ND EPSCoR
Established Program to Stimulate Competitive Research

REQUEST FOR APPLICATIONS
TRACK-1 ND-ACES: EMERGING AREAS/SEED PROPOSALS
Issued: March 9, 2023
Application Deadline: Noon, April 3, 2023

Purpose:

ND EPSCoR seeks to provide emerging areas seed awards of up to $35,000 in direct costs to researchers from the National Science Foundation (NSF) Established Program to Stimulate Competitive Research (EPSCoR) RII Track-1 New Discoveries in the Advanced Interface of Computation, Engineering, and Science (ND-ACES) participating institutions in areas of emerging high impact and transformative research related to the Center for Cellular Biointerfaces in Science and Engineering (CCBSE). More information can be found on the CCBSE webpage on the ND EPSCoR website.

Eligibility:

Applications must be made by a faculty member:

- from Cankdeska Cikana Community College (CCCC), Dickinson State University (DSU), Mayville State University (MaSU), Minot State University (MiSU), Nueta Hidatsa Sahnish College (NHSC), North Dakota State University (NDSU), Sitting Bull College (SBC), Turtle Mountain Community College (TMCC), University of North Dakota (UND), or Valley City State University (VCSU);
- who is not currently associated with CCBSE activities in the 2020-2025 ND-ACES cooperative agreement; and
- who did not receive a 2021 or 2022 ND-ACES emerging seed award. Members of traditionally underrepresented populations in STEM disciplines are especially encouraged to apply.

Emerging Areas:

The ND-ACES team recognizes several areas of spin-off and emerging research (described below) that can expand the reach and capacity of ND-ACES and increase the opportunity for sustainability. ***While proposals that fit well into one or more of the identified areas are encouraged, proposals for other areas that expand the capabilities of ND-ACES within the overall approved scope of the program will be considered.*** Research proposals that bridge ND-ACES foci are particularly welcome, as are proposals that connect CCBSE with PROmoting Sustainable Partnerships in Education and Research (PROSPER). Applicants are encouraged to talk with CCBSE leads and pillar leads. Those receiving awards will be incorporated into CCBSE during the time of their award and be required to participate in the programmatic efforts of PROSPER.

1. **Imaging Techniques for Cell Growth in Testbeds.** Advanced confocal and SEM imaging is extensively used for imaging cancer tumors and cells. Techniques in machine learning, genetic algorithms, and other novel approaches will be encouraged. *[Pillar(s): Computational and Cellular]*
2. M**ultimedia Art Modules for Explaining CCBSE Science.** Art exhibits, videos, or visual elements that build upon the research visualization work of this project may attract a wide audience, thereby informing public perceptions of ND-ACES research. Seed awards will be provided for

developing modules, videos, displays, etc. that are educational, informative, and geared toward the general public; particularly K-12. The products will be evaluated for use by ND EPSCoR in its outreach and communicating science efforts. [*Furthering integration of CCBSE and PROSPER]*

3. **Inclusion of Additional Cell Types and Fluid Flow Conditions in Testbeds.** By increasing expertise and adding investigators, the comparison of cellular growth and behavior between normal and malignant cell types may expand beyond the areas targeted. As a result, seed awards will seek innovation in complexity and analysis of 3D co-culture paradigms under static and fluid flow conditions will be provided. *[Pillar(s): Cellular and Computational]*
4. **Innovation Pilot Funding and Translational Seed Research that Fit the CCBSE Mission.** The intent of these seed awards is to continue building our regional capacity as an innovator in the use of 3D cultures that mimic normal and abnormal biology. Within CCBSE's scope, we will seek innovation in testbed design and materials, testbed fabrication methods, increased resolution assessment of cellular phenotype, 3D culture protocols, and cell types, and improved predictive methods for using the in vitro generated data to model in vivo conditions. We will also seek innovations in translating research and technologies toward private sector adoption, by linking CCBSE research to specific end use applications and potential private sector licenses with the support of a private sector company, with an identified need. *[Pillar(s): Materials, Cellular, Computational, Partnerships and Collaborations]*
5. **Self-assembly technologies for tissue engineering.** Innovation is needed in methods and compositions of self-assembled molecular substrates for cell culture that include but are not limited to nucleic acid, carbohydrate, and peptide-based materials that assemble via non-covalent interactions. In addition, materials stimulated to self-assemble by temperature, pH, or ion concentration change are desirable. *[Pillar(s): Materials and Cellular]*
6. **New Biomaterials in Tissue Engineering and Advanced Manufacturing of Biomaterials.** While nanoclay-, synthetic-, and biopolymer-based scaffolds are the primary focus of CCBSE research, additional material systems as well as manufacturing methodologies for novel tissue engineering based scaffolds are of importance to the overall effort. New materials as well as novel 3D bioprinting methods, or innovative designs of various nanocarriers for specific delivery of stimuli to 3D cultures or tissue microenvironments will also be sought. *[Pillar(s): Materials and Cellular]*
7. **Novel Biobased Specialty Crop Extracts for Anticancer Therapy Applications.** ND-ACES will pursue the screening of various specialty crop-derived compounds for effectiveness in therapeutic applications and in reducing or eliminating cancer. This translational area will target new links with ND's agricultural sector. *[Pillar(s): Materials and Sustainability]*

