2023
ANNUAL REPORT

Research & Innovation

UNIVERSITY OF MINNESOTA

Driven to Discover®

A LEADING RESEARCH AND INNOVATION UNIVERSITY

The state of the University's research enterprise is strong, with record expenditures and the second largest research award levels in the University's history in FY23. We are also increasing success in bringing our researchers' inventions to market, with new milestones and accolades for our Tech Comm team, including a record number of startups (23), and strengthening coordination with the University's corporate engagement efforts.

We are also focused on the future. Through our Research 2030 initiative, we have identified a set of high impact research themes for addressing new social, economic, and global challenges *before* they arise. And through strategic investments and new partnerships, we are ensuring that UMN research support services and systems, core facilities, technology, and equipment can continue to advance world class research and innovation well into this century and beyond.

In 2023, the Office of the Vice President for Research changed its name to the **Research and Innovation Office** (RIO). This change helps our office and the University to better communicate the innovation and entrepreneurialism that are a growing aspect of our work and our culture at UMN, and that are key to our ability to differentiate ourselves and our impact from that of other higher education and research institutions.

Shashank Priya
Vice President for Research and Innovation

AT-A-GLANCE

University of Minnesota Research and Innovation

RESEARCH EXCELLENCE

Ranked 8th
In the US in the Times Higher Ed Impact Rankings (THE Impact Rankings).

Ranked 10th
Among US public research universities by Academic Ranking of World Universities (Shanghai/ARWU).

Ranked 12th
Among US public research universities in research spending (HERD/NSF).

Top 25
Eight subjects ranked in the top 25 globally, including ecology (ranked no. 3 in the world). A total of 34 subjects ranked in the top 100 (Shanghai/ARWU).

Key Clinical Research Center Renewed
The Clinical and Translational Science Institute (CTSI) received a seven-year renewal award by the National Institutes of Health (NIH) to find better, faster ways to bring scientific advances to real-world use.

ECONOMIC IMPACT

$1.227 Billion
In systemwide research expenditures, a record number (FY22).

$220.2 Million
In revenue generated from UMN inventions over 10 years (FY14-23).

INNOVATION

Ranked 1st
As the most innovative university in the Heartland by the Heartland Forward Institute. UMN was 5th among all public universities and 10th overall (2022).

Ranked 18th
On the NAI list of Top 100 US Universities Granted US Utility Patents (2022).

Record Startups
Launched a record number of startups (23).

Life Changing Inventions
Time magazine included UMN startup Niron Magnetics in its list of 200 life changing inventions of 2023.

SELECTED AWARDS & HONORS

Congratulations to these UMN faculty who received distinguished awards and honors in 2023.

Three UMN faculty received Guggenheim Fellowships: **Pao Houa Her**, assistant professor of Photography and Moving Images, recognized in photography; **Tetsuya Yamada**, professor of Ceramics, recognized in fine arts; **Kao Kalia Yang**, Edelstein-Keller Writer-in-Residence in English, recognized in general nonfiction.

Boris Shklovskii, professor in the School of Physics and Astronomy, was elected to the National Academy of Sciences.

Andrew G. Alleyne, professor and dean of the College of Science and Engineering, was elected to the National Academy of Engineering.

Physicist **David Kohlstedt**, professor emeritus at the University of Minnesota, won the Vetlesen Prize, one of Earth sciences' highest honors.

Marlene Zuk, professor in the College of Biological Sciences, was recognized by the BBVA Foundation for outstanding contributions to the field of behavioral and evolutionary ecology.

The National Academy of Sciences elected three UMN professors to membership in recognition of their distinguished and continuing achievements in original research: **Megan Gunnar**, Institute of Child Development; **Kristin Hogquist**, Laboratory Medicine and Pathology; and **Larry Que**, Chemistry.

