The IDeA Program 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 five 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 in competitive research centers that strive to include traditionally under-represented groups. Communities within North Dakota 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):
Epigenomics of Development and Disease
- Provides direct research project support for junior investigators working in RNA polymerase II pausing during developmental fate decisions, chromatin remodeling during tumor initiation and progression with an emphasis on epithelial to mesenchymal transition, neuroepigenetics, and trans-generational inheritance of epigenetic modifications.
- Supports an Epigenetics Bioinformatics Core Facility that provides researchers with access to advanced–omics platforms such as next-generation sequencing and state of the art bioinformatics/computational resources.
- Advances epigenetics research and career development via mentoring programs for junior investigators, pilot grant funding, an annual epigenetics symposium, research training and workshops, and a seminar series to bring 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 (principally undergraduate institution) and the USDA Human Nutrition Research Lab.

Center for Diagnostic and Therapeutic Strategies in Pancreatic Cancer
A 2014 COBRE proposal submission, funded on February 22, 2016, will begin on March 1, 2016.

Center for Protease Research
- Novel therapeutics that have the potential to treat diseases such as cancer, arthritis, autoimmune diseases, diabetes, and asthma are being investigated.
- Broad-based research programs to provide fundamental information on how proteases impact these diseases through the study of the biological role played by matrix metalloproteinases and histone deacetylases.
- 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 RO1 and other grants.
- Core facilities in biology and synthesis have been established. Biomolecular Mass Spectrometric services such as proteomics and metabolomics have been incorporated.
- 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
- Provides access to many advanced visual and cognitive resources
- Five core facilities: 1) Driving Simulator Core (DSC) permits the collection of human performance measures with high ecological validity; 2) High-Density Electroencephalography (EEG)/Neurostimulation 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) Electro-Optical Instrumentation Core (EOIC) consists of a collection of instruments required for the evaluation, design, and/or fabrication of custom electronic and mechanical devices, and/or for the routine measurement and calibration of visual, auditory, and haptic displays, and response collection devices; 4) Eyetracking Core is a collection of 11 eye tracking devices that facilitates researchers’ ability to conduct cognitive, psychophysical and electrophysiological research; 5) Immersive Virtual Reality Core (IVRC) provides researchers with an immersive virtual reality (VR) facility with which to study social, cognitive, and visual processing, as well as audiovisual and visuo-haptic multisensory integration.
Pathophysiological Signaling in Neurodegenerative Disorders

- Probes deep into the microscopic and submicroscopic realm to answer questions about neurodegenerative diseases that loom large in health care, diseases such as Alzheimer’s and Parkinson’s disease, neurological complications associated with HIV-1 infection, multiple sclerosis and seizure disorders. Causes of these diseases are complex so 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 — “from lab bench to bedside” — 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.

North Dakota INBRE (IDeA Network for Biomedical Research Excellence):

- **Undergraduate Research**: full academic year and summer undergraduate research programs at UND, the four State supported PUIs and at Turtle Mountain Community College. The summer programs enroll between 55 and 75 students. Academic year programs (15-30 students) continue their summer experiences into the academic year. The summer program places a special emphasis on receiving and accepting applicants from community colleges.
- **Masters of Public Health Program**: INBRE at North Dakota State University (NDSU) engages TCs located in ND in research with particular interest in biomedical research. Current projects include: Research Training Modules, a Summer Undergraduate Research Program, and a Tribal Air Quality Study.
- **Tribal College Research**: The PI collaborated with Dr. Cynthia Lindquist, President of Cankdeska Cikana Community College (CCCC), on her application for a Native American Research Center for Health (NARCH). This application was funded in 2015 and allows academic year and summer research experiences at four TCs (CCCC, Sitting Bull College, United Tribes Technical College and Nueta Hidatsa Sahnish College). The NARCH program provides summer salary support to faculty, year-round employment for undergraduate students, a generous supply budget, and funds for travel for faculty and students to meetings. The NARCH funds the undergraduate research experiences for over 20 American Indian students.
- **Research Core Facilities**: INBRE supports research and training core facilities in Flow Cytometry, Metal and Environmental Analysis, Medical Informatics, Behavioral Research and Optigenetics. The facilities for behavioral research and training and flow cytometry (cell sorting) are the only facilities offering these services in ND.
- **Bioinformatics Seed Grant Programs**: NDSU implemented a Bioinformatics Seed Grant Program. The seed grants are awarded through a competitive process and are intended to build bioinformatics research capabilities that result in increased competitiveness.
- **Faculty Mentors**: The ND INBRE also provides faculty mentors to assist undergraduate research programs in all areas covered by the ND INBRE supported cores and also for all aspects of mammalian gene expression including cell culture and imaging. The ND INBRE Mentoring Core consists of over 11 participating faculty members.
- **Equipment Support for Primary Undergraduate Institutions and Tribal Colleges**: provides approximately $300K annually of 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 Sitting Bull College, United Tribes Technical College and Nueta Hidatsa Sahnish College.
- **Annual Undergraduate Research Symposiums**: supports annual ND Undergraduate Research Symposium (6th Annual). The symposium was attended by over 150 individuals with over 60 poster presentations. ND INBRE also sponsors the emerging TC Research Symposium held at the Cankdeska Cikana Community College. This year will mark the 3rd annual symposium. The symposium highlights undergraduate research at the TCs and provides networking with all members of the ND INBRE, NARCH and related IDeA programs. Attendance is approaching 75 individuals.

### Current Active North Dakota IDeA Awards

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<thead>
<tr>
<th>Program</th>
<th>Award</th>
<th>Amount</th>
<th>Type of Award</th>
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<tbody>
<tr>
<td>NIH</td>
<td>IDeA</td>
<td>$16.8 million</td>
<td>INBRE (1 award)</td>
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<tr>
<td>NIH</td>
<td>IDeA</td>
<td>$41.3 million</td>
<td>COBRE (5 awards)</td>
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**For more information about North Dakota EPSCoR:**
Visit our website: ndepscor.nodak.edu
Call 701.777.2492 (University of North Dakota Office) or 701.231.8400 (North Dakota State University Office)

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