

Federal and Non-Federal Research Funding:

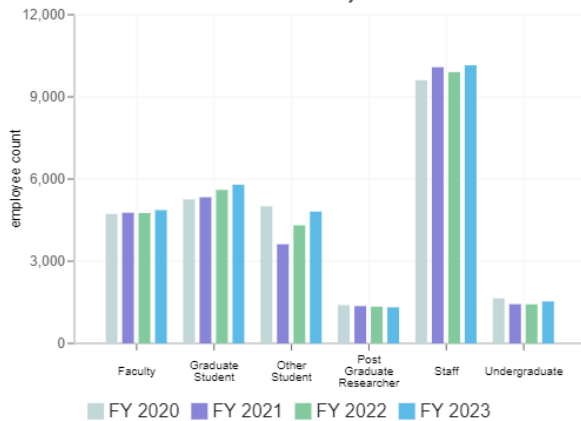
A Detailed Analysis of Research Expenditures at Michigan's URC

This report characterizes federal and non-federal research expenditures from members of Michigan's University Research Corridor (University of Michigan, Michigan State University, and Wayne State University), based on financial and payroll records submitted to IRIS for fiscal years 2020 - 2023.

Individuals Employed by Federal and Non-Federal Research Funding

During FY 2020 - 2023, federal and non-federal research expenditures supported a yearly average of 27,508 individuals at URC . On average, 41.6% of individuals supported by federal and non-federal research funding at these universities every year were students, while 17.4% were faculty.

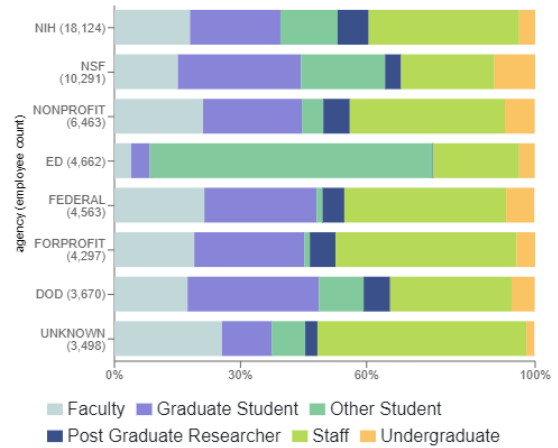
Counts of total individuals on URC ' federal and non-federal research awards, broken down by occupational category (FY 2020 - 2023)



Organization of the Scientific Workforce

During FY 2020 - 2023, students at URC constituted 59% of the research workforce supported by NSF awards and 38.9% of employees supported by awards from NIH. Post graduate researchers comprised 7.4% (1,333), 6.3% (410), 6.3% (230), and 6.1% (263) of the employees on awards from NIH (18,124), NONPROFIT (6,463), DOD (3,670) and FORPROFIT (4,297), respectively.

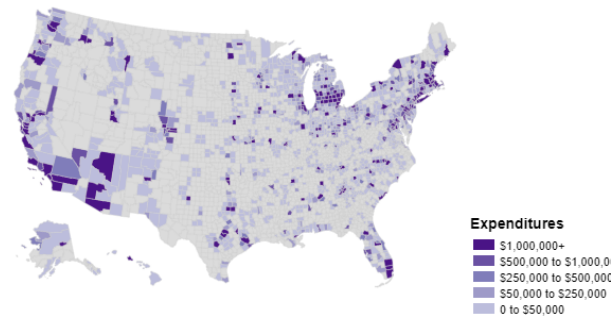
Employment patterns of federal and non-federal research awards from URC for FY 2020 - 2023



National Distribution of Research-Related Expenditures

The production of science requires the purchase of scientific equipment and technology as well as collaboration with private/public research organizations. Research-related spending from federal and non-federal grants to URC exceeded \$2.5 billion during FY 2020 - 2023 and included transactions with vendors in 1435 US counties.

Total vendor and subaward expenditures on federal and non-federal research awards from URC (FY 2020 - 2023)*

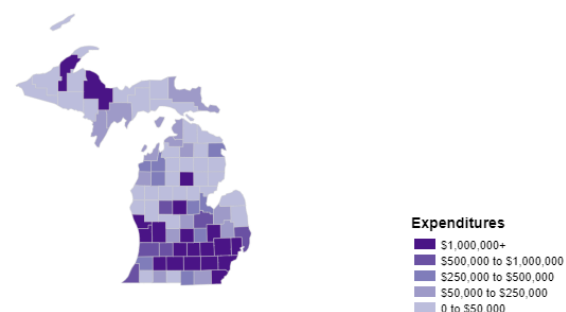


Regional Distribution of Research-Related Expenditures

During FY 2020 - 2023, URC ' federal and non-federal research generated over \$1.0 billion in expenditures in Michigan.