Three UMN faculty were honored as lifetime AAAS Fellows: Professors **Alan Love** (CLA), **Calvin Sun** (Pharmacy); and **Hui Zou** (CLA) are among more than 500 new AAAS Fellows, including scientists, engineers, and innovators spanning 24 scientific disciplines.

TECHNOLOGY COMMERCIALIZATION

UMN Technology Commercialization facilitates the transfer of University research to licensee companies for the development of new products and services that benefit the public good, foster economic growth, and generate revenue to support the University's mission. Among FY23's highlights: a record number of UMN startups launched (23) which aligns with the University's strategic plan, MPact 2025, and the goal of 25 startups annually by 2025. Additionally, the University received 360 invention disclosures, executed 231 licensing deals, and fostered 448 revenue-generating agreements—all highlighting the strong pipeline of research and substantial impact in the marketplace.

Technology commercialization statistics (below) reflect deal flow from year to year and are subject to significant volatility. Typically, the University of Minnesota is ranked among the top 10-15 US public universities for key technology transfer metrics.

	2019	2020	2021	2022	2023
New Licenses	223	235	236	211	231
Current Revenue Generating Agreements	571	601	575	467	448
Startup Companies Formed	19	19	20	22	23
Invention Disclosures	391	397	332	315	360
New Patent Filings	163	152	126	156	146
Issued Patents (US and Foreign)	187	182	181	241	234

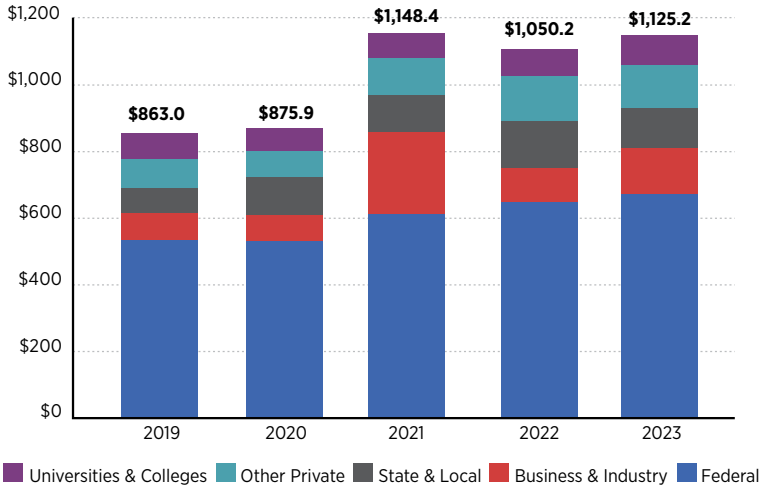
Dollar amounts in millions
Technology Commercialization, Wellspring Sophia; UMN Enterprise Financial System

See more technology commercialization statistics: techcomm.umn.edu/statistics

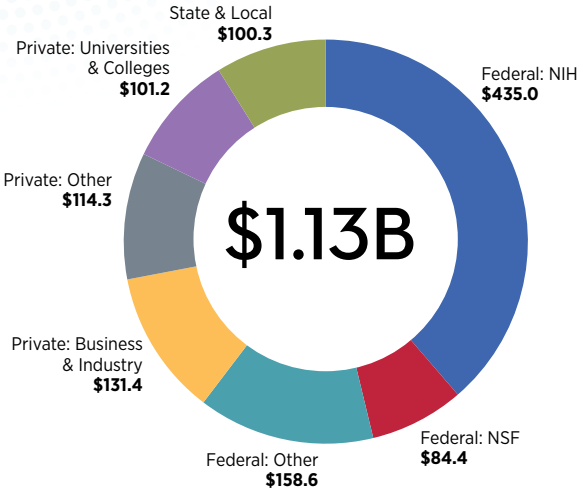
RESEARCH AWARDS

We are growing. University of Minnesota researchers received $1.13B in research awards in FY23, the second largest award total ever reported and an increase of 7.1% from the previous year. Over a five-year period (FY19-FY23), the University's awards have grown by 30.0%, including a 25.0% increase in the number of high-dollar awards.

