MnDRIVE ENVIRONMENT

2023 MnDRIVE Environment Seed Grant Request for Proposals

Program Overview

MnDRIVE – Minnesota's Discovery, Research, and InnoVation Economy – is a partnership between the University of Minnesota (UMN) and the State of Minnesota that aligns areas of research strength with the state's key and emerging industries to address grand challenges. MnDRIVE supports research in five strategic areas: Brain Conditions, Cancer Clinical Trials, **Environment**, Global Food, and Robotics.

The **MnDRIVE Environment** program supports research and partnerships that develop sustainable solutions to environmental grand challenges, thereby enhancing quality of life and economic vitality in Minnesota and beyond. MnDRIVE Environment values and invests in innovative, proactive, and long-lasting solutions that are environmentally, economically, and socially sustainable.

This solicitation requests seed grant proposals from UMN faculty or research scientists to address one or more of the following goals:

1. Reduce climate change and its impacts by increasing carbon sequestration
2. Enhance nature's benefits to people by conserving or restoring biodiversity
3. Clean the air, soil, and/or water by preventing or reducing environmental contaminants

Seed grants provide support for either graduate student or postdoctoral research scholars. Project teams must also include a local partner external to UMN (e.g., a company, Indigenous partner, governmental or nongovernmental organization).

Due dates:

Letter of intent: 27 January 2023 5:00 pm CDT, z.umn.edu/MnDRIVEenvLOI
Full proposal: 3 March 2023 5:00 pm CDT, z.umn.edu/MnDRIVEenvSubmissionPortal

Please direct questions about this solicitation to:

Forest Isbell, Director, MnDRIVE Environment, isbell@umn.edu

Jeff Standish, Associate Director, MnDRIVE Environment, standish@umn.edu

Introduction

The MnDRIVE Environment Seed Grant program invites proposals that advance sustainable solutions to three major environmental grand challenges: **climate change**, **biodiversity loss**, and **pollution**. Research may be at any stage of development, from early tests of novel and potentially transformative solutions to scaling and implementing later-stage projects.

Expanding our scope of research

According to the World Economic Forum, experts now rank climate change, extreme weather, and biodiversity loss as the most severe environmental risks over the next decade—above all other risks, including infectious diseases, debt crises, and geopolitics. As the planet warms more than halfway toward some of the costliest tipping points, extreme weather has become increasingly frequent, intense, and destructive—with cascading economic, social, and environmental impacts.

Climate change and biodiversity loss have been recognized as twin environmental challenges impacting people worldwide since the Rio Earth Summit in 1992. Many of nature's benefits to people depend directly on biodiversity, including wood production in forests, livestock forage in grasslands, pollinators in croplands, and fish in aquatic ecosystems. Yet human activities have altered at least 70% of the planet's land surface, and many species (two in five plants, one in four well-studied animals) are now threatened with global extinction.

At the same time, it has become increasingly difficult to clean our water, air, and soil. Human activities have more than doubled the amount of reactive nitrogen in the environment, impacting drinking water, human health, the climate, and biodiversity. And PFAS (forever chemicals) are being found in new places, with new warnings this year indicating they can threaten human health even at extremely low or undetectable levels.

Preserving our quality of life requires that we slow climate change and its impacts, reverse biodiversity loss, and address the contamination of our water, air, and soil. Our Seed Grant program seeks innovative solutions that help regulate the climate, address environmental pollution, and ensure a reliable supply of nature's benefits to people by conserving biodiversity.

University of Minnesota researchers are already leading the way toward identifying sustainable solutions to these challenges. We have more highly cited researchers in the Environment/Ecology category than any other institution worldwide, according to Clarivate. The University is also ranked 2nd in Ecology and 14th in Biotechnology by the global Shanghai Ranking. As public and private investments in sustainable solutions continue to grow, novel and creative ideas are needed to maximize the benefits of these investments. The MnDRIVE Environment program seeks to catalyze world-class research and local partnerships to identify, develop, scale, and implement sustainable solutions for Minnesota and beyond.

Solicitation Scope and Goals

This MnDRIVE Environment Seed Grant solicitation requests proposals that address one or more of the following goals:

1. Reduce climate change and its impacts by increasing carbon sequestration
2. Enhance nature's benefits to people by conserving or restoring biodiversity
3. Clean the air, soil, and/or water by preventing or reducing environmental contaminants

Together, these goals help address the greatest environmental challenges, focus on research strengths at UMN, and complement other ongoing efforts (e.g., those that instead support climate adaptation or emissions reduction). They also align with UMN's systemwide strategic plan (MPACT 2025), the UN Sustainable Development Goals, IPCC and IPBES science-policy reports, and many external funding opportunities. These goals expand the scope of research supported by MnDRIVE Environment and build on its past successes in advancing remediation. The program remains committed to developing environmental solutions for Minnesota.