Purchases from contractors in Washtenaw County exceeded \$415.6 million, making it the top-ranking county in the state.

Vendor and subaward expenditures on federal and non-federal research awards to URC by Michigan county (FY 2020 - 2023)*



*Generally, about 86% of research expenditures can be matched to location information with available data and methodology.

Federal and Non-Federal Research Funding:

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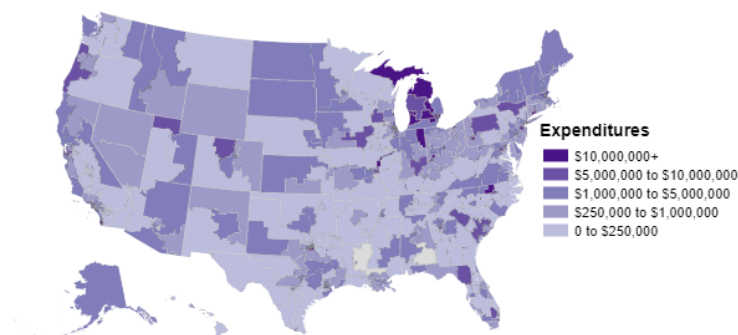
Congressional District Map.

National Distribution of Research-Related Expenditures

Total vendor and subaward expenditures on federal and non-federal research awards from URC by congressional district (FY 2020 - 2023)

The production of science requires the purchase of scientific equipment and technology as well as collaboration with private/public research organizations.

Research-related spending on goods and services from federal and non-federal grants to URC exceeded \$2.5 billion during FY 2020 - 2023 and included transactions with vendors in 433 US congressional districts (includes Washington, D.C.).

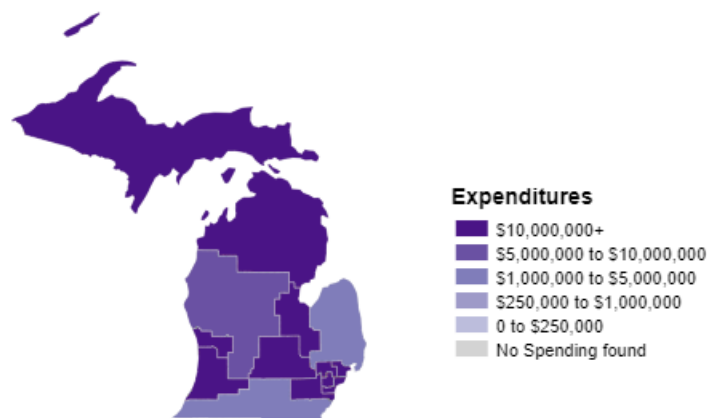


Regional Distribution of Research-Related Expenditures

Vendor and subaward expenditures on federal and non-federal research awards to URC by Michigan congressional district (FY 2020 - 2023)*

During FY 2020 - 2023, URC ' federal and non-federal research generated over \$1.0 billion in expenditures on research-related goods and services in Michigan congressional districts.

Purchases from vendors in Michigan's 6th congressional district exceeded \$431M, making it the top-ranking district in the state.



*Generally, about 86% of research expenditures can be matched to location information with available data and methodology.

Spending Report Methodology

This technical documentation describes how IRIS generates the data for this report.

This report includes data from Michigan IRIS member universities that have reported to IRIS the relevant data for FY2020-FY2023.

The universities are: Michigan State University, University of Michigan, and Wayne State University.

Updates

This report uses inflation adjusted dollars normalized to 2023 for all calculations, rather than nominal dollars.

Identifying and Characterizing Federal Awards in UMETRICS Data

Federal awards are identified by their corresponding Assistance Listing (previously known as CFDA [Catalog of Federal Domestic Assistance] code). All other awards are considered nonfederal and are filtered out before the Federal Spending Report is generated. Both Federal and nonfederal awards are reported in the All Spending Report.

The Assistance Listing is submitted to IRIS in each university's UMETRICS award file and corresponds to a specific Federal agency. In order to qualify for inclusion in the Federal Spending Report, an award must have an Assistance Listing that has the following characteristics:

- the listing IS NOT NULL (That means that a listing was submitted with the award)
- the listing IS NOT 99.xxx (99 is designated as 'UNKNOWN' and cannot be classified into a Federal agency)
- the listing does not start with 00. or 0. unless your university has specifically assigned a 00.700 code , which is a federal code as per the IRIS portal's OFS coding scheme
- the listing must have a period (.) in it. (This is important to place awards in the proper agencies, e.g., 12.800 - Air Force Defense Research Sciences Program.)

