	1,841	-
Trustees of Boston University - Nanosystems Engineering Research Center for Directed Multiscale Assembly of Cellular Metamaterials with Nanoscale Precision: CELL-MET	47.041		4500002845	244,007	-
Trustees of Boston University - Nanosystems Engineering Research Center for Directed Multiscale Assembly of Cellular Metamaterials with Nanoscale Precision: CELL-MET	47.041		4500002848	46,966	-
University of Illinois at Urbana - Champaign - EFRI C3 SoRo: An integrated approach towards the computational design, fabrication and understanding of bio-hybrid soft architectures capable of adaptive behavior	47.041		093088-17158	44,397	-
Total for CFDA 47.041				648,239	-
Association of Universities for Research in Astronomy, Inc. - LSST Atmospheric Calibration	47.049		N67177C-L	105,802	-
California Institute of Technology - Powering the Planet: A CCI Center for the Direct Conversion of Sunlight into Chemical Fuel	47.049		68D-1094592	36,713	-
Columbia University - Columbia MRSEC	47.049		2(GG008600-13)	53,896	-
Massachusetts Institute of Technology - Center for Ultracold Atoms	47.049		5710003095	(39,378)	-
Massachusetts Institute of Technology - NSF PFC Center for Ultracold Atoms Renewal	47.049		128237	902,042	-
National Radio Astronomy Observatory - NRAO Student Observing Award to Ryan Loomis	47.049		SOSPA4-011	1,121	-
National Radio Astronomy Observatory - NRAO Student Observing Support Award to Tarraneh Eftekhari	47.049		SOSA6-008	14,955	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Navajo Technical University - VENTURES - Vision for Excellence at Navajo Technical University in Research and Education in STEM	47.049		42766-00-1174	10,946	-
Northwestern University - Surfaces of Secondary Organic Aerosol Particles	47.049		SP0036066-PROJ0009763	102,748	-
Purdue University - RAISE-TAQS: Multifunctional Hybrid Quantum Systems for Spin-Based Quantum Control and Metrology	47.049		10001431-011	97,601	-
Stanford University - MSIP: Innovation to Achieve the Full Science Reach of the BICEP Array Stage 3 CMB Polarization Experiment	47.049		61941274-134448	25,817	-
University of Nebraska at Lincoln - Mathematics ClusteRs Engaging Women (CREW)	47.049		185-4	1,346	-
Yale University - ACME: Advanced Cold Molecule Electron Electric Dipole Moment Search	47.049		C15D11959(CON-80000041)	199,521	-
Total for CFDA 47.049				<u>1,513,130</u>	<u>-</u>
California Institute of Technology - MRI: Development of a 150 GHz Receiver for the BICEP Array CMB Polarimeter	47.050		S386502	184,543	-
Center for Dark Energy Biosphere Investigations - Investigating the Bioavailability and Degradation of Sedimentary Organic Matter	47.050		76197013	19,243	-
Massachusetts Institute of Technology - INSPIRE: Search for Records of the Hadean Dynamoin Detrital Zircons	47.050		5710004192	74,445	-
Southern California Earthquake Center - SCEC5 Research Collaboration at Harvard University	47.050		91255067	11,380	-
University of Massachusetts - Lowell - Collaborative Project: Magnitude and pathways of gaseous atmospheric mercury deposition in forests	47.050		S52100000041358	13,330	-
Total for CFDA 47.050				<u>302,941</u>	<u>-</u>
Clemson University - Advanced Cyberinfrastructure - Research and Educational Facilitation: Campus-Based Computational Research Support	47.070		1997-206-2009949	34,669	-
Duke University - New Approaches for Ranking in Machine Learning NSF-CAREER IIS-1053407	47.070		333-2325	30,214	-
Massachusetts Institute of Technology - A Center for Brains, Minds, and Machines: The Science and the Technology of Intelligence	47.070		5710003525	1,005,658	184,779
Trustees of Boston University - CIF21 DIBBs: EI: North East Storage Exchange.	47.070		4500002550	219,873	-
University of Southern California - NeTS: Large: Collaborative Research: Programmable Inter-Domain Observation and Control	47.070		101504188	209,942	-
Yale University - NeTS: Small: A Virtualized Network Resource Pool for Software-Defined Network Management	47.070		GR10481(CON-80001472)	35,169	-
Total for CFDA 47.070				<u>1,535,525</u>	<u>184,779</u>
Northern Arizona University - Collaborative Proposal: NSFDEB-NERC: Addressing the plant growth source-sink debate through observations, experiment, and modeling.	47.074		1003391-01	51,370	-
Regents of the University of California - Berkeley - Synthetic biology for yeast	47.074		8319	12,484	-
Regents of the University of California - Davis - VISABLI, an RCN-UBE for Visualizations, Interactive Simulations, and Animations for Biology Learning and Instruction	47.074		A19-0888-S001	32,208	-
Regents of the University of California - Santa Barbara - IDBR TYPE A: Definitive Chemical Analysis of Microbial Volatile Mixtures via Microwave Spectroscopy	47.074		KK1874	86,064	-
Yale University - Analysis of transient nuclear ruptures during development	47.074		GR105087(CON-80001599)	14,870	-
Total for CFDA 47.074				<u>196,996</u>	<u>-</u>
Northeastern University - CRISP Type 2: Interdependent Network-based Quantification of Infrastructure Resilience (INQUIRE)	47.075		502536-78051	125,172	-
University of Maryland, College Park - Economic Mobility: The Impact of Individual, Parent and Spatial Factors using National Survey Data	47.075		53730-Z3111201	46,598	-
University of Texas - Austin - A Lifespan Conceptual Model of Ethnic-Racial Identity	47.075		UTA17-001098	(1,212)	-
Total for CFDA 47.075				<u>170,558</u>	<u>-</u>
Carnegie Mellon University - Collaborative Research: Using Educational Data Mining Techniques to Uncover How and Why Students Learn from Erroneous Examples	47.076		1122530-383320	35,247	-
Total for CFDA 47.076				<u>35,247</u>	<u>-</u>
Board of Regents of the University of Arizona - PIRE: Black-Hole Astrophysics in the Era of Distributed Resources and Expertise	47.079		438295	1,869	-
CRDF Global - Assessing the burden of non-communicable diseases for people living with HIV in Uganda	47.079		OISE-17-62965-1	32,322	-
University of Chicago - PIRE: International Partnership for Cirrus Studies	47.079		FP065300-A	83,033	-
Total for CFDA 47.079				<u>117,224</u>	<u>-</u>
Smithsonian Astrophysical Observatory - The Spectrum Laboratory: Toward Authentic Inquiry for All	47.RD		SV8-88015	27,252	-
Total for CFDA 47.RD				<u>27,252</u>	<u>-</u>
Total for National Science Foundation Pass-through Awards R&D				<u>4,547,112</u>	<u>184,779</u>

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Harvard University

Schedule of Expenditures of Federal Awards

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
EPA					
Environmental Protection Agency - Assessing the Potential Impact of Global Warming on Indoor Air Quality and Human Health at two US Cities: Boston, MA and Atlanta, GA	66.509		83575501-0	52,700	28,365
Total for CFDA 66.509				<u>52,700</u>	<u>28,365</u>
Drexel University - Susceptibility to Multiple Air Pollutants in Cardiovascular Disease	66.511		850040	18,018	-
Health Effects Institute - Assessing Adverse Health Effects of Long-Term Exposure to Low Levels of Ambient Air Pollution	66.511		4953-RFA14-3/16-4-4	742,092	49,112
Health Effects Institute - Chemical and Physical Characterization of Non-Tailpipe and Tailpipe Emissions at 100 Locations near Major Roads in the Greater Boston Area	66.511		4948-RFPA14-1-15-2	31,391	-
Total for CFDA 66.511				<u>791,501</u>	<u>49,112</u>
Total for EPA Pass-through Awards R&D				<u>844,201</u>	<u>77,477</u>
Department of Energy					
Regents of the University of Minnesota - Predictive Hierarchical Modeling of Chemical Separations and Transformations in Functional Nanoporous Materials: Synergy of Electronic Structure Theory, Molecular Simulations	81.000		A006801501	(11,212)	-
Total for CFDA 81.000				<u>(11,212)</u>	<u>-</u>
California Institute of Technology - DOE EFRC: Light-Materials Interactions in Energy Conversion	81.049		S387535	98,540	-
California Institute of Technology - Quantum Communication Channels for Fundamental Physics (QCCFP)	81.049		S400020	92,171	-
Massachusetts Institute of Technology - Center for Excitonics	81.049		5710003733	56,541	-
National Renewable Energy Laboratory - Center for Next Generation of Materials by Design: Incorporating Metastability	81.049		ZGJ-4-42246-01	187,698	-
Northwestern University - Center for Bio-Inspired Energy Science (CBES)	81.049		SP0027267-PROJ0007134	20,813	-
Regents of the University of California - Los Angeles - Molecules Functionalized with Cycling Centers for Quantum Information Science	81.049		1000 G WB867	137,274	-
Stanford University - Photonics at Thermodynamic Limits	81.049		61961562-136555	58,811	-
Total for CFDA 81.049				<u>651,848</u>	<u>-</u>
Clemson University - All-Digital Plug and Play Passive RFID Sensors for Energy Efficient Building Control	81.086		1883-219-2021621	28,731	-
Total for CFDA 81.086				<u>28,731</u>	<u>-</u>
Battelle Memorial Institute - Mid-Atlantic Offshore Carbon Storage Resource Assessment Project	81.089		516545	39,279	-
Total for CFDA 81.089				<u>39,279</u>	<u>-</u>
California Institute of Technology - Real-time optimization and control of next-generation	81.135		81-1097358	128,871	-
United Technologies Research Center - Synergistic Membranes and Reactants for Transformational Flow-Battery System	81.135		1231122	295,801	-
Total for CFDA 81.135				<u>424,672</u>	<u>-</u>
Fermi National Accelerator Laboratory - Wire Tension for DUNE Anode Plane Assemblies	81.RD		290006-MLS	67,600	-
Iowa State University - EFRC: Center for the Advancement of Topological Semimetals	81.RD		SC-19-488	175,640	-
Lawrence Berkeley National Lab - Investigating the Nature of Dark Energy using Type Ia Supernovae with the WFIRST-AFTA Space Mission	81.RD		7341745	30,594	-
Lawrence Berkeley National Lab - Operation of the Harvard Forest Core Site in the AmeriFlux Network Management Project (ANMP)	81.RD		7086573	265,301	-
Lawrence Livermore Laboratory - Computational Design of Broadly Neutralizing Vaccines for Highly Mutable Pathogens	81.RD		B620984	166,398	-
Oak Ridge National Laboratory - Understanding and Controlling Entangled and Correlated Quantum States in Confined Solid-state Systems Created via Atomic Scale Manipulation	81.RD		4000169326	11,919	-
Pacific Northwest National Laboratory - AQUEOUS SOLUBLE ORGANIC MOLECULE AND ELECTRODE DEVELOPMENT	81.RD		428977	199,015	-
SLIPS Technology - Fuel Saving SLIPS Non-Toxic Foul Impede Coating on Ship Hulls	81.RD		STI DE-AR0000759-01	656	-
Total for CFDA 81.RD				<u>917,123</u>	<u>-</u>
Total for Department of Energy Pass-through Awards R&D				<u>2,050,441</u>	<u>-</u>
Department of Education					
Ascend Learning Inc - Rigorous Evaluation of the Ascend Learning Model	84.282M		No Awrd Nmbr	17,943	-
Total for CFDA 84.282M				<u>17,943</u>	<u>-</u>

