IDeA Program Funding Impact in North Dakota

The IDeA (Institutional Development Award) program has been instrumental in developing the scientific infrastructure necessary to provide statewide medical networks within ND that both serve the citizens of our state and contribute to the nation’s global competitiveness. Major components of IDeA in ND are six COBRE awards and the ND INBRE program. The programs provide a highly collaborative infrastructure of resources positioned to develop, and more tightly link statewide multi-institutional networks, as competitive research centers that strive to include traditionally under-represented groups. Communities within ND have American Indian populations that suffer from health disparities. IDeA programs have increased the pipeline for minority and rural students within those arenas to enter medical careers.

North Dakota COBRE (Centers Of Biomedical Research Excellence):
Center for Diagnostic and Therapeutic Strategies in Pancreatic Cancer

- Conducts fundamental research leading to early detection of pancreatic cancer and its potential treatment by combined chemotherapeutic agents, including projects involving nanoparticles based detection of biomarkers, phytochemicals and antibodies based therapeutic protocol development, as well as the site-specific delivery of therapeutic payloads to the diseased (pancreatic) tissues in an animal model.
- Two Core facilities--Animal Studies and Biostatistics--support the COBRE investigators and other biomedical researchers.
- Implemented an extensive mentoring mechanism to assist researchers, including young biomedical investigators, to become successful in publishing and obtaining research grants (preferably NIH R01) to facilitate transition to independent research.
- Outreach activities involve working with a pancreatic cancer awareness group in the Fargo-Moorhead community.

Epigenomics of Development and Disease

- Provides direct research project support for junior investigators working in diverse health-related topics, including pre- and post-natal development, malignant transformation, drug addiction, and infectious disease, with an emphasis on trans-generational inheritance mediated by epigenetic and epigenomic mechanisms.
- Supports an Epigenetics Bioinformatics Core Facility that provides researchers with access to advanced-omics platforms.
- Advances epigenetics research and career development via mentoring programs for junior investigators, pilot grant funding, an annual symposium, research training and workshops, as well as a seminar series that brings nationally and internationally recognized experts to ND.
- Investigators from three different University of North Dakota (UND) colleges support the Center. Other participants include a ND PUI (primarily undergraduate institution) and the USDA Human Nutrition Research Lab.

Center for Excellence in Host-Pathogen Interactions

- Newly funded in 2016, once established, this UND-based Center will support two core facilities and focus on defining the role that certain host factors such as C-type lectins, Toll-like receptors, and other cell surface receptors that play a major role in the initiation of the host response, and work to identify molecules and signaling pathways that can regulate immune response and inhibit bacterial/pathogen growth, with a commitment to addressing the needs of ND’s aging, largely rural population.
- Individualized mentoring and career development support will be implemented to make the program successful.

Pathophysiological Signaling in Neurodegenerative Disorders

- Probes deep into the microscopic and submicroscopic realm to answer questions about neurodegenerative diseases, such as Alzheimer’s and Parkinson’s disease, neurological complications associated with HIV-1 infection, multiple sclerosis and seizure disorders. The center’s team of investigators is drawn from all the medical research disciplines at UND’s School of Medicine and Health Sciences. Translating their discoveries into treatments is a crucial part of the work.
- Two core facilities: 1) the Mass Spectrometry Center, where researchers use instruments to measure with great precision and accuracy small molecular weight compounds that might play roles in the pathogenesis of neurodegenerative disorders, and 2) the Edward C. Carlson Imaging and Image Analysis Core Facility, where investigators use a variety of light and electron microscopes to visualize pathological features of the diseases, were initiated under this COBRE.

Center for Protease Research

- Investigates novel therapeutics that have the potential to treat diseases such as cancer, arthritis, autoimmune diseases, diabetes, and asthma.
- Broad-based research programs provide fundamental information on how proteases impact these diseases through the study of the biological role played by matrix metalloproteinases and histone deacetylases.
Center for Protease Research (cont.)
- Supports meritorious biomedical and interdisciplinary research through a pilot project mechanism. Several faculty who have received support from the Center have been successful in obtaining R01 and other grants.
- Core facilities in biology and synthesis have been established, including Biomolecular Mass Spectrometric services.
- Outreach activities include workshops for faculty and students and a summer research program for undergraduates. The core facility instruments have been utilized for research, teaching and outreach.

