



Report on MnDRIVE initiative to Minnesota state legislature

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## Report Preparation Costs:

Per the requirements set forth in Minnesota Statue 3.197, the cost to prepare this report was \$600.

## Background

MnDRIVE – Minnesota’s Discovery, Research, and InnoVation Economy – is a landmark partnership between the University of Minnesota and the State of Minnesota that aligns areas of University research strength with the state’s key and emerging industries to address grand challenges. Beginning in FY 2014, the state began investing approximately \$18 million annually in four research areas identified by University faculty and deans and corporate partners as the most promising areas for partnership: Robotics, sensors and advanced manufacturing; Global food ventures; Advancing industry, conserving our environment; and Discoveries and treatments for brain conditions. The University of Minnesota Informatics Institute (UMII), which fosters and accelerates data-intensive research, receives partial funding from MnDRIVE and provides key support to these projects. In its 2017 session, the Minnesota Legislature passed additional funding (\$4 million annually) for a MnDRIVE cancer initiative, Cancer Clinical Trials.

MnDRIVE represents a unique, collaborative research model involving interdisciplinary research projects across the University that address grand challenges and include industry partnerships as a key component. The University of Minnesota’s Office of the Vice President for Research (OVPR) provides accountability measures for the initiative and serves as an advocate for the program at the Legislature. Each of the five research areas have committees and advisory boards to oversee project implementation and outreach.

## Metrics & Results

During the fourth biennium of MnDRIVE funding (July 1, 2019 through June 30, 2021 covering fiscal years 2020-2021) the OVPR worked with principal investigators of each of the five MnDRIVE areas projects to gather data every six months. The OVPR requested information on:

1. Invention disclosures to the Office of Technology and Commercialization
2. Funding acquired from external grants (e.g., NSF, NIH, USDA, corporate funding)
3. Success stories resulting from MnDRIVE research and participation

MnDRIVE researchers acquired more than \$132 million in external funding and submitted 143 disclosures for inventions to UMN Technology Commercialization.



## Success Stories

### **Robotics**

A new low-cost, magnetic sensor technology developed in the University's College of Science and Engineering is being used to improve the efficiency and usability of wake boats, a popular pastime in the land of 10,000 lakes. Rajesh Rajamani, a professor in the Department of Mechanical Engineering, designed a sensor for cars that uses magnetic fields to estimate the positions of other nearby cars and detect imminent collisions. Now, Rajamani's startup company Innotronics is using that same sensor technology to detect the position of actuators that help machines move. The technology was licensed by Fortune 500 company Parker Hannifin and is now being used on MasterCraft boats optioned with the company's new SurfStar system. The sensor is built into SurfStar's actuators to allow for greater precision, consistency, and control of the wave height and shape, allowing MasterCraft to deliver easily customizable surf waves for its consumers to enjoy on the water behind their boat.

<https://cse.umn.edu/college/news/cse-startup-innotronics-delivers-tech-research-market>

### **Global Food**

Soybeans make up 30% of Minnesota's total agricultural exports and remain the state's top export commodity. In 2016, soybeans accounted for \$2.1 billion in exports from Minnesota, and the state ranked third in the nation for soybean production as of 2019. Aphid infestations pose a significant threat to soybean crop health and yields. A project led by Bob Kock in the University's Department of Entomology, is developing aphid-resistant soybean plants that could make it easier for organic farmers to combat the harmful pests and could also reduce pollution caused by insecticide use in Minnesota.

[https://mndaily.com/265322/news/university-researchers-developing-aphid-resistant-soybeans/\(Lorenz,Aaron\)](https://mndaily.com/265322/news/university-researchers-developing-aphid-resistant-soybeans/(Lorenz,Aaron))

### **Environment**

PFAS chemicals historically have been used in a wide spectrum of consumer goods and have since been implicated as a land and water contaminant linked to a range of health risks. Of particular concern is the fact that PFAS chemicals have started cropping up at municipal compost facilities that turn materials such as grass clippings and food waste into a nutrient-filled substance that is used to enrich soil. UMN environmental health researcher Matt Simcik and environmental engineering researcher William Arnold have been developing technology to keep PFAS from moving from landfills into groundwater. MnDRIVE Environment funding is supporting this work which, upon completion, might be used to protect water at compost sites.

<https://mndrive-environment.umn.edu/2021/01/20/is-pfas-a-problem-for/>



### **Brain Conditions**

A team of researchers, led by Alik Widge, M.D., Ph.D., assistant professor in the University's Department of Psychiatry and Behavioral Sciences and MnDRIVE Neuromodulation Scholar, was awarded a \$6.6 million grant from the National Institute of Mental Health (NIMH) to develop a new implantable brain stimulation device to treat mental illness, including addiction. The device will use methods of syncing and unsyncing brain waves to develop a novel, human-ready neuromodulation device that uses electrical impulses to help misfiring brain rhythms fall into synchrony.

<https://med.umn.edu/news/university-minnesota-researchers-awarded-66m-develop-new-device-treat-mental-health-disorders>

### **Cancer Clinical Trials**

Colorectal cancer screening is extremely important to detect cancer early and improve patient outcomes. In Minnesota, screening rates for colorectal cancer are 75 percent, but that number decreases to 50-55 percent in non-white populations. Screening rates in 2020 and 2021 have declined even more due to the COVID-19 pandemic. At Native American Community Clinic (NACC), a clinic that provides free health care services to Native Americans, screening rates are especially low at about 25 percent. A new project funded by MNCCTN aims to assess the effectiveness of a proactive outreach colorectal cancer screening program for NACC patients. The study, led by UMN Professor of Medicine Aasma Shaukat, will use a proactive outreach approach that incorporates a mailed invitation to screen, followed by navigation to a colonoscopy if the initial screening is positive.

<https://cancer.umn.edu/mncctn/news/minnesota-cancer-clinical-trials-network-funds-colorectal-cancer-screening-study>