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Manpower Demonstration Research Corporation - Supporting Early Learning from Preschool Through Elementary School Grades: Research Network Proposal	84.305		No Awrd Nmbr	209,145	-
Regents of the University of California - Berkeley - Investigating How and Under What Conditions Effective Professional Development Increases Student Achievement in Elementary Science	84.305		8819	5,947	-
Total for CFDA 84.305				<u>215,092</u>	<u>-</u>
Florida State University - Efficacy of the Core Knowledge Language Arts Listening and Learning Read Aloud Program in Kindergarten through Second Grade Classrooms	84.305A		R01972	1,621	-
New York University - Improving the odds of college readiness for low-income students in Chicago Public Schools: The respective roles of child self-regulation and preschool vs. high school intervention	84.305A		F7816-02	(4,218)	-
Northwestern University - Contexts Inside and Outside of School Walls as Predictors of Differential Effectiveness in Preschool Professional Development	84.305A		SP0034839-PROJ0009316	92,691	-
Total for CFDA 84.305A				<u>90,094</u>	<u>-</u>
Brown University - Using Teacher Evaluation Data to Drive Instructional Improvement: Evidence from the Evaluation	84.305E		815	36,129	-
Total for CFDA 84.305E				<u>36,129</u>	<u>-</u>
Tennessee Department of Education - Setting Students Up for Success	84.372A		33145-01417	176,920	-
Total for CFDA 84.372A				<u>176,920</u>	<u>-</u>
University of Colorado at Boulder - Center for the Study of Interactive Knowledge Utilization	84.RD		1551538	46,283	-
Total for CFDA 84.RD				<u>46,283</u>	<u>-</u>
Total for Department of Education Pass-through Awards R&D				<u>582,461</u>	<u>-</u>
DHHS					
Jos University Teaching Hospital - Reaching 90 percent target of HIV viral suppression: The role of point of care VL monitoring in resources constrained settings	93.067		SPH	172,919	-
Total for CFDA 93.067				<u>172,919</u>	<u>-</u>
Health Research, Inc. - Models for Tobacco Product Evaluation	93.077		100-05	14,169	-
Total for CFDA 93.077				<u>14,169</u>	<u>-</u>
Harvard Pilgrim Health Care, Inc - Epicenter IV: CLUSTER Trial for Outbreak Detection and Response	93.084		No Awrd Nmbr	102,008	-
University of Utah - Modeling and Simulation to Support Antibiotic Stewardship and Epidemiological Decision-Making in Healthcare Settings	93.084		10044546-01	110,176	-
Total for CFDA 93.084				<u>212,184</u>	<u>-</u>
Medical Device Innovation Consortium - NESTcc Methods Subcommittee Support	93.103		6292-2018-M-001	16,494	-
Weill Medical College of Cornell University - Creating National Surveillance Infrastructure for Priority Medical Devices	93.103		184021	49,736	-
Total for CFDA 93.103				<u>66,230</u>	<u>-</u>
Brown University - Evidence to improve heat warning effectiveness in reducing morbidity and mortality	93.112		1335	48,434	-
Total for CFDA 93.112				<u>48,434</u>	<u>-</u>
Beth Israel Deaconess Medical Center - Maternal organophosphate pesticide exposure, low birth weight and placental injury	93.113		1060906	2,065	-
Board of Trustees of the University of Illinois - Phthalate and Hot Flashes in Women	93.113		086885-16438	63,494	-
Boston University School of Public Health - Development and testing of response surface methods for investigating the epidemiology of exposure to mixtures	93.113		4500002635	191,606	-
Boston University School of Public Health - Endocrine Disrupting Chemicals and Risk of Uterine Fibroids: A Prospective Study	93.113		4500001944	22,296	-
Boston University School of Public Health - Validation of Portable XRF for In vivo Measurement of Heavy Metal Exposures	93.113		4500002203	4,762	-
Brigham and Women's Hospital, Inc - Cardiovascular Response to CAP Microbial Components in Controlled Human Exposures	93.113		111789	45,625	-
Brigham and Women's Hospital, Inc - The effects of environmental exposures on semen quality and the sperm epigenome	93.113		118582	273,188	-
Brown University - Ambient Air Pollution and Incident Stroke	93.113		545	(3,732)	-
Children's Hospital Boston - Arsenic-related cystic fibrosis	93.113		GENFD0001435028	2,388	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Children's Hospital Boston - Does Arsenic Increase Risk of Neural Tube Defect in a Highly-exposed Population	93.113		GENFD0001429682	9,647	-
Children's Hospital Boston - Indoor Air Quality and Respiratory Morbidity in School-Aged Children with Bronchopulmonary Dysplasia	93.113		GENFD0001585249	32,998	-
Columbia University - Air Pollution Exposure and Risk of Amyotrophic Lateral Sclerosis (ALS)	93.113		1(GG013011-01)	49,968	-
Columbia University - BPA, Phthalates and Stress: Mechanisms and Interactions for Childhood Obesity	93.113		3(GG010656-01)	2,940	-
Columbia University - Circulating microRNAs in Extracellular Vesicles, Air Particulate Pollution, and Lung Function in an Aging Cohort	93.113		1(GG010691-01)	52,781	-
Columbia University - Early Exposure to Persistent Organic Pollutants, Breast Milk Extracellular Vesicles and Abnormal Cardiometabolic Programming	93.113		1(GG010657-01)	5,036	-
Emory University - The adipose exposome: effects on the plasma metabolome, body composition and metabolic outcomes after bariatric surgery	93.113		A007024	8,687	-
Harvard Pilgrim Health Care, Inc - Longitudinal Associations of PFCs with Obesity Diabetes, and Metabolic Syndrome	93.113		PH000552D	27,930	-
Icahn School of Medicine at Mount Sinai - Methods for data integration and risk assessment for environmental mixtures	93.113		0255-A401-4609	45,297	-
Icahn School of Medicine at Mount Sinai - Neurologic Function in Children Exposed to Ambient Manganese	93.113		0255-0182-4609	25,315	-
Icahn School of Medicine at Mount Sinai - Stress-Chemical Interactions and Neurobehavior in School Age Children	93.113		0255-5545-4609	14,948	-
Mount Sinai Medical Center - Novel Biomarker to Identify Critical Windows of Susceptibility to Metal Mixtures:	93.113		0255-1871-4609	26,253	-
Oregon State University - Developmental Exposure to Arsenic, PAHs, and Immune Function in Children	93.113		P0388A-B	26,104	-
Silent Spring Institute - Data Sharing and Privacy Protection in Digital-Age Environmental Health	93.113		7511-SEAS	22	-
University of Massachusetts - Amherst - Paternal preconception phthalates and reproductive health - potential mediation through sperm DNA methylation	93.113		19-010627-A00	50,260	-
University of Southern California - Mitochondrial susceptibility to traffic-related pollution and neonatal health	93.113		65108860	4,083	-
University of Texas - Causal Inference with Interference for Evaluating Air Quality Policies	93.113		UTA19-000141	6,494	-
Washington State University - The UGT2A and 3A Metabolizing Enzymes and Tobacco-Related Cancer Risk	93.113		124336G003759	81,526	-
Yale University - Comprehensive Translational Science Analytics Tools for the Global Health Agenda	93.113		GR105382 (CON-80001652)	319,891	-
Yale University - Statistical Methods to Account for Exposure Uncertainty in Environmental Epidemiology	93.113		GR104702 (CON-80001508)	97,112	-
Total for CFDA 93.113				<u>1,488,984</u>	-
Boston University School of Public Health - Validation of Portable XRF for Invivo Measurement of Heavy Metal	93.114		4500002875	<u>62,182</u>	-
Total for CFDA 93.114				<u>62,182</u>	-
Kaiser Foundation Research Institute - Particulate Air Pollution, Cardiovascular Events, and Susceptibility Factors	93.117		RNG209805-HSPH-01	<u>20,047</u>	-
Total for CFDA 93.117				<u>20,047</u>	-
Physical Sciences Inc. - Optical Probe for real-time assessment of periodontal health status	93.121		SC 82527-1976-46	<u>46,174</u>	-
Regents of the University of Michigan - Michigan-Pittsburgh-Wyss Resource Center: Supporting Regenerative Medicine in Dental Oral and Craniofacial Technologies	93.121		3004400289	<u>206,794</u>	-
University of South Florida - The Oral Microbiome in Type 1 Diabetes and Sub-Clinical Cardiovascular Disease	93.121		6403-1081-00-A	<u>15,287</u>	-
University of Texas Health Science Center at Houston - Implementing Dental Quality Measures in Practice	93.121		0010816A	<u>34,767</u>	-
Total for CFDA 93.121				<u>303,022</u>	-
Massachusetts General Hospital - Clinic and Community Approaches to Healthy Weight	93.136		229250	<u>32,349</u>	-
Total for CFDA 93.136				<u>32,349</u>	-
Indiana University - NIEHS Worker Trainer Grant	93.142		BL-4645510-HARV	<u>43,493</u>	-
Total for CFDA 93.142				<u>43,493</u>	-
University of Rhode Island - Impacts of geochemistry and transport on PFAS exposures from drinking water and fish	93.143		0006745-11317	<u>397,164</u>	92,324
University of Rhode Island - Sources, Transport, Exposure and Effects of Perfluoroalkyl Substances (STEEP) Center	93.143		0006660-11117	<u>13,082</u>	-
University of Rhode Island - Sources, Transport, Exposure and Effects of Perfluoroalkyl Substances (STEEP) Center	93.143		0006746-11217	<u>85,979</u>	-
Total for CFDA 93.143				<u>496,225</u>	92,324
University of Miami - Environmental Risk Factors and Gene-Environment Interactions in ALS Risk and Progression	93.161		SPC-000701	<u>49,036</u>	-
Total for CFDA 93.161				<u>49,036</u>	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Brigham and Women's Hospital, Inc - Integrated pathogenicity assessment of clinically actionable genetic variants	93.172		120308	8,758	-
California Institute of Technology - The Alliance of Genomic Resources: towards integration of six model organism databases and the Gene Ontology Consortium	93.172		S405063	401,021	-
California Institute of Technology - WormBase: a core data resource for C. elegans and other nematodes	93.172		18B-1097519	18,642	-
Dana-Farber Cancer Institute - Computational Methods for Genome-Wide CRISPR Screens	93.172		1283803	134,449	-
Dana-Farber Cancer Institute - Overcoming Bias and Unwanted Variability in Next Generation Sequencing	93.172		1228008	70,804	-
Dana-Farber Cancer Institute - Overcoming bias and unwanted variability in next generation sequencing	93.172		1228008	17,417	-
Johns Hopkins University - Direct nanopore detection of modified RNA to probe structure and dynamics	93.172		R01HG010538	16,925	-
Lawrence Berkeley National Lab - Systematic, Genome-Scale Functional Characterization of Conserved smORFs	93.172		7374618	173,048	-
Ontario Institute for Cancer Research - Scaling up structured biological pathway knowledge acquisition at Reactome using text mining and crowdsourcing	93.172		P2019-0015	53,436	-
Regents of the University of California - Los Angeles - Integrative approaches for mapping the genetic risk of complex	93.172		1625GUE724	138,852	-
The Broad Institute - A Catalog of Cell Types and Genomic Elements in Tissues, Organoids and Disease	93.172		5000313-5500000958	185,743	-
The Broad Institute - A Catalog of Cell Types and Genomic Elements in Tissues, Organoids and Disease	93.172		5100312-5500001197	108,480	-
The Broad Institute - In situ ATAC-seq, a novel technology for structural epigenomics	93.172		5000880-5500001243	92,946	-
University of Pittsburgh - Center for Causal Discovery	93.172		0053374 (129456-1)	(15,415)	-
University of Pittsburgh - Center for Causal Modeling and Discovery of Biomedical Knowledge from Big Data	93.172		0049345 (127588-1)	7,819	-
Total for CFDA 93.172				<u>1,412,925</u>	-
Brigham and Women's Hospital, Inc - Risk Factors for Hearing Loss	93.173		119711	57,743	-
Massachusetts Eye and Ear Infirmary - Cochlear Synaptopathy: Prevalence, Diagnosis and Functional Consequences	93.173		2300175	94,107	-
San Diego State University Research Foundation - The Association of Perinatal HIV Infection and Hearing Loss in Children of Cape Town, South Africa	93.173		SA0000594	36,464	-
Total for CFDA 93.173				<u>188,314</u>	-
Beth Israel Deaconess Medical Center - Coupling technology and mind-body exercise to facilitate physical activity in	93.213		1029585	40,870	-
Beth Israel Deaconess Medical Center - Tai Chi after Pulmonary Rehabilitation in Patients with COPD: A Randomized Trial	93.213		1029129	18,184	-
Brigham and Women's Hospital, Inc - Contribution of phytochemicals to gut symbiont colonization and synthesis of immunomodulatory sphingolipids	93.213		120907	8,317	-
Washington State University - Investigation of a shipworm endosymbiont compound with activity against the AIDS-associated pathogens Cryptosporidium and Toxoplasma	93.213		131398-G003748A	(6,238)	-
Total for CFDA 93.213				<u>61,133</u>	-
Brigham and Women's Hospital, Inc - Identifying Cascades of Low-Value Care and the Organizational Practices that Prevent them	93.226		117961	22,363	-
Children's Hospital Boston - Improving Child Health and Healthcare through Dissemination and Implementation of Pediatric Quality Measures	93.226		GENFD0001528995	24,853	-
Harvard Pilgrim Health Care, Inc - Decision Making Challenges and Needs for Health Insurance Exchange Enrollees	93.226		No Awrd Nmbr	73,837	-
Massachusetts General Hospital - Federally Qualified Health Centers and Care for Vulnerable Populations	93.226		231035	30,885	-
Massachusetts General Hospital - Medicaid Payment Policy and Access to Care for Dual-Eligible Beneficiaries	93.226		229188	8,766	-
National Bureau of Economic Research - Measuring the Clinical and Economic Outcomes Associated with Delivery Systems	93.226		41610.01.13.00-HMS	984,988	-
National Bureau of Economic Research - The Impact of Direct-to-Consumer, Video Telehealth	93.226		41740	51,755	-
Rand Corporation - Understanding the role of physician group organizational capabilities and integration in PCOR implementation and outcomes	93.226		9920190031	10,342	-
Regents of the University of Minnesota - Medical reversals: De-implementing ineffective and unsafe treatments	93.226		P006920953	25,054	-
Stanford University - Understanding the role of physician group organizational capabilities and integration in PCOR implementation and outcomes	93.226		61818954-134417	10,537	-
Trustees of Dartmouth College - Accelerating the Use of Evidence-based Innovations in Healthcare Systems	93.226		R817	124,255	-
University of Chicago - Effects of Ambulance, Transport Distance, and Hospital Destination on Health Outcomes of Out of Hospital Medical Emergencies	93.226		FP066242	122,655	-
Yale University - Consumer Assessment of Healthcare Providers and Systems (CAHPS V)	93.226		GR104417 (CON-80001433)	130,850	-
Total for CFDA 93.226				<u>1,621,140</u>	-