Center for Visual and Cognitive Neuroscience (CVCN)
- Provides access to many advanced visual and cognitive resources through three core facilities: 1) Driving Simulator Core permits the collection of human performance measures with high ecological validity; 2) High-Density Electroencephalography (EEG)/Neuroimaging Core (EEGC) applies geophysics techniques to make accurate inferences concerning the intracranial location of the generators of the voltages recorded at the scalp, and allows for causal conclusions about brain-behavior relationships to be drawn with non-invasive brain stimulation; 3) Technical Services Core, including the Electro-Optical Instrumentation and Eye Tracking subcomponents, provides advanced computer programming support for real-time applications, electronics design and fabrication, custom EEG recording and analysis software, as well as web development and maintenance support not only for the faculty and students of the CVCN and North Dakota State University (NDSU), but also for visual and cognitive neuroscience researchers in the region, along with COBRE investigators in other IDeA states associated with the Scientific Exchange Network.

North Dakota INBRE (IDeA Network for Biomedical Research Excellence):
- Undergraduate Research: ND INBRE supports undergraduate research programs at UND, the four State supported PUIs, and Turtle Mountain Community College. Summer programs enroll between 55 and 75 students and place a special emphasis on accepting applicants from community colleges. Academic year programs (15-30 students) extend their summer experiences.
- Masters of Public Health Program: ND INBRE at NDSU engages tribal colleges (TCs) in research with a particular focus on biomedical fields. Current projects include: Research Training Modules, a Summer Undergraduate Research Program, and a Tribal Air Quality Study.
- Tribal College Research: Funded in 2015, a Native American Research Center for Health (NARCH) awarded to Dr. Cynthia Lindquist, President of Cankdeska Cikana Community College (CCCC), creates academic year and summer undergraduate research experiences at four TCs [CCCC, Nueta Hidatsa Sahnish College (NHSC), Sitting Bull College (SBC), and United Tribes Technical College (UTTC)] for over 20 American Indian students. The NARCH program provides summer salary support to faculty, year-round employment for undergraduate students, travel funds for both and a supply budget.
- Research Core Facilities: ND INBRE supports research and training core facilities in Metal and Environmental Analysis, Medical Informatics, Optogenetics, Behavioral Research and Flow Cytometry, the latter two are the only facilities offering these services in ND.
- Bioinformatics Seed Grant Programs: Implemented by NDSU, these seed grants are awarded through a competitive process and are intended to build bioinformatics research capabilities that increase competitiveness.
- Faculty Mentors: ND INBRE enables over 11 participating faculty members to assist undergraduate research programs in all areas covered by the supported cores, as well as all aspects of mammalian gene expression.
- Equipment Support for Primarily Undergraduate Institutions and Tribal Colleges: ND INBRE provides approximately $300K annually in equipment to Mayville State University, Minot State University, and Dickinson State University. The NARCH award has pending a similar amount to support equipment upgrades for research at SBC, UTTC and NHSC.
- Annual Undergraduate Research Symposiums: ND INBRE supports an annual ND Undergraduate Research Symposium (6th Annual), which included over 60 poster presentations and over 150 in attendance. ND INBRE also sponsors the annual TC Research Symposium (attendance is approaching 75) held at the CCCC, which, in its 3rd year, highlights undergraduate research at the TCs and facilitates networking.

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<tr>
<th>Program</th>
<th>Award</th>
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<tr>
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<tr>
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<td>IDeA</td>
<td>$45.9 million</td>
<td>COBRE (6 awards)</td>
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For more information about North Dakota EPSCoR:
Visit our website: [www.ndepscor.ndus.edu](http://www.ndepscor.ndus.edu) or Call 701.777.2492 (University of North Dakota Office) or 701.231.8400 (North Dakota State University Office)