Primary evaluation criteria. (Priority will be given to early career faculty at ND-ACES participating institutions.)

Primary evaluation criteria from the CCBSE Leads will include the potential for:

1. Linking of the ongoing ND-ACES CCBSE efforts through an improved interdisciplinary understanding of biological and engineered materials biointerfaces, expand expertise in novel cellular growth and analysis paradigms for mimicking the in vivo environment, and development or use of cyber-enabled discovery and innovation;

2. Enhancing broader impacts of the ND-ACES RII Track-1 project elements of PROSPER: education and workforce development, broadening participation, partnerships and collaborations, and communication and dissemination (see the PROSPER webpage); and

3. The results to form the basis for a competitive research proposal to the NSF during the award or shortly thereafter.

Allowable expenses (the total of up to $35K in expenditures is for direct costs. F&A expenses are not allowed on these state-match dollars to the NSF RII Track-1):

1. Faculty salary (up to ½ month of summer salary, but not to exceed $5,000) plus related fringe benefits;
2. Student salary and related fringe benefits;
3. Research supplies (including minor equipment);
4. Core facility or recharge center fees;
5. Domestic travel up to $2,000 (i.e. to collaborating institutions or field study sites, or for conference presentation).

Capitalized equipment, and visiting scholars/researchers are not allowed under this award.

Application Requirements:

Electronic submission: Submit items in the order as listed in the checklist below as ONE submission in a single PDF file to ndepscor@ndus.edu. In the subject line, please indicate: Track-1: Emerging Areas Seed Award Application.

Checklist of Requirements:

1. ND EPSCoR Cover page
   https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/SeedAwards/CovSheetNDACESEmergingandSeed2022.pdf
2. Executive Summary - One-page limit, single spaced, font no smaller than 10 pt.
3. Project Description: No more than four (4) double-spaced pages, font no smaller than 10 pt. Required sections: 1) Introduction, 2) Proposed research, 3) Nature of collaborative fit between the ND-ACES CCBSE, 4) Incorporation of potential ties to ND-ACES PROSPER elements, and 5) Anticipated results. References or bibliography can be single spaced, but will be included in the 4 page limit.
4. NSF-style Two-page Bio-sketch.
5. NSF-style Current and Pending form.
6. Budget form is at:
   https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/SeedAwards/2020NDSUStandardBudgetFormFederal.xlsx
7. Budget justifications with a clear alignment to the budget form.
8. A tentative list of specific federal programs to which proposals may be submitted as a result of this support.

Proposals that do not adhere to the stated requirements may be rejected without review.

Award Announcements and Additional Information:

Awards will be announced on or about May 1st, 2023. The effective award dates are from May 15th, 2023 through May 14th, 2024 subject to availability of funds.

Please direct questions to:

- Kalpana Katti (CCBSE Lead at NDSU) – Kalpana.Katti@ndsu.edu
- Mark Hoffmann (CCBSE Lead at UND)– Mark.Hoffmann@und.edu

For information about: ND EPSCoR's NSF RII Track-1 ND-ACES cooperative agreement, please visit the ND-ACES webpage.