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Beth Israel Deaconess Medical Center - Mechanisms of Arousal in Sleep Apnea	93.233		1060693	307,817	-
Total for CFDA 93.233				307,817	-
Allen Institute for Brain Science - A comprehensive whole-brain atlas of cell types in the mouse	93.242		2017-0570	1,056,180	-
Beth Israel Deaconess Medical Center - A Psychobiological Follow-up Study of Transition from Prodrome to Early Psychosis	93.242		1029400	54,914	-
Beth Israel Deaconess Medical Center - Predictors and Mechanisms of Conversion to Psychosis	93.242		1061037	11,033	-
Board of Trustees of the University of Illinois - Identifying Social Processes Implicated in Remitted Recurrent Depression	93.242		16400	4,685	-
Brigham and Women's Hospital, Inc - In-utero exposure to psychotropic medications and the risk of neurodevelopmental disorders	93.242		119487	34,212	-
Brigham and Women's Hospital, Inc - Rare and common variants in complex disease	93.242		117943	218,761	-
Children's Hospital Boston - 1/2 Somatic mosaicism and autism spectrum disorder	93.242		GENFD0001619202	380,213	-
Children's Hospital Boston - Admin Core: Complement regulation and critical periods in diverse CNS cell types	93.242		GENFD0001497266	53,912	-
Children's Hospital Boston - An environment-wide association study in autism spectrum disorders using novel bioinformatics methods and metabolomics via mass spectrometry	93.242		GENFD0001510950	92,410	-
Children's Hospital Boston - Complement regulation and critical periods in diverse CNS cell types	93.242		GENFD0001497267	258,732	-
Children's Hospital Boston - Neural-immune mechanisms and synaptic connectivity in psychiatric illness	93.242		GENFD0001497265	102,272	-
Children's Hospital Boston - Novel epigenetic mechanisms in neuronal development and cognitive function	93.242		GENFD0001482158	112,252	-
Children's Hospital Boston - Research Support Core: Complement regulation and critical periods in diverse CNS cell types	93.242		GENFD0001497264	133,360	-
Cold Spring Harbor Laboratory - A Comprehensive Center for Mouse Brain Cell Atlas	93.242		64580221 / 64580229	2,803,813	-
Dartmouth-Hitchcock Medical Center - Peer Support and Mobile Technology Targeting Cardiometabolic Risk Reduction in Young Adults with SMI	93.242		GC10036-00-05	3,498	-
Desmond Tutu HIV Foundation - Design and delivery of combination HIV prevention in young South African women	93.242		NIH-3P-HC-04	13,490	-
FlySorter, LLC - A Modular Automated Platform for Large-scale Drosophila Experiments and Handling	93.242		No Awrd Nmbr	64,755	-
Icahn School of Medicine at Mount Sinai - Somatic Mosaicism in Schizophrenia and Control Brains	93.242		0255-0426-4609	172,378	-
Luxel Corporation - Grid-Tape: A High-Throughput Platform for Brain Connectomics and Nanoscale Structural Analysis	93.242		16827	10,793	-
Massachusetts General Hospital - 2/7 Psychiatric Genomics Consortium: Finding actionable variation	93.242		228900	31,892	-
Massachusetts General Hospital - Machine Learning for Data-driven Subtyping in Depression	93.242		233133	19,081	-
Massachusetts General Hospital - Real-World Adherence to HIV PrEP In Serodiscordant African Couples	93.242		227997	(11,731)	-
Massachusetts Institute of Technology - A Molecular and Cellular Atlas of the Marmoset Brain	93.242		S4495 PO 329629	719,522	-
Massachusetts Institute of Technology - Network-based prediction and validation of causal schizophrenia genes and variants	93.242		S4614	195,574	-
Massachusetts Institute of Technology - Network-based prediction and validation of causal schizophrenia genes and variants	93.242		S4616	23,842	-
Princeton University - CRCNS: Representational foundations of adaptive behavior in natural and artificial agents	93.242		SUB0000110	33,378	-
Rand Corporation - Improving Value of Publicly Funded Mental Health Care	93.242		9920160099	212,719	-
Regents of the University of California - Los Angeles - Joint Genomic and Statistical Analyses of Schizophrenia and Bipolar to Decipher Genetic Susceptibility	93.242		2000GVR227	51,924	-
Regents of the University of California - San Diego - Efficacy of ART to interrupt HIV transmission networks	93.242		58328838	8,210	-
Regents of the University of California - San Diego - Psychiatric Genomics Consortium for PTSD	93.242		78931958	49,368	-
San Diego State University - Enhanced Linkage to HIV Care and Treatment following Home-Based HIV testing in Rural Uganda	93.242		SA0000486	13,933	-
The Broad Institute - Genetic neuroscience: How human genes and alleles shape neuronal phenotypes	93.242		5000482-5500001103	685,930	-
The Broad Institute - Genetic neuroscience: How human genes and alleles shape neuronal phenotypes	93.242		500482-5500001075	871,602	-
The Broad Institute - Statistical methods to localize disease heritability and identify biological mechanisms	93.242		5001510-5500001234	96,589	-
The McLean Hospital Corporation - Predicting the onset of depression in at-risk adolescents from endophenotype	93.242		401500	10,010	-
University of California, San Diego - Toward a human adult brain cell atlas with single-cell technologies	93.242		111911793	77,793	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
University of Colorado Denver - A Patient Decision Aid for Augment Lethal Means Counseling for Suicidal Patients	93.242		FY19.930.001	22,714	-
University of Hawaii - Maraviroc and NeuroAIDS Pathogenesis	93.242		KA1082	7,732	-
University of North Carolina - Chapel Hill - Do dimensions of adversity differentially predict neural development and psychopathology in young children	93.242		5112038	38,813	-
University of North Carolina - Chapel Hill - Longitudinal Assessment of Post-traumatic Syndromes	93.242		5111495	833,244	-
University of North Carolina - Chapel Hill - Longitudinal Assessment of Post-traumatic Syndromes	93.242		5111496	93,870	-
University of North Carolina - Chapel Hill - Multilevel Biomarkers for Suicidal Behavior: From Interpersonal Stress to Gene Expression in a Longitudinal Study of Adolescent Girls	93.242		5101900	91,232	-
University of Pennsylvania - Recording Neural Activities onto DNA	93.242		573341	17,644	-
University of Pennsylvania - Statistical methods in mHealth to signal interventional needs for mental health patients	93.242		576460	2,678	-
University of Pittsburgh Medical Center - Imaging the Suicidal Mind using Neurosemantics Signatures of Suicidal State	93.242		CNVA00059460 (131200-2)	10,470	-
University of Rochester - Neurocircuitry of OCD: Effects of Modulation - Core C and Project 3	93.242		416629-G	460,620	-
University of Washington - HIV self-testing and PrEP to increase testing and prevention uptake among male partners and improve postpartum ART use in PMTCT B+ programs in Uganda	93.242		UWSC10153	133,374	-
University of Washington - Integrated PrEP and ART delivered in Ugandan public health clinics to improve HIV and ART outcomes for HIV serodiscordant couples	93.242		UWSC10102	115,321	-
Washington University - Mapping the Human Connectome During Typical Development	93.242		WU-18-450	782,120	-
Total for CFDA 93.242				<u>11,281,131</u>	-
Brigham and Women's Hospital, Inc - Novel Circadian Exposure Metrics for Shift Workers	93.262		115367	1,188	-
Total for CFDA 93.262				<u>1,188</u>	-
Beth Israel Deaconess Medical Center - The Moderate Alcohol and Cardiovascular Health Trial (Harvard Biostatistical and Biospecimen Core)	93.273		1029990	87,299	10,362
International Agency for Research on Cancer - A pooling project on alcohol use and risk of cancers with inconsistent prior evidence, with an emphasis in non-smokers	93.273		CRA/NMB/2017/2	292,182	-
San Diego State University Research Foundation - Administrative Core of the CIFASD (U24)	93.273		SA0000604	55,772	-
Wayne State University - Dose and Pattern of Adverse Effects in the Diagnosis of Fetal Alcohol Spectrum Disorders: A Secondary Analysis of Data from Five Cohorts	93.273		WSU18048	62,716	-
Total for CFDA 93.273				<u>497,969</u>	<u>10,362</u>
Brandeis University - Center to Improve System Performance of Substance Use Disorder Treatment: Administrative Core	93.279		403586 (formerly 403416)	28,336	-
Brandeis University - Center to Improve System Performance of Substance Use Disorder Treatment: Research Core	93.279		403587 (formerly 403417)	177,497	-
Brigham and Women's Hospital, Inc - The Impact of Prescription Opioid Use on Pregnancy Outcomes	93.279		117817	34,201	-
California Institute of Technology - Deciphering the function and mechanisms of lncRNA-mediated organization of nuclear compartments	93.279		18B-1096549	36,417	-
Children's Hospital Boston - Finding the projection-specific dopaminergic synaptic organizers	93.279		GENFD0001659942	14,459	-
Johns Hopkins University - Consumer-Directed Health Plans and Substance Use Disorder Treatment	93.279		2004055395	48,123	-
Massachusetts General Hospital - The Impact of Medicaid Plans on Access to and Quality of SUD Treatment	93.279		232747	152,542	-
Pennsylvania State University - NIDA Innovative Methods for Constructing Just-In-Time Adaptive Interventions	93.279		5692-HU-DHHS-9838	384,575	-
Total for CFDA 93.279				<u>876,150</u>	-
Brigham and Women's Hospital, Inc - Using mHealth technology to identify and refer surgical site infections in Rwanda	93.286		115533	7,843	-
Columbia University - Multi-tissue platform for modeling systemic pathologies	93.286		2(GG008687-04)	225,405	-
Massachusetts General Hospital - Connectome 2.0: Developing the next generation human MRI scanner for bridging studies of the micro-meso-and macro-connectome	93.286		233327	817,629	-
Massachusetts Institute of Technology - Deep learning analysis for DNA damage assays	93.286		S4699/ PO 245053	2,366	-
The University of Memphis - Mobile Sensor Data Knowledge MD2K	93.286		5-40604	60,739	-
University of North Carolina - Chapel Hill - QuBBD: Statistical and Visualization Methods for PGHD to Enable Precision Medicine	93.286		5108991	25,426	-
Total for CFDA 93.286				<u>1,139,408</u>	-

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Harvard University

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Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Fundacion de Investigacion - Food access, social connectedness, and allostatic load after a natural disaster: a mixed-methods study	93.307		R21MD013650	14,484	-
Massachusetts General Hospital - Mechanisms underlying racial/ethnic disparities in mental disorders	93.307		227351	48,370	-
Massachusetts General Hospital - Medicare Policy Effects on Mental Health Care Disparities	93.307		230084	28,758	-
New York University - Impact of Social Cohesion and Social Capital in PrEP Uptake and Adherence Among Transwomen of Color	93.307		18-A0-00-1001313	36,200	-
Rand Corporation - Improving Minority Health by Monitoring Medicaid Quality, Disparities and Value	93.307		9920180018	369,906	-
Tufts University - Comparative and Cost-Effectiveness of Population Strategies to Improve Diet and Reduce Cancer	93.307		101389-00001-HH1501	20,435	-
University of Illinois at Urbana - Champaign - Epigenomic Predictors of PTSD and Traumatic Stress in an African American Cohort	93.307		088353-16584	5,731	-
University of South Florida - Epigenomic Predictors of PTSD and Traumatic Stress in an African American Cohort	93.307		6408-1117-00-C	35,952	-
Yale University - Environmental Health Disparities in an Older Population	93.307		GR101389 (CON-80001010)	50,129	-
Total for CFDA 93.307				609,965	-
Baylor College of Medicine - Admin Supplement: Beyond pairwise DNA contacts: exploring higher-order genome structure using proximity ligation	93.310		7000000868	39,259	-
Board of Regents of the University of Wisconsin System - U.S. Childhood Respiratory and Environment Workgroup	93.310		843K710	171,397	-
Brigham and Women's Hospital, Inc - Multi-omic approaches to mechanisms of vitamin D, environmental influences, and the microbiome on asthma	93.310		119919	2,871	-
Harvard Pilgrim Health Care, Inc - Common and distinct early environmental influences on cardiometabolic and respiratory health: Mechanisms and methods	93.310		PH000615C	235,205	-
Icahn School of Medicine at Mount Sinai - ECHO Consortium on Perinatal Programming of Neurodevelopment	93.310		0255-2293-4609	82,679	-
Massachusetts General Hospital - Designer probiotics for the treatment of intestinal infection and inflammation	93.310		229595	87,330	-
Mount Sinai Medical Center - CHEAR Center for Data Science	93.310		0255-0241-4609	95,821	-
Optical Wavefront Laboratories - High-resolution, parallelized imaging of freely swimming zebrafish with a gigapixel microscope	93.310		No Awrd Nmbr	15,158	-
University of North Carolina - Chapel Hill - Illuminating Function of the Understudied Druggable Kinome	93.310		5111411	632,461	-
Total for CFDA 93.310				1,362,181	-
Brigham and Women's Hospital, Inc - Kidney Microphysiological Analysis Platforms (MAP) to Optimize Function and Model Disease	93.350		118085	359,677	-
Massachusetts Institute of Technology - Cartilage-Bone-Synovium MPS: Musculoskeletal Disease Biology in Space	93.350		S4428 PO 327346	79,603	-
Ohio State University - N-lighten	93.350		60060045	(12,810)	-
Regents of the University of California - Irvine - CTSA External Reviewer Exchange Consortium	93.350		2018-3592	38,220	-
University of Pittsburgh Medical Center - ACT Supplement	93.350		00000243 (132627-2)	278,496	-
Total for CFDA 93.350				743,186	-
Brigham and Women's Hospital, Inc - A Community Zebrafish Resource for Modeling GWAS Biology	93.351		119850	160,602	-
The Jackson Laboratory - Teaching the Genome Generation: Professional Development for Genomics Instruction in	93.351		210239-0119-02	9,053	-
Total for CFDA 93.351				169,655	-
Dana-Farber Cancer Institute - The Cellular Geography of Therapeutic Resistance in Cancer	93.353		1206301	151,856	-
Oregon Health and Science University - Omic and Multidimensional Spatial Atlas of Metastatic Breast and Prostate Cancers	93.353		1013337 HARVARD	210,232	-
Total for CFDA 93.353				362,088	-
Dana-Farber Cancer Institute - Passive Data to Improve Outcomes in Advanced Cancer	93.361		1169301	5,357	-
Regents of the University of California - San Francisco - Interventions for Symptom Management in Older Patients with HAND	93.361		8591sc	15,306	-
Total for CFDA 93.361				20,663	-
Baylor College of Medicine - Integrative Analysis of Lung Cancer Etiology and Risk	93.393		7000000634	200,373	90,996
Baylor College of Medicine - Predictors of Early Stage Lung Cancer Recurrence	93.393		No Awrd Nmbr	31,401	-
Brigham and Women's Hospital, Inc - Comprehensive characterization of prostate stromal gene expression and	93.393		118830	70,222	-
Brigham and Women's Hospital, Inc - Long term multidisciplinary study of cancer in women: The Nurses Health Study	93.393		111048	100,184	-
Brown University - Inference and Validation of Chromosomes 3D Structure via Statistical Shape Analysis of Elastic Curves Models	93.393		1158	77,963	-
Dana-Farber Cancer Institute - A functional genomic approach to identification and interpretation of germline-tumor genetic interactions	93.393		1201302	41,048	-
Dana-Farber Cancer Institute - Accelerating Transdisciplinary Epidemiology of Colorectal Cancer	93.393		1261103	113,513	-
Dana-Farber Cancer Institute - Identifying PTSD in Young Adult Cancer Survivors in the DSM-5 Era Are Newly Revised PRO Measures Accurate Compared to a Structured Diagnostic Interview	93.393		1303601	11,843	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
H. Lee Moffitt Cancer Center and Research Institute - (PQA4) Molecularly Targeted Chemoprevention for Preneoplastic Squamous	93.393		10-18701-99-01-S6	50,618	-
Health Research, Inc. - Consortium on Methods Evaluating Tobacco (COMET): Filter Ventilation and Product Standards	93.393		289-01	34,210	-
Indiana University - Integrating Genetics of Gene Expression into Pathway Analysis for SCC GWAS	93.393		IN-4679755-HC	5,614	-
Lawrence Berkeley National Lab - Structural Cell Biology of DNA Repair Machines	93.393		7337766	54,385	-
Massachusetts General Hospital - Inflammation and Colorectal Neoplasia	93.393		226172	137,484	-
Mayo Clinic - Risk and penetrance of mutations from breast cancer testing panels	93.393		HAR-195385-07	106,684	-
Memorial Sloan Kettering Cancer Center - Characterizing the role of glucosamine and chondroitin supplements in the prevention of colorectal tumors	93.393		BD523707	32,563	-
NIH/NCI - Predicted lean body mass, fat mass, and risk of lung, pancreatic, colorectal, breast, and prostate cancers	93.393		5R03CA223619-02	73,373	-
Regents of the University of California - San Diego - Elucidating the role of nascent RNA in enhancer-promoter communication and three-dimensional genome organization	93.393		92851495	641,306	353,958
Regents of the University of Michigan - Linking State Registry and All Payer Claims Data to Study Cancer Care	93.393		3002831917	(1,299)	-
St. Jude Children's Research Hospital - Analysis of the role of the SWI/SNF complex in tumor suppression	93.393		112260040-7693401	540	-
St. Jude Children's Research Hospital - The Function of Snf5, an Epigenetic Tumor Suppressor	93.393		112261150-7830109	49,360	-
St. Jude Children's Research Hospital - The role of the SWI/SNF complex in tumor suppression	93.393		112260079-7843699	52,370	-
Stanford University - Evaluation of genetic, clinical, and environmental risk factors to establish effective screening strategies for second primary lung cancer	93.393		61958611-130956	10,828	-
Trustees of Boston University - A Prospective Investigation of the Oral Microbiome and Pancreatic Cancer	93.393		4500002808	183,459	-
University of North Carolina - Resolving the obesity paradox in kidney cancer	93.393		5106676	1,259	-
University of Washington - Quantifying and Characterizing the shared genetic contribution to common cancers	93.393		UWSC9239	42,772	-
Vanderbilt University Medical Center - Effects of Expanded Coverage on Access, Health Care and Health in the South	93.393		VUMC56386	(235)	-
Vanderbilt University Medical Center - Effects of Expanded Coverage on Access, Health Care and Health in the South	93.393		VUMC56386	167,490	-
Total for CFDA 93.393				2,289,328	444,954
Brigham and Women's Hospital, Inc - MRI-guided focused ultrasound for drug delivery and ablation of brain tumors (Project 3)	93.394		114165	(1)	-
Dana-Farber Cancer Institute - Circulating Biomarker Consortium for Pancreatic Cancer Early Detection	93.394		1283202	55,975	-
Dana-Farber Cancer Institute - GENOTYPE AND IMAGING PHENOTYPE BIOMARKERS IN LUNG CANCER	93.394		1235004	142,777	-
Dana-Farber Cancer Institute - QUANTITATIVE RADIOMICS SYSTEM DECODING THE TUMOR PHENOTYPE	93.394		1236204	67,160	-
Emory University - Emory, Harvard and Univ. of Washington Prostate Cancer Biomarker Center	93.394		A176870	67,089	-
Massachusetts General Hospital - INTEGRATED MODELS FOR METASTATIC PHENOTYPE AND OUTCOME PREDICTION IN OSTEOSARCOMA	93.394		227062	19,602	-
Massachusetts Institute of Technology - Optical Biopsy Using Optical Coherence Tomography	93.394		5710003780	48,713	-
RareCyt, Inc. - Highly Multiplexed Analysis of Solid Tumors and Liquid Tissues by Cyclic Immunofluorescence	93.394		1R41CA224503-01A1SUB	106,343	-
University of Massachusetts Medical School - Weight Management Counseling in Medical School: A Randomized Controlled Trial	93.394		OSP2016161	19,214	-
Total for CFDA 93.394				526,872	-
Auburn University - Proteasome inhibitors for the treatment of Solid Tumors	93.395		17-PHAR-201318-HMS	24,799	-
Dana-Farber Cancer Institute - NOVEL RANDOMIZED CONTROLLED TRIALS OF VITAMIN D SUPPLEMENTATION IN PATIENTS WITH COLORECTAL CANCER: IMPACT ON SURVIVAL AND BIOLOGY	93.395		1299503	15,177	-
Dana-Farber Cancer Institute - Strengthening Patient and Caregiver Supports in Ovarian Cancer with Palliative Care: Pilot RCT of BOLSTER	93.395		1208501	1,607	-
Massachusetts General Hospital - Abbreviated Targeted Therapy to Improve Anti-PD-1 Inhibitor Efficacy in Melanoma	93.395		232616	207,890	-
Massachusetts General Hospital - Dietary sulfur, the gut microbiome, and colorectal cancer	93.395		227950	270,364	-
Regents of the University of Michigan - Novel use of mHealth data to identify states of vulnerability and receptivity to JITAIs	93.395		SUBK00008226	45,933	-
Total for CFDA 93.395				565,770	-