BY SOURCE FY19-23

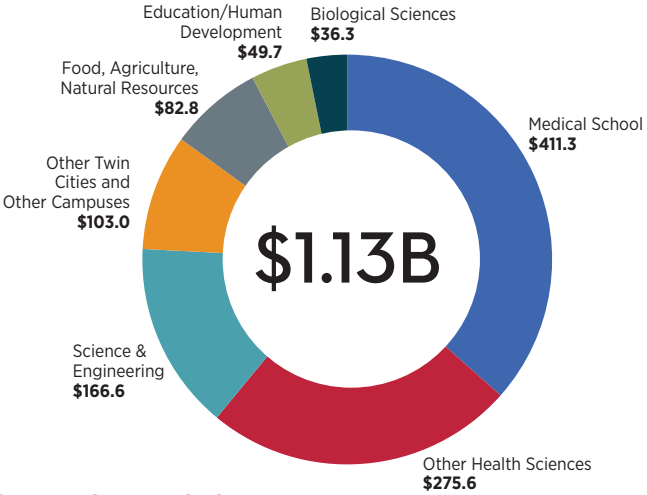


BY SOURCE FY23



Federal awards ($678M) comprised 60.3% of the research portfolio, including awards from the National Institutes of Health (NIH) and National Science Foundation (NSF). Agencies in the Federal: Other category include health and human services ($36.9M), agriculture ($35.4M), defense ($27.2M), energy ($19.4M), and education ($12.4M). The $131.4M in business and industry funding increased 41.9% from FY22, largely due to COVID-19-related pass-through funding from NIH.

BY RECIPIENT (College/Campus) FY23



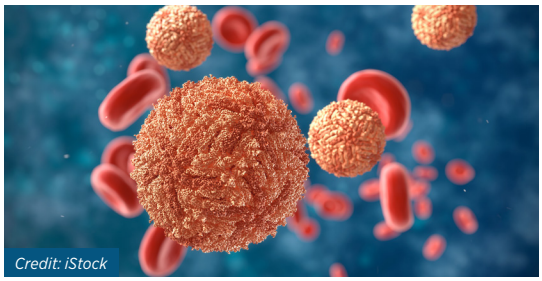
The University's Medical School ($411.3M) and Other Health Sciences ($275.6M) received the largest share (61.0%) of research awards. Colleges with the largest annual percentage of increases from FY22 include: Medical School (+33.1%), College of Science and Engineering (+9.0%), and the School of Public Health (+12.6%) (part of Other Health Sciences).

Dollar amounts in millions
Office of Research Information Systems - Data Services

See more UMN research and innovation statistics:
research.umn.edu/statistics

"Research is about preparing for the problems that lie ahead, anticipating those problems today, and being ready with the solutions." - Shashank Priya, Vice President for Research and Innovation

DISCOVERIES & INNOVATION



Credit: iStock

UMN CENTER TO DEVELOP DRUG TREATMENTS FOR FUTURE PANDEMICS

The Midwest Antiviral Drug Discovery (AViDD) Center, established through a grant from the National Institutes of Health (NIH), is part of a network of nine national centers established in response to the public health emergency caused by COVID-19. Midwest AViDD is a key part of this broader initiative to bring together expertise across disciplines to discover effective responses to pandemics, life-threatening infections, and antimicrobial resistance through basic, translational, and clinical research. Midwest AViDD researchers will be exploring antivirals for flaviviruses, such as Zika and West Nile, filoviruses, such as Ebola, and arenaviruses. They will be supported by $66 million in funding from NIH.