More information about Assistance Listings can be found here: <https://sam.gov/content/assistance-listings>

Work-Study

Some universities send IRIS the employment data for students who are paid by the federal work-study program. The federal government categorizes its work-study program with an Assistance Listing of 84.033, and we use this definition to identify a university's work-study-related records in this data. In this report, the option to include work-study data is available if a university has included students paid by federal work-study in the employee records it sends; if the work-study toggle is not available then the university has not provided those records.

Chart 1: Individuals Employed by Research Funding

Chart 1 displays counts of unique employees who are paid on all awards or all Federal awards, broken out by job categories.

IRIS has developed a keyword-based sorting algorithm which uses job title, university-provided occupational class, Assistance Listing, and employee accounting code description to sort each job into one of six categories. This mechanism ensures a standardized application of sorting rules across all employees at all universities. It also emphasizes an employee's status as a student, postgraduate researcher, or faculty member rather than their role in an awards production function.

More information on this method, known as Emphasization and Prioritizing of Student Status or EPSS, can be found in the slide presentation from the 2019 IRIS Summit at <http://myumi.ch/W277J>

The resulting categories used in Chart 1 are:

1. Faculty
2. Staff
3. Post-Graduate Researcher
4. Graduate Student
5. Undergraduate Student
6. Other Student (graduate or undergraduate, unable to be classified)

Spending Report Methodology

It is possible that an individual employee has multiple classifications if they have multiple job titles for the given time period in the report. To avoid duplication in this case, we use a ranking system to determine which job classification should be used in the report.

Below is the ranking approach to resolve multiple occupational classifications for a given employee. The ranking shows which classifications take precedence over others.

Occupational Classification	Rank
Student	1
Faculty	2
Post Graduate Research	3
Staff	4

When the Graduate Student or Undergraduate categories account for 5% or less of the overall employee count, they are rolled into the "Other Student" category. If the "Other Student" category makes up 5% or less of the overall employee count or if the "Post Graduate Researcher" category makes up 1% or less of the overall employee count, they are rolled into the "Staff" category.

Chart 2: Individuals Employed by Agency

Chart 2 displays counts of unique employees who are paid on all awards or all Federal awards, broken out by occupational categorization and funding source. (If a university employee is paid on multiple awards funded by different sources, they are counted for each of those funding sources.)

Funding source (agency) for Federal awards is defined by the Assistance Listing in the UMETRICS award file. If the Assistance Listing is identified as a federal agency then it is counted in federal reporting, all other are considered non-federal. Non-federal Assistance Listings that a university has supplied according to the File and Field guide, such as state, nonprofit, for profit, foreign, etc., are grouped by those categories. Those that cannot be categorized are grouped as "UNKNOWN". Funding source (agency) for Federal awards is defined by the CFDA code in the UMETRICS award file. If the CFDA code is identified as a federal agency then it is counted in federal reporting, all other CFDA codes are considered non-federal. Those that cannot be categorized are grouped as "UNKNOWN".

Occupational classifications for these data are assigned as described above.

Charts 3-6: Research Expenditures

These national and state maps display total expenditures to university vendors and subawardees, by US county and congressional district. The data are aggregated from the university's UMETRICS vendor and subaward data files.

IRIS applies geocodes to all of the vendor and subaward transactions in the data files. The geocoding relies on accurate addresses for vendors and subawardees. Vendor and subaward transactions that are missing ZIP codes are not included in the maps that show spending by county. These transactions are counted toward the total dollar amount in the text of the report.

Transactions without complete location data may cause discrepancies between data downloads and map visuals.

The location of spending by county is based on the ZIP code provided to IRIS in the UMETRICS data. When a ZIP code spans multiple legislative districts, spending is allocated based on the proportion of addresses in that ZIP found in each county. To allocate spending by county, we use data from www.unitedstateszipcodes.org; for legislative districts, we use www.unitedstateszipcodes.org and latitude and longitude data from Google and Moody's.

Benchmarking and QA

The third tab of the report allows universities to review the quality of their submitted UMETRICS data and to benchmark their data against a set of aggregated data from selected peer universities. Technical documentation is embedded throughout the QA report.

Citation

Institute for Research on Innovation and Science, Michigan's URC Federal Spending Report, Fiscal Year 2020 - 2023 <http://iris.isr.umich.edu>

*If a university employee is paid on multiple awards funded by different sources, they are counted for each of those funding sources.