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Beth Israel Deaconess Medical Center - A multi-faceted approach to identifying K-Ras synthetic lethal relationships	93.396		1060888	193,322	-
Beth Israel Deaconess Medical Center - Basic and translational studies of Ras-mutant colorectal cancer	93.396		1027625	16,085	-
Beth Israel Deaconess Medical Center - Molecular wiring and therapeutic targeting of EGFR and PDGFR signaling	93.396		1029110	4,978	-
Brigham and Women's Hospital, Inc - Identifying new therapeutic avenues to selectively target tumors with uncontrolled mTORC1 activation	93.396		120102	108,008	-
Brigham and Women's Hospital, Inc - Molecular Pathogenesis of the Hamartoma Syndromes	93.396		114746	3,856	-
Brigham and Women's Hospital, Inc - Molecular Pathogenesis of the Hamartoma Syndromes P01 Project 1: Identifying new therapeutic avenues to selectively target tumors with uncontrolled mTORC1 activation	93.396		120102	186,159	-
Cleveland Clinic Lerner College of Medicine of CWRU - CryoPen: An Innovative Treatment Cervical Pre-cancer in Low-Memorial Sloan Kettering Cancer Center - Interrogating the Evolutionary Dynamics of Cancer for Clinical Benefit and Regents of the University of California - San Francisco - Genetic Models of exRNA Communication	93.396		1142-SUB	27,746	-
Stanford University - SCH: INT: Collaborative Research: Intelligent Information Sharing: Advancing Teamwork in Complex Care	93.396		BD523873	4,973	-
Whitehead Institute for Biomedical Research - Mechanisms of Breast Development and Carcinogenesis	93.396		7798sc	103,029	-
Total for CFDA 93.396			62023614-137827	122,606	-
Beth Israel Deaconess Medical Center - DF/HCC Kidney Cancer SPORE	93.397		11-1786-2004	210,678	-
Dana-Farber Cancer Institute - Cancer Center Support Grant	93.397			981,440	-
Dana-Farber Cancer Institute - Circadian rhythm disruption and advanced prostate cancer	93.397		1060974	65,581	-
Dana-Farber Cancer Institute - Dana-Farber/Harvard Cancer Center Support Grant	93.397		HSPH-54	320,403	-
Dana-Farber Cancer Institute - DF-HCC SPORE in Prostate Cancer - Project 1	93.397		1058015	9,177	-
Dana-Farber Cancer Institute - SPORE: Dana-Farber/Harvard SPORE in Breast Cancer	93.397		HMS-54	1,031,762	-
Dana-Farber Cancer Institute - Synthetic screening to identify novel drug targets within the NF1 signaling network	93.397		1225415	28,119	-
Instituto Nacional De Salud Publica - Mesoamerican Center for Population Health Research on Non-Communicable Disease	93.397		1230005	8,832	-
Total for CFDA 93.397			1276154	970	-
Joslin Diabetes Center - The impact of vagal nutrient sensing neurons on systemic metabolism	93.647		1	2,334	-
Total for CFDA 93.647				1,467,178	-
Partners in Health - Policy, System and Environmental Change for Health Navajo Communities	93.738		P30DK036836-32 LiberlesHarvard	56,055	24,836
Total for CFDA 93.738			40	56,055	24,836
Massachusetts General Hospital - MA/Region 1 Partnership for Regional Health Disaster Response	93.817			827	-
Total for CFDA 93.817			233381	827	-
Beth Israel Deaconess Medical Center - Mechanisms of Prosthetic Arterial Graft Failure	93.837			34,085	-
Beth Israel Deaconess Medical Center - Use of Registries, Claims and Health System Data to Enhance the Evaluation of Cardiovascular Therapies in Clinical Trials	93.837		1029633	278,991	-
Boston Biomedical Innovation Center - Silencing airway nociceptors for treatment of cough and airway inflammation	93.837		1029815	56,681	-
Brigham and Women's Hospital, Inc - Adipose Dependent Mechanisms of Dietary Protein Restriction Protective Effects on Vein Graft	93.837		116096	62,085	-
Brigham and Women's Hospital, Inc - Adult Tissue Morphogenesis: Functional Regulation of Intussusceptive Angiogenesis	93.837		115081	18,162	-
Brigham and Women's Hospital, Inc - Boston Biomedical Innovation Center	93.837		114207	8,089	-
Brigham and Women's Hospital, Inc - Disease and Health: Asthma Resilience through MicroRNA Attributes (DHARMA)	93.837		114756	81,077	-
Brigham and Women's Hospital, Inc - Ingber-Shear Activated Nanothrombolytic	93.837		113158	120	-
Brigham and Women's Hospital, Inc - MicroRNAs in Circulation: Ontologies of Asthma Severity and Treatment (microCOAST)	93.837		116979	180,839	-
Brigham and Women's Hospital, Inc - Optimizing Revascularization of Coronary Artery Disease in Chronic Kidney Disease	93.837		113090	278,854	-
Brigham and Women's Hospital, Inc - Pre-DETERMINE: Biologic Markers and MRI SCD Cohort Study	93.837		110015	13,312	-
Brigham and Women's Hospital, Inc - Risk Factors for Ischemic Stroke in Women	93.837		116706	82,221	-
Brigham and Women's Hospital, Inc - Risk Factors of CVD in Women	93.837		113892	13,286	-
Brigham and Women's Hospital, Inc - Targeting erythropoietin-based therapeutics	93.837		120938	4,939	-
Children's Hospital Boston - Megakaryocyte Transcription Factor Activation to Enhance In Vitro Platelet Production from Human iPSCs	93.837		116479	180,743	-
Cincinnati Children's Hospital Medical Center - Administrative Coordinating Center: Cardiovascular Development and Pediatric Cardiac Genomics Consortia	93.837		GENFD0001358806	(334)	-
			138275	28,808	-

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Cincinnati Children's Hospital Medical Center - Administrative Coordinating Center: Cardiovascular Development and Pediatric Cardiac Genomics Consortia. Steering Committee Chair for the PCGC	93.837		2018 PCGC 138281 CHAIR	38,900	-
Cincinnati Children's Hospital Medical Center - Down Syndrome Admin Supp to ACC: Cardiovascular Development and Pediatric Cardiac Genomics Consortia	93.837		FP00001653 Supplement	44,823	-
Columbia University - ROLE OF RAGE IN BICUSPID AORTIC VALVE SYNDROME	93.837		1(GG013569)	63,632	-
Duke University - Novel Mechanisms and Therapies in Heart Failure	93.837		A031557	113,314	-
Emory University - Worksite lifestyle program for reducing diabetes and CVD risk in India	93.837		A035442	78,748	-
Icahn School of Medicine at Mount Sinai - Data Coordination and Integration Center for LINC5-BD2K	93.837		0255-7892-4609	147,491	-
Joslin Diabetes Center - Metabolic Pathways of Increased Cardiovascular Risk in Type 2 Diabetes	93.837		100026	24,234	-
Massachusetts General Hospital - Does Exercise Induce Cardiomyogenesis	93.837		227636	(27,702)	-
Massachusetts General Hospital - Identifying novel cardiopulmonary disease intervention targets among people with HIV in rural	93.837		232954	4,431	-
Massachusetts General Hospital - Mechanisms of Cardiac Dysfunction in HIV and the Effect of Statins	93.837		230744	12,566	-
Massachusetts General Hospital - Primary prevention of vascular events in HIV	93.837		224846	220,287	-
Massachusetts General Hospital - Promoting employee health through the worksite food environment	93.837		226216	30,157	-
Massachusetts General Hospital - The Impact of anti-inflammatory treatment with low dose methotrexate	93.837		224883	7,706	-
Northeastern University - Comparative Assessment of Modifying Social Determinants to Reduce Cardiovascular Disease Burden and Disparities	93.837		500537-78050	14,644	-
Regents of the University of Minnesota - Diffusion of Clinical Evidence into Practice: Physician Networks, Delivery Organizations, and Markets	93.837		P006001153	3,708	-
Stanford University - Statistical Methods for Optimizing Personalized Treatment Selection	93.837		60552401-44738	90,468	-
Tufts University - Diet and Metabolic Risks: Joint Drivers of Global Epidemiologic Transition	93.837		101467-00001	17,728	-
University of Massachusetts - Amherst - Statistical methods for large-scale, prospective, epidemiologic studies	93.837		15-008650-A03	980	-
University of Massachusetts Medical Center - Pediatric Practice-based Obesity Intervention to Support Families:	93.837		OSP2017060	30,261	-
Vanderbilt University - Outcome Dependent Sampling Studies of Longitudinal Data: Design and Analysis	93.837		VUMC58615	105,576	-
Wayne State University - Cardiac Toxicity in Perinatally HIV-infected Adolescents and Young Adults, a Longitudinal	93.837		WSU17134	22,589	-
Total for CFDA 93.837				<u>2,332,414</u>	-
Brigham and Women's Hospital, Inc - Genetic Epidemiology of COPD (2 of 2)	93.838		117868	255,739	-
Brigham and Women's Hospital, Inc - Leveraging Family Data to Identify Genetic Variants for Sleep Apnea	93.838		113855	56,361	-
Brigham and Women's Hospital, Inc - Manipulating Tissue Strain in Surgical Repair	93.838		120026	83,017	-
Brigham and Women's Hospital, Inc - Systems Biology of Airway Disease	93.838		115975	115,812	-
Brigham and Women's Hospital, Inc - Therapeutic modulation of zinc for lung injury and mechanobiology	93.838		121004	16,112	-
Children's Hospital Boston - Environmental Risk Factors for Pediatric Sleep Disordered Breathing	93.838		GENFD0001491676	88,966	-
COPD Foundation - Network Management Core (NEMO) for the Pulmonary Trials Cooperative (PTC)	93.838		001-Amend2	10,344	-
Emory University - Household air pollution and health: a multi-country LPG intervention trial	93.838		A003516	37,610	-
University of Colorado Denver - Data Fusion-A Self-Scaling, Open Source Registry Advancing Pediatric Pulmonary Vascular Disease Research	93.838		FY18.369.003	59,075	-
University of Colorado Denver - Pulmonary Hypertension Data Fusion: Regulatory Science	93.838		FY19.369.010	219,883	-
University of Pennsylvania - CEBPD - Medicated Mechanisms of Glucocorticoid Insensitivity in Severe Asthma	93.838		571226	129,682	-
Total for CFDA 93.838				<u>1,072,601</u>	-
Beth Israel Deaconess Medical Center - Targeting the Endothelium in Sepsis	93.839		1027662	130,030	-
Brigham and Women's Hospital, Inc - Cytoskeletal Mechanisms of Platelet Formation	93.839		116938	11,236	-
Brigham and Women's Hospital, Inc - Genetic and Environmental Risk Factors for Venous Thromboembolism	93.839		113440	26,641	-
Case Western Reserve University - Platelet-inspired Delivery System for Targeted Thrombolytic Therapy	93.839		RESS12743	209,041	-
Massachusetts General Hospital - Functional dissection of clonal hematopoiesis	93.839		230441	408,369	-

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Massachusetts General Hospital - Integrated Coagulation Sensing to Predict Hemorrhage and Guide Transfusions	93.839		233097	56,533	-
University of Maryland, College Park - Relationship of ambient air pollution exposures with vaso-occlusive pain crises in sickle cell disease	93.839		66027-Z0155201	7,580	-
University of Massachusetts Medical School - Novel Growth Factor Regulators of Early Erythropoiesis	93.839		OSP2018073	336,270	-
University of Pennsylvania - Vascular delivery of nanocarriers by erythrocytes	93.839		574882	225,057	-
Total for CFDA 93.839				<u>1,410,757</u>	<u>-</u>
Brigham and Women's Hospital, Inc - Sociodemographic Disparities in SLE Incidence: Behavioral and Psychosocial Factors	93.846		113176	20,151	-
Brigham and Women's Hospital, Inc - VERIFY: Value and Evidence in Rheumatology using bioinformatics, and advanced analytics	93.846		118064	22,419	-
Hebrew SeniorLife - The Gut Microbiome and Bone Microarchitecture	93.846		90094	13,906	-
Maine Medical Center - Cellular Mechanisms of PTH1R Activation with Osteoporosis Treatments	93.846		ROSEN-111071-A	18,117	-
Massachusetts General Hospital - Identifying gene and regulatory networks underlying postnatal tendon growth	93.846		230508	99,931	-
Massachusetts General Hospital - Posttranscriptional control of epidermal progenitors senescence	93.846		234150	3,926	-
University of Louisville - Interplay of androgens, microbiota and immunoregulation in lupus	93.846		ULRF 15-0685-01	17,093	-
University of North Carolina - Ethnic differences in outcomes and treatment barriers after sexual assault/ Admin Supplement	93.846		5110056	(211)	-
Total for CFDA 93.846				<u>195,332</u>	<u>-</u>
Beth Israel Deaconess Medical Center - Generation of a Cellular Atlas of Adipose Tissue in Mouse and Man	93.847		1060496	433,804	-
Beth Israel Deaconess Medical Center - Memory Advancement by Intranasal Insulin in Type 2 Diabetes (MemAiD)	93.847		1028191	7,687	-
Beth Israel Deaconess Medical Center - Role of Macrophages in Impaired Wound Healing in Diabetes	93.847		1028521	4,330	-
Boston Medical Center - Boston Obesity Nutrition Research Center	93.847		2137	(13,970)	-
Boston Medical Center - Boston Obesity Nutrition Research Center	93.847		6860	121,108	-
Boston Nutrition Obesity Research Center - Chronic Inflammation and Obesity: Genetic Susceptibility and the Role of	93.847		BMC-ID-7-72	1,128	-
Brigham and Women's Hospital, Inc - Circulating plasma metabolites, diet, and risk of type 2 diabetes	93.847		118780	160,442	-
Brigham and Women's Hospital, Inc - Novel Pathways for Kidney Stone Formation	93.847		120966	8,943	-
Brigham and Women's Hospital, Inc - Physiology of Thyroid Hormone-Dependent Gene Expression	93.847		114846	1,138	-
Brigham and Women's Hospital, Inc - Risk Factors for and Tissue Biomarker Expression in Primary	93.847		110397	(4,284)	-
Brown University - Impact of Medicaid Expansion on Racial and Socioeconomic Disparities in ESRD	93.847		1181	39,954	-
Children's Hospital Boston - Customized stem cells for clinical applications in blood disorders	93.847		GENFD0001552720	287,708	-
Children's Hospital Boston - Development of Silk Fibroin Grafts for Reconstruction of Esophageal Defects	93.847		GENFD0001481955	22,781	-
Children's Hospital Boston - Mechanisms and Markers of Small Intestinal Epithelial Injury	93.847		GENFD0001606915	3,177	-
Children's Hospital Boston - The neuropilin 2 axis in smooth muscle contractility	93.847		GENFD0001459936	38,758	-
Children's Hospital Boston - Transcriptional Reprogramming in Podocyte Injury	93.847		GENFD0001472388	85,890	-
Children's Hospital Corporation - Chemosensory intestinal tuft cells and mucosal immunity	93.847		GENFD0001258270	(657)	-
Dana-Farber Cancer Institute - Control of Adipocyte Gene Expression and Physiology	93.847		1032937	3,931	-
Duke University - Microbial regulation of host nutrient metabolism	93.847		2037259	58,683	-
Harvard Pilgrim Health Care, Inc - Impact of Emerging Health Insurance Designs on Diabetes Complications	93.847		AH000527	3,769	-
Harvard Pilgrim Health Care, Inc - New Insights into the Federal Calorie Labeling Law	93.847		PH000668A	128,057	-
Johns Hopkins University - Sleep Apnea Treatment with Positive Airway Pressure for Prevention of Diabetes Mellitus	93.847		2004175483	5,673	-
Joslin Diabetes Center - Can technology improve self-care in youth with type-1 diabetes	93.847		P30DK036836-31 Dassau Harvard	3,675	-
Joslin Diabetes Center - Regulation of human brown and beige adipocyte differentiation and function by genetic and secreted factors	93.847		14-897-02	21,762	-
Kaiser Foundation Health Plan of Washington - Long-Term Benefits and Risks of Bariatric Surgery in Integrated Care Systems	93.847		RNG002749-BUDG04-HSPH-00	17,733	-
Massachusetts General Hospital - Deconvoluting the hematopoietic niche under stress	93.847		227794	183,883	-