Proposals are invited from eligible principal investigators (PIs), which include UMN faculty or research scientists (see eligibility requirements below). Seed grant awards provide support for either graduate student or postdoctoral researcher scholars. Proposals are encouraged from all relevant disciplines, which include, but are not restricted to, the life sciences, earth sciences, chemistry, environmental engineering, and environmental economics or policy. Projects may include basic research that advances knowledge in areas relevant to the above goals. For example, basic research related to the carbon cycle may help identify currently unknown solutions related to goal one.

In addition to the PI, any co-PIs, and the graduate student or postdoctoral researcher scholar, project teams must also include a local partner external to UMN. Project partners may include companies, Indigenous partners, governmental or nongovernmental organizations, or other groups. The role of the project partner may include, for example, engaging in the identification, development, scaling, implementation, or dissemination of solutions. Both existing and new partnerships are supported. If you would like help identifying a potential project partner, feel free to contact MnDRIVE Environment at the emails included above.

Proposals should concisely describe the: (1) **Problem** to be addressed; (2) **Proposed solution** and its estimated potential magnitude of impact; (3) **Approach** for investigating the solution; (4) **Project roles** of the PI, any co-PIs, graduate student or postdoctoral scholar, and and local partner(s); (5) **Plan for recruitment, training, and mentoring** of the graduate student or postdoctoral scholar; (6) **Anticipated research products and impacts**, which might include publications, presentations, grant proposals, data products, computing scripts, or technology commercialization; (7) **Intended benefits to society** of the proposed work, including plans for results dissemination, community engagement, and other broader impacts; and (8) **Contributions to DEIJ** (diversity, equity, inclusion, and justice), which might be related to the local partners, graduate student or postdoctoral scholar, research products and impacts, or benefits to society.

Award Information

Types of awards

- **Postdoctoral scholar seed grants:** Supports a postdoctoral scholar's salary and fringe benefits and provides a stipend for non-salary research expenses or broader impacts. See award amounts below for further details and allowable expenses.
- **Graduate student seed grants:** Supports a graduate student's salary, fringe benefits, and tuition, and provides a stipend for non-salary research expenses or broader impacts. See award amounts below for further details and allowable expenses.

Estimated number of awards: approximately 10 total seed grants

Award sizes

- **Postdoctoral scholar grants:** $75,000 per year, which includes salary and fringe benefits for the postdoctoral scholar and, depending on these rates, a small amount of additional funds (see categories below) for research or its broader impacts and societal benefits
- **Graduate student seed grants:** $55,000 for one year, which includes salary, fringe benefits, and tuition for the graduate student and, depending on these program-specific rates, a small amount of additional funds (see categories below) for research or its broader impacts and societal benefits

Award durations

- **Postdoctoral scholar seed grants:** Initial awards are for one year and can be renewed for a second year, if sufficient progress is documented in the annual report.
- **Graduate student seed grants:** Awards will be for one year and will not be renewable.

Allowable expenses

- Expenses may include personnel, travel, research materials and supplies, publication fees, consultant services, or computer services
- Cost sharing and indirect costs are not allowed.

Note: Estimated number, sizes, and durations of awards are subject to the availability of funds.

Eligibility Information

Who may serve as PI: Eligible principal investigators (PIs) include faculty members or research scientists from any campus within the University of Minnesota system. Research scientists must include a letter of collaboration (see details below) from their research supervisor.

Limit on the number of awards per PI: PIs may have no more than one MnDRIVE Environment award at a time. To encourage collaboration, co-PI roles will not count towards this limit on the number of awards per PI.

Limit on the number of proposals per PI: There are no restrictions or limits on the number of proposals per PI or co-PI.

Letters of Intent: Preparation and Submission Instructions

Due date: 27 January 2023 5:00 pm CDT

Letters of intent are required and will be used to identify proposal reviewers. No applications will be rejected at this stage. Submit letters of intent by completing the online form (z.umn.edu/MnDRIVEenvLOI), which will request the following information:

1. Title of project
2. Name(s) and email address(es) of PI and any co-PIs
3. Name(s) of anticipated project partner(s)
4. Research goal(s) of project: climate, biodiversity, or remediation
5. Type of seed grant: graduate student or postdoctoral scholar
6. Proposed start and end dates
7. Problem to be researched (two to four sentences)
8. Proposed solution to be tested (two to four sentences)

Full Proposal: Preparation and Submission Instructions

Due date: 3 March 2023 5:00 pm CDT

Full proposals are required. Submit full proposals through our Proposal Submission Portal (SMapply): z.umn.edu/MnDRIVEenvSubmissionPortal

Proposal submission will consist of: (1) creating an account; (2) submitting an online form; and (3) uploading the documents described below as a combined PDF.