Credit: Natural Resources Research Institute

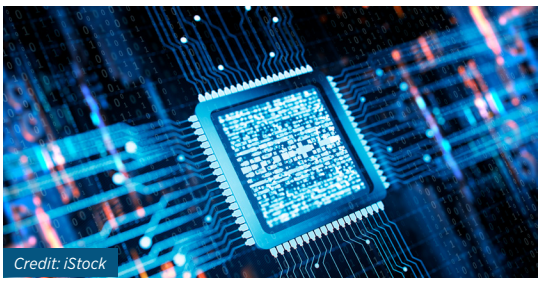
UMN COMMERCIALIZES NEW FAST-GROWING TREE VARIETY

The InnovaTree™ is a new poplar variety developed by the Natural Resources Research Institute, with a patent pending by the University of Minnesota. The InnovaTree, which is the result of nearly 30 years of cross pollination, grows 64 percent faster than leading commercial hybrid poplar varieties, with the ability to grow up to an astounding eight feet per year and 35 feet in under five years. The tree is now available for purchase with greater availability expected next spring.

Credit: Rebecca Slater

CRYOGENIC BREAKTHROUGH IN ORGAN PRESERVATION

In a groundbreaking new study, engineers and medical researchers at the UMN Twin Cities have proven the life-saving potential of long-term organ preservation at ultra-low temperatures by successfully transplanting a rewarmed kidney in a rat and restoring full kidney function. The research, published in *Nature Communications*, has the potential to save thousands of human lives by enabling long-term storage of organs for transplantation.



Credit: iStock

BREAKTHROUGH SPINTRONICS PROCESS COULD REVOLUTIONIZE ELECTRONICS INDUSTRY

UMN researchers, along with a team at the National Institute of Standards and Technology (NIST), developed a breakthrough process for making spintronic devices that has the potential to become the new industry standard for semiconductor chips that are essential to computers, smartphones, and many other electronics. The new process will allow for faster, more efficient spintronics devices that can be scaled down smaller than ever before. This research was funded by a grant from DARPA and in part by NIST; SMART, one of seven centers of nCORE, an SRC program; and NSF.

Research 2030

IDENTIFYING FUTURE RESEARCH DIRECTIONS

Research 2030 workshop participants

In spring 2023, the Research and Innovation Office helped facilitate a Research 2030 workshop, engaging members of our research community and key external stakeholders, to anticipate trends in research and our society and to identify ways to leverage the University's many disciplines to address the biggest challenges of the not-to-distant future—the year 2030. The result of these discussions is a research strategy based on 14 high-impact research themes for addressing new social, economic, and global challenges before they arise. We have initiatives underway based on two of the themes:

BIOTECHNOLOGY AND BIOMANUFACTURING INNOVATION

A new **Biotechnology and Biomanufacturing Innovation Center (BBIC)** will catalyze innovative, cross-disciplinary research, entrepreneurship, and workforce development, building upon current strengths of the University, Minnesota's abundant natural resources, and its well-developed agricultural, biomedical, and food industries, with an additional emphasis on climate resilience. BBIC is kicking off with targeted seed grants to UMN researchers to stimulate research in biofuels, decarbonization and carbon storage/capture solutions, and recycling/upcycling of waste products.

SUSTAINABLE TECHNOLOGY AND SYSTEMS

The University's **Sustainable Futures** initiative will foster global data-informed collaboration for achieving Sustainable Development Goals (SDGs). SDGs are a globally agreed-to framework for achieving a better and more sustainable future for our societies and our planet, and they inform many corporate responsibility programs, including those of 3M, Boston Scientific, Cargill, General Mills, Land O'Lakes, and Target. In partnership with Minnesota, US, and global partners, this new consortium will become a hub for data-informed solutions.

The University will use the Research 2030 research themes to inform new initiatives that leverage our strengths, align with external funders' priorities, and address global issues.

Research & Innovation

RESEARCH AND INNOVATION OFFICE

420 Johnston Hall | 101 Pleasant Street SE | Minneapolis, MN 55455

612-625-3394 | rio@umn.edu |

research.umn.edu