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Massachusetts General Hospital - Examining Sleep Disparities in a Birth Cohort	93.847		229046	5,386	-
Massachusetts General Hospital - Infant Sleep Characteristics and Accelerated Growth Trajectories from Birth to 24 months	93.847		227074	211,070	-
Massachusetts General Hospital - Inflammation and Risk of Diverticulitis	93.847		224804	15,112	-
Massachusetts General Hospital - Nutrition Obesity Research Center at Harvard	93.847		231130	2,427	-
Massachusetts General Hospital - Obesity over the adult life course and late-life subjective cognitive function	93.847		231091	11,288	-
Massachusetts General Hospital - Psychological, cognitive, and genetic factors in a behavioral intervention to prevent weight gain	93.847		231761	31,473	-
Rand Corporation - Robust Statistical Methods to Identify and Use Surrogate Markers in Diabetes	93.847		9920190016	11,115	-
Symbiotix Biotherapies, Inc. - Therapeutics for Inflammatory Bowel Disease from the Microbiome	93.847		SYMBI-04	30,196	-
The Broad Institute - A comprehensive platform for novel therapy development from the microbiome	93.847		5000472-5500001054	575,863	-
Tulane University - Nutrigenetics and Nutrigenomics for Precision Weight-Loss Diet Interventions	93.847		TUL-HSC-556076-17-18	73,802	-
Tulane University - Obesity Genes, Energy Regulation in Response to Weight-Loss Diets	93.847		TUL-HSC-556619-18/19	24,747	-
Tulane University - Weight-Loss Diet Intervention on Cardiometabolic Factors of Gut Microbiota	93.847		TUL-HSC-55400-16-17	20,253	-
University of Alabama - Effect of Pitavastatin on Kidney Function in HIV-infected Persons	93.847		000509533-005	24,287	-
University of Massachusetts Medical School - Humanized Mouse Avatars for T1D	93.847		WA00239846-RFS2015105	45,556	-
University of Pennsylvania - A Large Scale Long-Term Randomized Trial of Nutrition Labeling Interventions	93.847		574745	25,806	-
University of Southern California - (Re)Building a Kidney Partnership Project Program	93.847		84071314	89,829	-
University of Virginia - MD-PSCH Clinical Acceptance of the Artificial Pancreas: The International Diabetes Closed Loop (iDCL) Trial	93.847		GB10282 151300	374,082	201,332
Xeris Pharmaceuticals, Inc. - Closed-Loop Glucagon Pump for Treatment of Post-Bariatric Hypoglycemia	93.847		123953	2,799	-
Yale University - Data and Biostatistics Core : Amazon Center of Excellence in Malaria Research	93.847		GR106222(CON-80001764)	70,821	-
Yale University - On-body ecosystem for automated insulin delivery in type 1 diabetes	93.847		GR100945 (CON-80000948)	173,864	-
Total for CFDA 93.847				3,444,859	201,332
Brigham and Women's Hospital, Inc - Identification of Presenilin downstream targets in neuronal survival	93.853		116846	174,732	-
Brigham and Women's Hospital, Inc - Identification of exosome signature in serum from ALS patients	93.853		119414	17,143	-
California Institute of Technology - Functional Mapping of Pathways for Sensory-Motor Integration	93.853		21B-1095833	14,351	-
California Institute of Technology - Project 4- Neural Basis of Behavioral Sequence Loops	93.853		S397744	584,990	513,977
Children's Hospital Boston - Cell Identity Determination In Human Brain: Somatic mutation and cell lineage	93.853		GENFD0001680550	149,635	-
Columbia University - CRCNS: Refining computational models of motor sequence learning and execution	93.853		1(GG012952-01)	222,090	-
Columbia University - Project 2-Neural Basis of Motor Pattern Control	93.853		1(GG012999-02)	83,733	-
Johns Hopkins School of Medicine - Gene expression underlying serotonin axon regrowth in the adult mammalian brain	93.853		2003998519	60,495	-
Massachusetts General Hospital - Micro-Coil Implants for Cortical Activation	93.853		229585	177,536	-
Massachusetts General Hospital - mRNA Splicing Modulation in Familial Dysautonomia	93.853		228844	158,541	-
Massachusetts General Hospital - Phase 3 trial of inosine in Parkinson's disease CCC	93.853		226396	25,166	-
New York University - Statistical methods for censored and dependently truncated data	93.853		F1067-01	53,090	-
New York University School of Medicine - Development and Function of 5HT3aR-Expressing Cortical GABAergic Interneurons (Project 1 Trx Yr 5 The role of genetic and activity dependent cues in the generation of 5HT3aR	93.853		12-00633	29,832	-
New York University School of Medicine - Development and Function of 5HT3aR-Expressing Cortical GABAergic Interneurons (Project 1)	93.853		18-A1-00-008334-01	95,757	-
Princeton University - Mechanisms of Neural Circuit Dynamics in Working Memory and Decision-Making	93.853		SUB0000239	221,854	-
Regents of the University of California - Berkeley - Specifying the constraints on cerebellar dependent sensorimotor adaptation	93.853		9885	153,940	-
Stanford University - Project 3- Neural Basis of Sensory-Guided Actions	93.853		61745076-130506	194,038	-
University of Massachusetts - Amherst - A six dimensional connectomics approach to the neural basis of behavior	93.853		19-010728 C00	94,313	-
University of Massachusetts - Lowell - The Gut Microbiome In Parkinson Disease	93.853		S5111000036435	88,352	-
University of North Carolina - Bcl-xL-regulated apoptosis in cerebellar development and medulloblastoma treatment	93.853		5110620	23,287	-
University of Pittsburgh - Integrating EHR and Genomics to Predict Multiple Sclerosis Drug Response	93.853		0055152(128815-3)	121,298	-
Total for CFDA 93.853				2,744,173	513,977