Submit the full proposal as a combined PDF that includes the following four components:

1. **Project description** (limit 1,700 words)
   - Your project description should include the following headings and concisely address each of the following:
     - **Problem** to be addressed
     - **Proposed solution** to the problem and its estimated potential magnitude of impact
     - **Research approach** for investigating the solution
     - **Project roles** of the PI, any co-PIs, graduate student or postdoc, and local partner(s)
     - **Plan for recruitment, training, and mentoring** of the graduate student or postdoc
     - **Anticipated research products and impacts**, which might include publications, presentations, grant proposals, data products, computing scripts, and technology commercialization
     - **Intended benefits to Minnesotans and society** of the proposed work, including plans for results dissemination, community engagement, and other broader impacts
     - **Contributions to DEIJ** (diversity, equity, inclusion, and justice), which might be related to the local partners, graduate student or postdoctoral scholar, research products and impacts, or benefits to society
2. **Budget and its justification** (limit one page)
   - Expenses may include personnel, travel, research materials and supplies, publication fees, consultant services, or computer services
3. **Biographical sketch(es)** (limit three pages each)
   - Required for the PI and any co-PIs
   - Use an NSF-approved template or format
4. **Letter(s) of collaboration from local partner(s) external to UMN** (limit one page each)
   - Limited to the following statement of the intent to collaborate, without additional text endorsing or evaluating the proposed project:

"If the proposal submitted by Dr. [insert full name of PI] entitled [insert proposal title] is selected for funding, it is my intent to collaborate and/or commit resources as detailed in the Project Description of the proposal."

Proposal Review and Evaluation Criteria

Reviewers will evaluate the proposals by providing: (1) ratings for seven key components of the proposal, (2) an overall rating for the entire proposal, and (3) review comments summarizing the main strengths and weaknesses of the proposal.

Rating key components of the proposal

For each of the following seven key components of the proposal:

1. Advance knowledge and understanding
2. Address one or more goal(s) of this solicitation
3. Strengthen collaborations between UMN and the local partner(s)
4. Effectively recruit, mentor, and train early career researchers
5. Produce publications, presentations, grant proposals, data products, computing scripts, or technology commercialization products (e.g., patents, licenses, startups)
6. Benefit Minnesotans and society through dissemination of results, community engagement, or other broader impacts
7. Increase diversity, equity, inclusion, and justice through engagements with local partners, advancement of early career researchers, research products and impacts, or other benefits to society

reviewers will rate the potential for the proposed work to address the component, using the following scale:

- **Exceptionally high potential:** Compelling evidence indicates the component will likely be addressed in an outstanding or transformative way
- **High potential:** Compelling evidence indicates the component will likely be addressed
- **Moderate potential:** Limited evidence suggests the component may be addressed
- **Low or unclear potential:** Lack of evidence that the component will be addressed

Overall rating for the entire proposal

Reviewers will also provide an overall rating for the entire proposal, using the following scale:

- **Excellent:** Outstanding proposal in all respects; deserves highest priority for support
- **Very good:** High quality proposal in nearly all aspects, should be supported if possible
- **Good:** A quality proposal, worthy of support
- **Fair:** Proposal lacking in one or more critical aspects; key issues need to be addressed
- **Poor:** Proposal has serious deficiencies

Reporting Requirements

Prior to the submission of proposals for this solicitation, PIs must successfully complete all reports for previous projects supported by MnDRIVE Environment.

Graduate student seed grants:

The PI is required to submit a Final Project Report within 90 days of the project end date. Reports will include information on accomplishments, project participants, publications, and other specific products and impacts of the project. Further project reporting information will be provided in the award letter.

Postdoctoral scholar seed grants:

The PI is required to submit an Annual Project Report no later than 11 months after the project start date. The second year of postdoctoral scholar funding is conditional on evidence of adequate progress toward project goals, as documented in the Annual Project Report. The PI is also required to submit a Final Project Report within 90 days of the project end date. Reports will include information on accomplishments, project participants, publications, and other specific products and impacts of the project. Further project reporting information will be provided in the award letter.