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Beth Israel Deaconess Medical Center - Combined Immunologic Approaches to Cure HIV-1	93.855		1060734	37,343	-
Beth Israel Deaconess Medical Center - Viral dynamics of rebound and control following early treatment of HIV/SIV	93.855		1060812	38,218	-
Beth Israel Deaconess Medical Center - Viral dynamics of rebound and control following early treatment of HIV/SIV	93.855		1060815	43,432	-
Board of Regents of the University of Wisconsin System - Antimicrobial Drug Discovery from Coevolved Symbiotic Communities	93.855		808K706	397,896	-
Board of Regents of the University of Wisconsin System - Novel antimicrobials targeting MDR pathogens from animal microbial symbionts	93.855		882K346	83,564	-
Board of Regents of the University of Wisconsin System - Novel antimicrobials targeting MDR pathogens from animal microbial symbionts	93.855		882K442	178,196	-
Boston University School of Medicine - Phase 2 Pharmacodynamic Study of High-Dose Levofloxacin In MDR-TB	93.855		4500002132	638	-
Brandeis University - Developing Homology-Independent Targeted Insertion (HITI) toolkits for molecular genetic manipulation of Drosophila melanogaster and Anopheles gambiae	93.855		403591	76,771	-
Brandeis University - Unraveling the polymodal behavior of sensory transduction receptors	93.855		403164	104,694	-
Brigham and Women's Hospital, Inc - A Pilot Clinical Trial for HIV-1 Eradication	93.855		114094	17,674	-
Brigham and Women's Hospital, Inc - ACTG Leadership and Operations Center	93.855		110298	315,148	-
Brigham and Women's Hospital, Inc - AIDS Clinical Trials Group (ACTG)	93.855		115113	3,882	-
Brigham and Women's Hospital, Inc - Antiretroviral Drug Resistance in KwaZulu Natal	93.855		114727	17,682	-
Brigham and Women's Hospital, Inc - Core A: Metabolic factors that control the spectrum of human tuberculosis [TBRU]	93.855		111846	42,744	-
Brigham and Women's Hospital, Inc - Core B: Metabolic factors that control the spectrum of human tuberculosis [TBRU]	93.855		111896	45,314	-
Brigham and Women's Hospital, Inc - Finding and Treating Unsuspected and Resistant TB to Reduce Hospital Transmission	93.855		111945	42,511	-
Brigham and Women's Hospital, Inc - Metabolic factors that control the spectrum of human tuberculosis	93.855		119249	7,924	-
Brigham and Women's Hospital, Inc - Project 1: Metabolic Factors that control the spectrum of Human Tuberculosis [TBRU]	93.855		111899	20,926	-
Brigham and Women's Hospital, Inc - Project 3: Metabolic factors that control the spectrum of human tuberculosis [TBRU]	93.855		111903	4,576	-
Brigham and Women's Hospital, Inc - Protection of organ transplant from ischemia reperfusion injuries	93.855		115242	13,329	-
Brigham and Women's Hospital, Inc - Relationships Between Adipose Tissue (AT) Density and Cardiometabolic Outcomes in A5260s	93.855		117360	119	-
Brigham and Women's Hospital, Inc - The Fetal and Childhood Environment, Oxidative Balance, Inflammation and Asthma	93.855		114196	39,695	-
Brigham and Women's Hospital, Inc - TIM Family of Genes: Role in T Cell Immunity and Tolerance (Core C)	93.855		112676	96,566	-
Case Western Reserve University - Resetting Immune Homeostasis: A Non-Invasive Approach Towards HIV Eradicator	93.855		RES513648	50,937	-
Children's Hospital Boston - Novel Therapeutics targeting the membrane proximal external region of HIV-1 Env	93.855		GENFD0001349063	5,233	-
Children's Hospital Boston - Optimization and preclinical development of a TB Multiple Antigen Presenting System	93.855		GENFD0001394794	40,333	-
Children's Hospital Boston - School Inner-City Asthma Intervention Study	93.855		GENFD0001578883	260,734	-
Children's Hospital Boston - Structural Basis of Coreceptor Recognition by HIV-1 Envelope Spike	93.855		GENFD0001665271	89,852	-
Children's Hospital Boston - Structure-function analysis of infection- and vaccine-induced B-cell repertoire	93.855		GENFD0001501258	42,101	-
Children's Hospital Boston - Structure-function studies of the membrane-interacting domains of HIV-1 Env spike	93.855		GENFD0001448013	362,507	-
Dana-Farber Cancer Institute - Targeting Immunogenicity to the MPER Hinge and C-helix for BNAb Elicitation	93.855		1282102	28,355	-
Duke University - Antibacterial Resistance Leadership Group (ARLG)	93.855		2037694	32,770	-
FHI Development 360 - HPTN 081 A phase 2b study to evaluate the safety and the efficacy of VRC01	93.855		PO15004266	287,030	287,030
FHI Development 360 - HPTN084 A Phase 3 Double Blind Safety and Efficacy Study of Long-Acting Injectable Cabotegravir Compared to Daily Oral TDF/FTC for Pre-Exposure Prophylaxis in HIV-Uninfected Women	93.855		PO17003036	34,628	34,628
Harvard Pilgrim Health Care, Inc - Network modeling and robust estimation of the intraclass correlation coefficient to inform the design and analysis of cluster randomized trials for infectious diseases	93.855		AH000680	12,405	-
Icahn School of Medicine at Mount Sinai - The Immune Cell Atlas - A Robust Framework to Map the Entire Human	93.855		0255-B131-4609	214,130	-
Johns Hopkins University - Johns Hopkins University Kampala-Nanning Clinical Trial Unit	93.855		2003732848	27,150	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Johns Hopkins University - Statistical Designs and Methods for Double-Sampling for HIV/AIDS	93.855		2002962625	8,890	-
Massachusetts Eye and Ear Infirmary - Compounds and Strategies for Treating MRSA and VRE	93.855		530539	482,355	-
Massachusetts General Hospital - Assessing measures to eliminate transmission of cholera in Haiti	93.855		232975	26,714	-
Massachusetts General Hospital - Cardiovascular Disease Risk in HIV-infected Women: Sex-Specific Mechanisms of Risk and Risk Reduction among REPRIEVE Trial Participants	93.855		227111	68,394	-
Massachusetts General Hospital - Cost Effectiveness of Preventing HIV Complications	93.855		226292	123,678	-
Massachusetts General Hospital - Development of a point of care urine tenofovir immunoassay to distinguish adherence versus resistance-based HIV treatment failure	93.855		234351	3,109	-
Massachusetts General Hospital - Evolution of Gut Flora in HIV-exposed Uninfected Infants	93.855		226820	(172)	-
Massachusetts General Hospital - Inflammation and the Vaginal Microbiome in HIV Acquisition	93.855		224082	9,274	-
Massachusetts General Hospital - Novel Methods to Inform HIV/TB Clinical Trial Development	93.855		226434	69,698	-
Massachusetts General Hospital - Optimizing HIV Care in Less Developed Countries	93.855		224628	336	-
Massachusetts General Hospital - Optimizing HIV Care in Less Developed Countries	93.855		233034	51,569	-
Regents of the University of California - Los Angeles - Leadership and Operation Center (LOC), AIDS Clinical Trials	93.855		1560GWB424	2,159	-
Regents of the University of California - Los Angeles - Leadership and Operation Center (LOC), AIDS Clinical Trials	93.855		1560GWB425	139,045	-
Regents of the University of California - Los Angeles - Leadership and Operations Center (LOC), AIDS Clinical Trials	93.855		1560GWB420	53,309	-
Regents of the University of California - Los Angeles - Leadership and Operations Center (LOC), AIDS Clinical Trials	93.855		1560GWB421	130,366	-
Regents of the University of California - Los Angeles - Leadership and Operations Center (LOC), AIDS Clinical Trials	93.855		1560GWB422	13,793	-
Regents of the University of California - Los Angeles - Leadership and Operations Center (LOC), AIDS Clinical Trials	93.855		1560GWB423	985	-
Regents of the University of California - Los Angeles - Leadership and Operations Center (LOC), AIDS Clinical Trials	93.855		1560GWB426	35,402	-
Regents of the University of California - San Diego - Center for AIDS Research, Biostatistics and Modeling (BAM) Core	93.855		104237211	19,902	-
Regents of the University of California - San Diego - Quantitative Methods Research Project	93.855		93420631	70,823	-
Regents of the University of New Mexico - Stimulating protective CD4+ T cell immunity to Chlamydia trachomatis	93.855		3RT66	369,381	-
Regents of the University of New Mexico - Stimulating protective CD4+ T cell immunity to Chlamydia trachomatis	93.855		3RT66 Project 2	64,121	-
Stanford University - Big Data Analysis of HIV Risk and Epidemiology in Sub-Saharan Africa	93.855		61499525-123298	189,066	-
Texas A&M Research Foundation - Structure-based Discovery of Critical Vulnerabilities of Mycobacteria	93.855		M1803704	153,921	-
The Broad Institute - Advancing Genomic Technologies to Combat Infectious Disease: Mapping Dynamics within Single Cells, Individual Hosts, and Global Populations	93.855		5000544-5500001280	37,945	-
The Broad Institute - Infectious Disease Genomics: Pathogen Evolution, Emergence and Host Interactions	93.855		5035430-5500001135	15,912	-
University of California, San Diego - Automation and Evaluation of Real-Time Transmission Network-Based HIV Prevention Services in New York City	93.855		99689314	51,968	-
University of California, San Diego - Primary Infection Resource Consortium (PIRC)	93.855		93599352	169,014	-
University of Massachusetts Medical School - Systems Genetics of Tuberculosis	93.855		OSP2018035	449,573	-
University of Massachusetts Medical School - Tuberculosis and T cell recognition	93.855		OSP2016182	125,398	-
University of Miami - Immune correlates of LTBI in HIV-exposed infants	93.855		SPC-001000	4,749	-
University of Pennsylvania - NEXT GENERATION MISSING DATA METHODS IN HIV RESEARCH	93.855		574360	189,272	-
University of Pittsburgh - Conditionally replicating BCG for alternative vaccination routes	93.855		CNVA00062617 (132386-1)	41,487	-
University of Pittsburgh - Core D: Synergies among Inhibitory Receptors in Tolerance Cancer and Antiviral Immunity	93.855		9011704 (126208-1)	15,237	-
University of Pittsburgh - HIV-TB Co-infection: Tracking TB emergence after asymptomatic (latent) infection	93.855		0038654 (124296-1)	59,060	-
University of Pittsburgh - Influence of SIV replication on TB progression and immunity	93.855		0056912 (129847-1)	48,593	-
University of Pittsburgh - Project 1: Synergies among Inhibitory Receptors in Tolerance Cancer and Antiviral Immunity	93.855		CNVA00044083 (126209-1)	503,895	-
University of Pittsburgh - The Consequences of Reinfection with M. tuberculosis	93.855		0046965 (126363-1)	153,096	-
University of Washington - A Point-of-Care Assay to Measure Tenofovir for Monitoring PrEP and ART Adherence	93.855		UWSC9214	6,454	-
University of Washington - Assessing Mother and Infant Antiretroviral Exposure Using Hair Measures	93.855		UWSC10586	15,732	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
University of Washington - Malaria Evolution in South Asia	93.855		UWSC9952	158,266	-
Weill Medical College of Cornell University - Conditionally replicating Mycobacterium tuberculosis vaccines	93.855		17091331	242,988	-
Wellcome Trust Sanger Institute - Large-scale systematic prioritisation of Plasmodium vivax blood stage vaccine	93.855		R01AI37154-SPH	226,201	-
Western University of Health Sciences - Identifying schistosomiasis resistance genes of snail vectors in hotspot transmission zones: Translating from laboratory models to the field.	93.855		20150-Steinauer-HTHCHAN	14,864	-
Yale University - Costimulatory Mechanisms of Autoimmunity (Composite)	93.855		GR100959 (CON-80001032)	603,777	-
Yale University - Data and Biostatistics Core : Amazon Center of Excellence in Malaria Research	93.855		94004692	94,642	-
Yale University - Evaluating health and economic effects of targeted strategies in TB/HIV	93.855		GK000461 (CON-80000341)	128,114	-
Yale University - New Methods for the Design and Evaluation of Large HIV Prevention Interventions	93.855		GR105323 (CON-80001636)	126,606	-
Total for CFDA 93.855				8,685,968	321,658
Baylor College of Medicine - A Comprehensive Resource for Manipulating the Drosophila Genome	93.859		5601104954	377,306	-
Brandeis University - Genetic and Physiological Mechanisms of Temperature Detection and Compensation	93.859		403233	2,599	-
Brandeis University - Genetic and Physiological Mechanisms of Temperature Detection and Compensation (Project 3)	93.859		403234	136,401	-
Brandeis University - Thermosensory integration and behavior in Drosophila larva	93.859		403758	16,568	-
Dana-Farber Cancer Institute - Preprocessing and Analysis Tools for High-Throughput Technologies	93.859		1286003	9,130	-
Fred Hutchinson Cancer Research Center - Statistical Methods for Prospective Evaluation of Biomarkers	93.859		901695	55,506	-
Massachusetts General Hospital - Competitive Antagonists for General Anesthetics: Novel Drugs for Improving Patient Care and Advancing Scientific Research	93.859		230354	40,241	-
Massachusetts General Hospital - Core C: Protein Chemistry	93.859		224991	298,702	-
Massachusetts General Hospital - Project 1: Locating General Anesthetic Binding Sites in GABAA and Glycine	93.859		224993	285,818	-
Northwestern University - Regulation and Function of Intermediate Filaments in Cell Mechanics	93.859		60048379 HC	5,795	-
Northwestern University - Regulation and Function of Intermediate Filaments in Cell Mechanics	93.859		60051124 HU	98,542	-
Regents of the University of Michigan - Translational frameshifting and U5-PBS:tRNALys interaction	93.859		3004633964	233,476	-
Rockefeller University - A minimally invasive synthetic biology-driven approach for natural products discovery	93.859		5U01GM110714-05	492,498	-
Rosalind Franklin University of Medicine and Science - Structure and function of the ATP synthase	93.859		Mueller - 212159	106,816	-
Rutgers, The State University of New Jersey - Membrane Protein Structure Using Evolutionary Couplings and Sparse	93.859		232	126,672	-
University of Cincinnati - Structural insight into the signaling and regulation of GDF8 and GDF11	93.859		011843-002	15,284	-
University of Georgia - Collaborative Research: Statistical Approaches for Deciphering the Regulatory Role of Small	93.859		SUB00001241	43,357	-
University of Georgia Research Foundation, Inc. - Novel statistical tools for cell line specific epigenetic analysis	93.859		RR193-157/4945416	61,459	-
University of North Carolina - Chapel Hill - Epigenetic control of metazoan transcription and pre-mRNA processing by	93.859		5111066	59,695	-
University of Washington - Ribosomal DNA copy number variation as a source of missing heritability in complex traits	93.859		UWSC10049	220,939	-
Virginia Institute of Marine Science - The impacts of host vaccination and selective breeding for disease resistance on pathogen transmission and ecology in freshwater aquaculture	93.859		718792-712683	41,934	-
Total for CFDA 93.859				2,728,738	-
Arizona State University - Innovative Family Prevention with Latino Siblings in Disadvantaged Settings	93.865		ASUB00000124	45,531	-
Brigham and Women's Hospital, Inc - BMI-Based Prenatal Vitamins To Ameliorate Oxidative Stress In Obese	93.865		117984	(1,715)	-
Brigham and Women's Hospital, Inc - Causes and consequences of mitochondrial dysfunction in oocytes and cumulus	93.865		117986	314,883	-
Brigham and Women's Hospital, Inc - Mechanics of Vertebrate Embryo Elongation	93.865		119812	181,991	-
Brigham and Women's Hospital, Inc - Ondansetron and risk of congenital malformations	93.865		117025	10,762	-
Brigham and Women's Hospital, Inc - TRANSLATING NEW INSIGHTS FROM AXOLOTL LIMB REGENERATION INTO	93.865		120755	18,697	-

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Harvard University

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Children's Hospital Boston - Boston Intellectual and Developmental Disabilities Research Center	93.865		GENFD0001544485	42,728	-
Children's Hospital Boston - Child Health Research Career Development Award	93.865		GENFD0001410733	24,727	-
Children's Hospital Corporation - The Hippocampus and Brainstem in the Sudden Infant Death Syndrome	93.865		GENFD0001660081	131,583	-
Emory University - Spatial Uncertainty in Small Area Population Inference from Survey and Administrative Data	93.865		A110121	56,093	-
Harvard Pilgrim Health Care, Inc - Pre- and Peri- Natal Predictors of Childhood Health and Obesity	93.865		AH000630	28,781	-
Icahn School of Medicine at Mount Sinai - Advancing use of hair and salivary cortisol in stress-asthma research	93.865		0255-8001-4609	(99)	-
Johns Hopkins University - Preterm Birth, Maternal and Cord Blood Metabolome, and Child Metabolic Risk	93.865		2003250340	104,076	-
Johns Hopkins University - "Determining Bone Loss and Bone Mineral Density Recovery following Repeat Pregnancy/Lactation among HIV Infected women on ART."	93.865		2004010614	8,225	-
Massachusetts General Hospital - Adolescent Medicine Trials Network for HIV/AIDS Intervention (ATN) Coordinating	93.865		231478	113,936	-
Massachusetts General Hospital - Improving Outcomes for HIV-infected children in South Africa and Cote d'Ivoire	93.865		224642	39,087	-
Massachusetts General Hospital - Long-term Impact of Fertility Treatments (LIFT) Study	93.865		231263	192,800	-
Massachusetts General Hospital - Outcomes and Predictors of Successful Transition to Adult Care for HIV-infected Adolescents in South Africa	93.865		230644	42,661	-
New York University - Type, timing, and turbulence of poverty-related risk: Long-term evidence from CSRP	93.865		F7479-03	1,080	-
Pennsylvania State University - CONTROL OF THE NEONATAL SEPTISOME AND HYDROCEPHALUS IN SUBSAHARAN AFRICA	93.865		HARHD086071	59,989	-
Regents of the University of California - Los Angeles - Impact of HIV PMTCT Interventions on HBV Disease in HIV/HBV Co-infected	93.865		1560GUB041	41,004	-
Regents of the University of Michigan - Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN)	93.865		SUBK00009927	115,697	-
Tulane University - Disparities in Recovery from Hurricane Katrina: NOLA@10	93.865		TUL-HSC-556513-18/19	352,414	27,750
University of Illinois at Urbana - Champaign - RNA Pol II pausing is critical for spermatogenesis and fertility	93.865		092758-17182	71,432	-
University of Pittsburgh - Alliance for Regenerative Rehabilitation Research and Training (AR3T) -Robotic actuator for in vivo muscle stimulation	93.865		0048860 (126873-16)	19,804	-
Total for CFDA 93.865				2,016,167	27,750
Arizona State University - Identification of the genetic and transcriptomic networks of cognitive and neuropathological resilience to Alzheimer's disease associated viruses	93.866		ASUB00000190	166,908	-
Boston University School of Medicine - Identifying epigenetic mechanisms underlying age-related disease risk in	93.866		4500002101	(21)	-
Brigham and Women's Hospital, Inc - Boston OAIC: A Translational Approach to Function Promoting Anabolic	93.866		115900	9,564	-
Brigham and Women's Hospital, Inc - Non-esterified fatty acids and dementia: risk, structure, and biomarkers	93.866		119900	51,118	-
Brown University - Changing Long-Term Care in America	93.866		669	41,058	-
Brown University - Delirium, Dementia and the Vulnerable Brain: An integrated Approach (Project 4: Defining Phenotype	93.866		1317	3,789	-
Brown University - Which Post Acute Care Setting is best for Patients' Outcomes	93.866		1165	66,999	-
Hebrew SeniorLife - Cerebrovascular Mechanisms of Slow Gait and Falls	93.866		10.10.90072	9,678	-
Massachusetts General Hospital - Alzheimer's Disease and Related Dementia Care within the Medicare Program	93.866		233402	62,122	-
Massachusetts General Hospital - Harnessing Diverse Bioinformatic Approaches to Repurpose Drugs for Alzheimer's	93.866		233405	248,700	-
Massachusetts General Hospital - Harnessing Diverse Bioinformatic Approaches to Repurpose Drugs for Alzheimer's	93.866		231367	50,716	-
National Bureau of Economic Research - Constructing U.S. Life Tables by Educational Status from 1990 through 2011	93.866		41710.HMS	(160)	-
National Bureau of Economic Research - Evaluating Changes in Pharmaceutical Therapies for Medicare and Other	93.866		41490 HMS	(118)	-
National Bureau of Economic Research - Improving Health Outcomes for an Aging Population	93.866		4135G.30.12.HMS	102,229	-
National Bureau of Economic Research - Improving Health Outcomes for an Aging Population	93.866		4135G.30.16.HKS	101,991	-
National Bureau of Economic Research - NBER Roybal Center for Behavior Change in Health and Savings: Reminders through Association	93.866		33-4121-07-02	(16)	-
Northwestern University - Proteostasis in Aging and Neurodegenerative Disease (Project 2)	93.866		60052291 HARVARD	402,219	-
Northwestern University - Proteostasis in Aging and Neurodegenerative Disease. Core C: Global Proteomics Core.	93.866		60052292 HARVARD	85,277	-
Posit Science Corporation - Amplified Attention Training (AAT) for Age-related Cognitive Decline	93.866		PSC- 1006-14	10,625	-
Regents of the University of California - San Francisco - Closing the gap between observational research and randomized trials for prevention of Alzheimer's Disease and dementia	93.866		11206sc	43,259	-
Regents of the University of New Mexico - Biodemography of Aging in Wild Chimpanzees	93.866		045446-87D7	34,148	-
Rush University Medical Center - MIND Diet Intervention to Prevent Alzheimers Disease	93.866		15052004-Sub05-Supplement	1,339,610	-

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Stanford University - Link between epigenetic and fat metabolism	93.866		61396029-122992	108,618	-
Syracuse University - Educational Attainment, Geography, and U.S. Adult Mortality Risk	93.866		29218-04806-S04	16,383	-
Trustees of Dartmouth College - Causes and Consequences of Healthcare Efficiency - Project 3	93.866		R1033	77,684	-
Trustees of Dartmouth College - Causes and Consequences of Healthcare Efficiency - Project 4	93.866		R1034	8,271	-
University of Colorado Denver - Pitavastatin to REDuce Physical Function Impairment and FRailty in HIV (PREPARE)	93.866		2-5-A4588	42,499	-
University of Massachusetts - Amherst - Development and Application of a Metabolomic Profile of Chronic Distress to	93.866		18-010151 B02	66,275	-
University of Massachusetts - Amherst - Treatment of randomly censored covariates in Alzheimer's disease studies	93.866		17-009565 A03	9,167	-
University of Southern California - Dietary Restriction, GH-IGF-1 and Mechanisms of Differential Cellular Protection	93.866		101993163	437,547	-
University of Southern California - Harmonized Diagnostic Assessment of Dementia (DAD) for Longitudinal Aging Study	93.866		66924119	1,257	-
University of Wisconsin - Integrative Pathways to Health and Illness Project 1 - Psychosocial Contributors	93.866		99	19,952	-
Van Andel Institute - Developing novel treatments for Parkinson's disease by targeting molecular pathways that have been shown to	93.866		V3015-1	24,171	-
Total for CFDA 93.866				3,641,519	-
Massachusetts Eye and Ear Infirmary - NEIGHBORHOOD Consortium for POAG Genetics	93.867		530066	33,582	-
Northwestern University - The Mechanical Basis of Primary Open Angle Glaucoma	93.867		SP0028943-PROJ0007599	207,755	-
University of Rochester - Accelerating vision restoration through in-vivo cellular imaging of inner and outer retina	93.867		416635-G	117,759	-
University of Rochester - CRCNS Research Proposal: Perceptual decision-making in a probabilistic inference	93.867		417154G/UR FAO GR510693	90,216	-
Total for CFDA 93.867				449,312	-
Brigham and Women's Hospital, Inc - Building capacity for chronic kidney disease research in Guatemala	93.989		117983	26,402	-
Children's Hospital Boston - International Bioethics Research Training (IBRTI - Central Asia Network)	93.989		GENFD0001635756	2,218	-
College of Medicine of the University of Lagos - Building Research And Innovation in Nigeria's Science - (BRAINS)	93.989		Harvard-TW010134	101,085	-
Institute for Clinical Effectiveness and Health Policy - Promoting Capacity Building in Chronic Diseases Research in South America	93.989		E0047	(1,533)	-
Johns Hopkins School of Public Health - Multilevel Program and Policies to Reduce Chronic Disease for American	93.989		2003231673	9,221	-
Universidad Peruana Cayetano Heredia - Planning to establish a regional center of NCD research training in Peru	93.989		No Awrd Nmbr	1,107	-
University of Ibadan - University of Ibadan MEPI Junior Faculty Research Training Program (UI-MEPI-J)	93.989		Harvard-TW010140	58,434	-
University of Jos - Support of Training and Mentoring in Nigeria for Academics [STAMINA]	93.989		UJHVD-STAMINA-Y3	127,340	-
Total for CFDA 93.989				324,274	-
Abt Associates, Inc. - Evaluation of the Oncology Care Model	93.RD		46244	694,717	-
Dimagi, Inc - NASCare: A mobile tool for the assessment and treatment of Neonatal Abstinence Syndrome	93.RD		HHSN271201700065C	51,879	-
J. Craig Venter Institute - Bioinformatics Resource Centers for Infectious Diseases - Viral	93.RD		JCVI-14-003	21,636	-
Leidos Biomedical Research, Inc - Conditionally replicating strains of BCG	93.RD		18X058Q1	339,117	148,635
MITRE Corporation - Model Portfolio Plan (ACO Regulations)	93.RD		120686	376,183	-
Rand Corporation - Implementation of the CAHPS Surveys for the Medicare Shared Savings Program, Physician Quality Reporting System and Other Physician Quality Programs	93.RD		9920150141	28,927	28,926
Rand Corporation - Implementation of the Medicare PDP and MA Plan Disenrollment Reasons Survey	93.RD		HHSM-500-2016-00052G	91,314	-
Rand Corporation - National Implementation of Medicare Advantage and Prescription Drug Plan CAHPS Surveys	93.RD		9920180001	729,691	9,962
Rand Corporation - National Implementation of the CAHPS Hospice Survey	93.RD		400076	14,737	-
Social + Scientific Systems, Inc. - Pilot Study of Whole Genomic Sequencing to Detect Reduced Antibiotic Susceptibility	93.RD		CRB-SSS-S-18-005448	11,545	-
Vanderbilt University Medical Center - Trends in Nursing Home-Hospice Contracting and Common Ownership Between Hospice Agencies and Nursing Homes	93.RD		VUMC63613	70,984	-
Westat Corporation - NICHD International and Domestic Pediatric and Maternal HIV and Other High Priority Infectious Diseases Data Coordinating Center	93.RD		6579-S42	177,400	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Westat Corporation - Prospective Cohort Study of HIV and Zika in Infants and Pregnancy Study (HIV-ZIPS)	93.RD		6579-S42	201,190	-
The Broad Institute - Human Tumor Atlas Pilot Project (HTAPP)	93.RD		5101211-5500001184	312,832	-
Brigham and Women's Hospital, Inc - Developing the Capability of Using National Medicaid data for FDA Post-Marketing Surveillance to Assess Medication Safety During Pregnancy	93.RD		118120	149,807	-
Mathematica Policy Research, Inc. - Evaluation of the Million Hearts CVD Model	93.RD		50496S05639	(12,753)	-
Total for CFDA 93.RD				<u>3,259,206</u>	<u>187,523</u>
Total for DHHS Pass-through Awards R&D				<u>61,891,062</u>	<u>1,824,716</u>
Social Security Administration					
National Bureau of Economic Research - Changing Labor Markets Mental Illness: Impacts on Work and Disability	96.007		51460.01:R-DRC19-05	33,231	-
National Bureau of Economic Research - Disability Insurance and Treatment for Pain	96.007		51010.05:DRC17-15	(40)	-
National Bureau of Economic Research - The Effects of Medicaid Policy on the Health Care Utilization and Health of	96.007		51010.06:DRC18-13	15,005	-
Total for CFDA 96.007				<u>48,196</u>	<u>-</u>
Total for Social Security Administration Pass-through Awards R&D				<u>48,196</u>	<u>-</u>
Department of Homeland Security					
Rand Corporation - Puerto Rico Post-Disaster Redevelopment	97.108		9920180081	86,915	-
Total for CFDA 97.108				<u>86,915</u>	<u>-</u>
Total for Department of Homeland Security Pass-through Awards R&D				<u>86,915</u>	<u>-</u>
Agency for International Development					
International Medical Corps - Building a Better Response: Strengthening Non-governmental organization Capacity and Engagement in the International Humanitarian Architecture	98.001		103443.100.51	247,173	35,630
International Rescue Committee - Safer Cash	98.001		AID-OFDA-A-17-00064	42,251	-
South Africa Partners, Inc. - Albertina Susulu Executive Leadership Program in Health (ASELPH)	98.001		HSPH-USAID 2018-001	39,807	-
Tufts University - Feed the Future Innovation Lab for Collaborative Research on Nutrition - Africa	98.001		AID920	47,786	-
University Research Co., LLC - Applying Science to Strengthen and Improve Systems (ASSIST)	98.001		FY13-S04-8800-00	(166)	-
Yale University - Genomic, spatial, and epidemiological analysis to inform targeted TB interventions in Moldova	98.001		GR104345 (CON-80001427)	28,388	-
Total for CFDA 98.001				<u>405,239</u>	<u>35,630</u>
Total for Agency for International Development Pass-through Awards R&D				<u>405,239</u>	<u>35,630</u>
Total for Pass-through Awards R&D Cluster				<u>84,994,309</u>	<u>2,152,602</u>
Total for R&D Cluster				<u>622,925,240</u>	<u>119,138,124</u>
Student Financial Assistance Cluster					
Direct Awards					
Department of Education					
Federal SEOG 2018-2019	84.007	P007A181874		2,213,859	-
Total for CFDA 84.007				<u>2,213,859</u>	<u>-</u>
Federal Work-Study Program (On Campus)	84.033	P033A181874		1,120,160	-
Federal Work-Study Program (Off Campus)	84.033	P033A181874		1,173,420	-
Total for CFDA 84.033				<u>2,293,580</u>	<u>-</u>
Federal Pell Grant 2018-2019	84.063	P063P180187		6,144,862	-
Total for CFDA 84.063				<u>6,144,862</u>	<u>-</u>
Teacher Education Assistance for College and Higher Education Grant (TEACH) 2018-2019	84.379	P379T190187		29,888	-
Total for CFDA 84.379				<u>29,888</u>	<u>-</u>
Federal Family Education Loans					
Outstanding Loans as of July 1, 2018	86.032			351,932	-
New Loans Issued During 2018-2019	86.032			-	-
Administrative Cost Allowance	86.032			-	-
Total for CFDA 84.032				<u>351,932</u>	<u>-</u>

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Federal Perkins Loans					
Outstanding Loans as of July 1, 2018	86.038			47,026,662	-
New Loans Issued During 2018-2019	86.038			-	-
Administrative Cost Allowance	86.038			-	-
Total for CFDA 84.038				47,026,662	-
Federal Direct Student Loans	86.268			96,716,393	-
Total for CFDA 86.268				96,716,393	-
Total for Department of Education Direct Awards Student Financial Assistance Cluster				154,777,176	-
DHHS					
Health Professions Student Loans, Primary Care Loans and Loans for Disadvantaged Students (HPSL/PCL/LDS)					
Outstanding Loans as of July 1, 2018	93.342			12,350,290	-
New Loans Issued During 2018-2019	93.342			1,145,862	-
Administrative Cost Allowance	93.342			-	-
Total for CFDA 93.342				13,496,142	-
Total for DHHS Direct Awards Student Financial Assistance Cluster				13,496,142	-
Total for Direct Awards Student Financial Assistance Cluster				168,273,318	-
Total for Student Financial Assistance Cluster				168,273,318	-
Other Programs					
Direct Awards					
Department of Defense					
Equipment for Ultracold Molecular Assembly	12.431	W911NF1810194		94,374	-
Total for CFDA 12.431				94,374	-
Bridges to Russia: Culture and Social Studies	12.900	H98230-19-1-0163		23,144	-
STARTALK: Bridges to Russia	12.900	H98230-18-1-0219		73,686	-
Total for CFDA 12.900				96,830	-
Leadership in Homeland Security	12.U01	W912SV 18P0029		186,378	-
Total for CFDA 12.U01				186,378	-
Total for Department of Defense Direct Awards Other Programs				377,582	-
Department of State					
Crossroad of Empires: From the Monumental Lydian Gate to the Roman Road and Mosaics at Sardis	19.040	S-TU-150-17-GR-051		28,040	-
Total for CFDA 19.040				28,040	-
Disability Civil Society, Human Rights, and Law in China	19.345	S-LMAQM-17-GR-1102		384,423	-
Global Internet Censorship Measurement Consortium	19.345	S-LMAQM-17-GR-1069		604,841	264,946
Total for CFDA 19.345				989,264	264,946
Total for Department of State Direct Awards Other Programs				1,017,304	264,946
Department of Transportation					
Dwight David Eisenhower Transportation Fellowship	20.215	693JJ31945083		5,000	-
Dwight David Eisenhower Transportation Fellowship	20.215	693JJ31945089		4,995	-
Exploring blockchain technology for efficient application to connected vehicles	20.215	693JJ31945076		5,000	-
Total for CFDA 20.215				14,995	-
Total for Department of Transportation Direct Awards Other Programs				14,995	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Department of the Treasury					
Low Income Taxpayer Clinic	21.008	18-LITC0231-03-00		49,637	-
Low Income Taxpayers Clinic	21.008	19-LITC0393-01-01		34,917	-
Total for CFDA 21.008				84,554	-
Total for Department of the Treasury Direct Awards Other Programs				84,554	-
NASA					
The 9th International GEOS-Chem Meeting (IGC9)	43.001	80NSSC19K0410		15,000	-
Total for CFDA 43.001				15,000	-
Total for NASA Direct Awards Other Programs				15,000	-
Institute of Museum and Library Services					
Opening Up Digital Collections: Learning Resources for Middle School	45.301	MA-10-18-0311-18		26,711	-
Preserving an American Treasure: A New Storage System for the Mineral Collection at Harvard Universitys Mineralogical	45.301	MA-30-15-0159-15		3,415	-
Reimagining, reinvigorating and conserving the Earth Archive in a digital age	45.301	MA-30-18-0310-18		50,292	-
Total for CFDA 45.301				80,418	-
Building for Tomorrow: Collaborative Development of Sustainable Infrastructure for Architectural and Design Documentation	45.312	LG-73-17-0004-17		(5,992)	-
Scaling Up Perma. cc: Ensuring the Integrity of the Digital Scholarly Record	45.312	LG-70-16-0023-16		255,772	-
Total for CFDA 45.312				249,780	-
Foundations to Actions: Extending Innovations in Digital Libraries in Partnership with NDSR Learners	45.313	RE-40-16-0082-16		20,593	17,135
Planning Grant: Young Changemakers in the 21st Century Library	45.313	RE-97-18-0063-18		33,291	-
Total for CFDA 45.313				53,884	17,135
Total for Institute of Museum and Library Services Direct Awards Other Programs				384,082	17,135
National Endowment for the Humanities					
Nuremberg Tribunals Project - Trial 9	45.149	PW-253721-17		3,984	-
Total for CFDA 45.149				3,984	-
Animal-Shaped Vessels from the Ancient World: Feasting with Gods, Heroes, and Kings	45.164	GI-250140-16		319,234	-
Digital Giza	45.164	MN-258709-18		195,760	118,320
Total for CFDA 45.164				514,994	118,320
Bogoraz's Itelmen Notebooks	47.075	PD-260979-18		17,889	-
Total for CFDA 47.075				17,889	-
Total for National Endowment for the Humanities Direct Awards Other Programs				536,867	118,320
Department of Education					
Foreign Language and Area Studies Fellowships	84.015	P015B140085-16		(5,000)	-
Foreign Language and Area Studies Fellowships	84.015	P015B140089-17		28,823	-
Foreign Language and Area Studies for Davis Center for Russian and Eurasian Studies	84.015	P015B140087 - 17		677	-
National Resource Centers for the Committee on African Studies	84.015	P015A140089 - 17		24,990	-
Total for CFDA 84.015				49,490	-
National Resource Centers: Center for African Studies	84.015A	P015A180138		221,554	-
National Resource Centers: Davis Center for Russian and Eurasian Studies	84.015A	P015A180078		173,127	-
Total for CFDA 84.015A				394,681	-
Foreign Language and Area Studies (FLAS): Davis Center for Russian and Eurasian Studies	84.015B	P015B180078		367,500	-
Foreign Languages and Area Studies (FLAS) - Center for African Studies	84.015B	P015B180138		127,401	-
Total for CFDA 84.015B				494,901	-

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Fulbright-Hays Doctoral Dissertation Research Abroad	84.022A	P022A180031		129,001	-
Fulbright-Hays Doctoral Dissertation Research Abroad	84.022A	P022A170026		5,461	-
Total for CFDA 84.022A				<u>134,462</u>	<u>-</u>
The Strategic Data Project for Higher Education— Using Data to Improve Retention and Workforce Outcomes	84.305U	R305U190001		2,378	-
Total for CFDA 84.305U				<u>2,378</u>	<u>-</u>
Total for Department of Education Direct Awards Other Programs				<u>1,075,912</u>	<u>-</u>
DHHS					
Prevention Policy Modeling Lab	93.084	6NU38PS004644-05-03		1,579,632	485,789
Total for CFDA 93.084				<u>1,579,632</u>	<u>485,789</u>
Equitable Care For Elders	93.129	6 U30CS307880301		366,299	-
Total for CFDA 93.129				<u>366,299</u>	<u>-</u>
Total for DHHS Direct Awards Other Programs				<u>1,945,931</u>	<u>485,789</u>
Department of Homeland Security					
Evaluation of the Greater Boston Countering Violent Extremism (CVE) Pilot Program	97.108	15STFRG00005-01-01		131,453	-
Total for CFDA 97.108				<u>131,453</u>	<u>-</u>
Total for Department of Homeland Security Direct Awards Other Programs				<u>131,453</u>	<u>-</u>
Agency for International Development					
Privatization and Economic Diversification Training in Ethiopia	98.001	72066319FA00001		56,893	-
Total for CFDA 98.001				<u>56,893</u>	<u>-</u>
Total for Agency for International Development Direct Awards Other Programs				<u>56,893</u>	<u>-</u>
Total for Direct Awards Other Programs				<u>5,640,573</u>	<u>886,190</u>
Other Programs					
Pass-through Awards					
Department of Agriculture					
University of New England - Supermarket Science: Multipronged Approaches to Increasing Fresh, Frozen and Canned	10.310		230060-11	52,408	-
Total for CFDA 10.310				<u>52,408</u>	<u>-</u>
Total for Department of Agriculture Pass-through Awards Other Programs				<u>52,408</u>	<u>-</u>
Department of Defense					
Griffiss Institute - Embedded Deep Learning: Algorithms and Architectures for Efficient CNN Inference	12.U01		SA2018-UP-026	133,629	-
Total for CFDA 12.U01				<u>133,629</u>	<u>-</u>
Total for Department of Defense Pass-through Awards Other Programs				<u>133,629</u>	<u>-</u>
Department of Housing & Urban Development					
Neighborhood Reinvestment Corporation - A Shared Future: Fostering Communities of Inclusion in an Era of Inequality - Neighborworks	14.U01		No Awrd Nmbr	12,807	-
Neighborhood Reinvestment Corporation - Achieving Excellence in Community Development	14.U01		No Awrd Nmbr	441,810	-
Neighborhood Reinvestment Corporation - THE EDWARD M. GRAMLICH FELLOWSHIP IN COMMUNITY AND ECONOMIC DEVELOPMENT SUMMER FELLOWSHIP PROGRAM - Summer 2018	14.U01		No Awrd Nmbr	23,500	-
Neighborhood Reinvestment Corporation - THE EDWARD M. GRAMLICH FELLOWSHIP IN COMMUNITY AND ECONOMIC DEVELOPMENT SUMMER FELLOWSHIP PROGRAM - Summer 2019	14.U01		OSPNEG-7289	10,000	-
Total for CFDA 14.U01				<u>488,117</u>	<u>-</u>
Total for Department of Housing & Urban Development Pass-through Awards Other Programs				<u>488,117</u>	<u>-</u>
Department of Justice					
University of Massachusetts - Lowell - Research and Evaluation on Prevention and Mitigation of Domestic Pathways to	16.560		S51000000040709	2,680	-
Total for CFDA 16.560				<u>2,680</u>	<u>-</u>
Total for Department of Justice Pass-through Awards Other Programs				<u>2,680</u>	<u>-</u>

The accompanying notes are an integral part of this schedule.

Harvard University

Schedule of Expenditures of Federal Awards

Year Ended June 30, 2019

Federal Grantor/Pass-through Grantor/Program or Cluster Title	CFDA Number	Award Number	Pass-through Entity Identification Number	Federal Expenditures	Passed to Sub-Recipients
Department of State					
Trust for University Innovation in Vietnam - Development for Fulbright University Vietnam	19.451		100002-1051	231,439	-
Total for CFDA 19.451				<u>231,439</u>	<u>-</u>
George Mason University - I/UCRC Spatiotemporal Innovation Center for the Mapping Secondary Cities for Resiliency	19.U01		E2045731	25,136	-
Total for CFDA 19.U01				<u>25,136</u>	<u>-</u>
Total for Department of State Pass-through Awards Other Programs				<u>256,575</u>	<u>-</u>
Library of Congress					
Waynesburg University - Teaching Curriculum: Furthering Teacher Learning of Effective Instructional Practices and Student Learning with Primary Sources	42.U01		No Awrd Nmbr	17,839	-
Total for CFDA 42.U01				<u>17,839</u>	<u>-</u>
Total for Library of Congress Pass-through Awards Other Programs				<u>17,839</u>	<u>-</u>
Institute of Museum and Library Services					
Regents of the University of California - Cobweb: A Collaborative Collection Development Platform for Web Archiving	45.312		LG-70-16-0093-16-Harvard	4,998	-
Total for CFDA 45.312				<u>4,998</u>	<u>-</u>
Total for Institute of Museum and Library Services Pass-through Awards Other Programs				<u>4,998</u>	<u>-</u>
Department of Energy					
Krell Institute - Krell Institute DOE Computational Science Graduate Fellowship	81.049		No Awrd Nmbr	13,670	-
Total for CFDA 81.049				<u>13,670</u>	<u>-</u>
Total for Department of Energy Pass-through Awards Other Programs				<u>13,670</u>	<u>-</u>
Department of Education					
United Way Massachusetts Bay, Inc. (UWMB) - BoSTEM Initiative with MEDscience	84.411C		No Awrd Nmbr	22,323	-
Total for CFDA 84.411C				<u>22,323</u>	<u>-</u>
Total for Department of Education Pass-through Awards Other Programs				<u>22,323</u>	<u>-</u>
DHHS					
AIDS Prevention Initiative in Nigeria, Ltd/Gte. - Engaging Indigenous Organizations to Sustain and Enhance Comprehensive Clinical Services for the Prevention, Care and Treatment of HIV/AIDS in Nigeria under PEPFAR	93.067		HSPH-GH002098	429,186	-
Total for CFDA 93.067				<u>429,186</u>	<u>-</u>
Association of State and Territorial Health Officials - Essential Skills for Newly Appointed State and Territorial Health	93.424		1584	104,191	-
Total for CFDA 93.424				<u>104,191</u>	<u>-</u>
Trustees of Boston University - Improving HIV Health Outcomes through the Coordination of Supportive Employment	93.928		4500002839	24,109	-
Total for CFDA 93.928				<u>24,109</u>	<u>-</u>
Commonwealth of Massachusetts/Center for Health Information and Analysis - MDPH Health and Medical Coalition	93.U02		INTF6208HH4183222192	34,341	-
Total for CFDA 93.U02				<u>34,341</u>	<u>-</u>
Commonwealth of Massachusetts/Center for Health Information and Analysis - MDPH Health and Medical Coalition	93.U01		INTF6208HH4183222192	280,109	-
Total for CFDA 93.U01				<u>280,109</u>	<u>-</u>
Total for DHHS Pass-through Awards Other Programs				<u>871,936</u>	<u>-</u>
Agency for International Development					
Concern Worldwide U.S. Inc - Humanitarian Leadership Program: Developing the Next Generation of Humanitarian	98.001		BBE-HVD-001	119,436	-
Total for CFDA 98.001				<u>119,436</u>	<u>-</u>
Total for Agency for International Development Pass-through Awards Other Programs				<u>119,436</u>	<u>-</u>
Total for Pass-through Awards Other Programs				<u>1,983,611</u>	<u>-</u>
Total for Other Programs Cluster				<u>7,624,184</u>	<u>886,190</u>
Grand Total for SEFA				<u>\$ 798,822,742</u>	<u>\$ 120,024,314</u>

The accompanying notes are an integral part of this schedule.

Harvard University

Notes to Schedule of Expenditures of Federal Awards Year Ended June 30, 2019

1. Basis of Presentation and Summary of Significant Accounting Policies

The accompanying Schedule of Expenditures of Federal Awards (the "Schedule") summarizes the expenditures of Harvard University (the "University") under programs of the federal government for the year ended June 30, 2019. The information in this Schedule is presented in accordance with the Title 2 U.S. *Code of Federal Regulations Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). Therefore, some amounts presented in this schedule may differ from amounts presented in, or used in the preparation of, the basic financial statements of the University. Negative amounts represent adjustments or credits to amounts reported as expenditures in prior years in the normal course of business. CFDA numbers and pass-through numbers are provided when available.

For purposes of the Schedule, Federal awards include all grants, contracts and similar agreements entered into directly between the University and agencies and departments of the Federal government and all subawards to the University by nonfederal or organizations pursuant to Federal grants, contracts and similar agreements.

The term "Revised" accompanying the award numbers on the Schedule represents a revised Notice of Grant Award (NGA).

Expenditures reported in the Schedule are reported on the accrual basis of accounting. Such expenditures are recognized following the cost principles contained in the Uniform Guidance and OMB Circular A-21, *Cost Principles for Educational Institutions*, as applicable, wherein certain types of expenditures are not allowable or are limited to reimbursement.

2. Facilities and Administrative Costs

The University applies its predetermined approved facilities and administrative rate when charging indirect costs to federal awards rather than the 10% de minimis cost rate as described in Section 200.414 of the Uniform Guidance. The University recovers facilities and administrative costs associated with sponsored agreements pursuant to separate arrangements negotiated with the University's Federal cognizant agency by each of the Medical School, School of Public Health, and the University Area. Predetermined facilities and administrative rates have been established for the University Area and Medical School (including the School of Dental Medicine) through June 30, 2019. The School of Public Health has predetermined rates through June 30, 2023.

Harvard University
Notes to Schedule of Expenditures of Federal
Awards Year Ended June 30, 2019

3. Federal Student Loan Programs

The Federal student loan programs listed below are administered directly by the University and balances and transactions relating to these programs are included in the University's consolidated financial statements. Loans outstanding at the beginning of the year, the administrative cost allowance and loans made during the year are included in the federal expenditures presented in the Schedule. The balance of loans outstanding at June 30, 2019 consist of:

	CFDA #:	Amount
Perkins	84.038	\$ 36,335,098
FFEL (includes FISL, Sub Stafford, Unsub Stafford, PLUS, and SLS)	84.032L	322,354
HPSL/LDS/PCL	93.342	<u>12,361,911</u>
Total Federal Student Loans		<u>\$ 49,019,363</u>

The University participated in the School as Lender program (CFDA# 84.032L) beginning in 1977 until the program ended in June 2010. There were no new loans distributed to students in connection with this program during the year ended June 30, 2019.

Loans made by the University to eligible students under the Federal student loan programs and Federally guaranteed loans issued to students during the year ended June 30, 2019 are summarized as follows:

	CFDA #:	Amount
Perkins	84.038	\$ -
Net Direct Subsidized Stafford	84.268	1,217,961
Net Direct Unsubsidized Stafford	84.268	55,092,906
Net Direct PLUS	84.268	3,861,333
Net Direct Grad PLUS	84.268	36,544,193
HPSL/LDS/PCL	93.342	<u>1,145,852</u>
Total		<u>\$ 97,862,245</u>

Part II
Reports on Internal Control and Compliance



Report of Independent Auditors on Internal Control Over Financial Reporting and on Compliance and Other Matters Based on an Audit of Financial Statements Performed in Accordance with *Government Auditing Standards*

To the Joint Committee on Inspection of the Governing Boards of Harvard University:

We have audited, in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States, the consolidated financial statements of Harvard University and its subsidiaries (the “University”), which comprise the consolidated balance sheet as of June 30, 2019, and the related consolidated statements of changes in net assets with general operating account detail, changes in net assets of the endowment and of cash flows for the year then ended, and the related notes to the financial statements, and have issued our report thereon dated October 24, 2019, which included an emphasis of matter paragraph related to the University changing the manner in which it presents net assets and reports certain aspects of its consolidated financial statements as a not-for-profit entity in 2019 as discussed in Note 2.

Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered the University’s internal control over financial reporting (“internal control”) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the University’s internal control. Accordingly, we do not express an opinion on the effectiveness of the University’s internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity’s financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.



Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether the University's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

A handwritten signature in cursive script that reads "PricewaterhouseCoopers LLP".

October 24, 2019



**Report of Independent Auditors on Compliance with Requirements
That Could Have a Direct and Material Effect on Each Major Program and on Internal
Control Over Compliance in Accordance with the Uniform Guidance**

To the Joint Committee on Inspection of the Governing Boards of Harvard University:

Report on Compliance for Each Major Federal Program

We have audited Harvard University's (the "University") compliance with the types of compliance requirements described in the *OMB Compliance Supplement* that could have a direct and material effect on each of the University's major federal programs for the year ended June 30, 2019. The University's major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs.

Management's Responsibility

Management is responsible for compliance with federal statutes, regulations and the terms and conditions of its federal awards applicable to its federal programs.

Auditors' Responsibility

Our responsibility is to express an opinion on compliance for each of the University's major federal programs based on our audit of the types of compliance requirements referred to above. We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States; and the audit requirements of Title 2 U.S. *Code of Federal Regulations Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). Those standards and the Uniform Guidance require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about the University's compliance with those requirements and performing such other procedures as we considered necessary in the circumstances.

We believe that our audit provides a reasonable basis for our opinion on compliance for each major federal program. However, our audit does not provide a legal determination of the University's compliance.

Opinion on Each Major Federal Program

In our opinion, the University complied, in all material respects, with the types of compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2019.



Report on Internal Control Over Compliance

Management of the University is responsible for establishing and maintaining effective internal control over compliance with the types of compliance requirements referred to above. In planning and performing our audit of compliance, we considered the University's internal control over compliance with the types of requirements that could have a direct and material effect on each major federal program to determine the auditing procedures that are appropriate in the circumstances for the purpose of expressing an opinion on compliance for each major federal program and to test and report on internal control over compliance in accordance with the Uniform Guidance, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of the University's internal control over compliance.

A deficiency in internal control over compliance exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. *A material weakness in internal control over compliance* is a deficiency, or combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis. *A significant deficiency in internal control over compliance* is a deficiency, or a combination of deficiencies, in internal control over compliance with a type of compliance requirement of a federal program that is less severe than a material weakness in internal control over compliance, yet important enough to merit attention by those charged with governance.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over compliance that might be material weaknesses or significant deficiencies. We did not identify any deficiencies in internal control over compliance that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

The purpose of this report on internal control over compliance is solely to describe the scope of our testing of internal control over compliance and the results of that testing based on the requirements of the Uniform Guidance. Accordingly, this report is not suitable for any other purpose.

PricewaterhouseCoopers LLP

December 10, 2019

Part III
Audit Findings and Questioned Costs

Harvard University
Schedule of Findings and Questioned Costs
Year Ended June 30, 2019

I. Summary of Auditors' Results

Financial statements

Type of audit report issued	Unmodified
Internal control over financial reporting:	
Material weaknesses identified?	No
Significant deficiency(ies) identified that are not considered to be material weaknesses?	None reported
Noncompliance which is material to the financial statements noted?	No

Federal awards

Internal control over major programs:	
Material weaknesses identified?	No
Significant deficiency(ies) identified that are not considered to be material weaknesses?	None reported
Type of auditor's report issued on compliance for student financial assistance programs:	Unmodified
Any audit findings disclosed that are required to be reported in accordance with 2 CFR 200.516(a)?	No

Identification of major programs

CFDA Number

Name of Federal Program or Cluster

Various 19.345	Research and Development Cluster Disability Civil Society, Human Rights, and Law in China, Global Internet Censorship Measurement Consortium
84.032L	Federal Family Education Loans – School as a Lender
Dollar threshold to distinguish between Type A and Type B programs	\$3,000,000
Auditee qualifies as a low-risk auditee?	Yes

II. Financial Statement Findings

None noted.

III. Findings and Questioned Costs for Federal Awards

None noted.

Harvard University
Summary of Status of Prior Audit Findings
Year Ended June 30, 2019

There are no findings from prior years that require an update in this report.