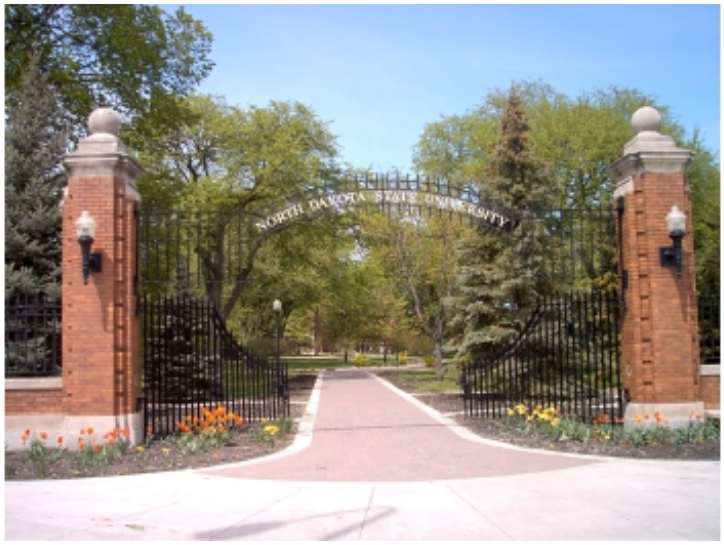
POSITION PROFILE



NORTH DAKOTA STATE UNIVERSITY
CENTER FOR COMPUTATIONALLY ASSISTED SCIENCE AND TECHNOLOGY

DIRECTOR

Position	Director
Location	Fargo, North Dakota
Reporting Relationship	Dr. Philip Boudjouk, Vice President of Research, Creative Activities and Technology Transfer
Education	Masters in Science or Engineering required; Ph.D. strongly preferred

NORTH DAKOTA STATE UNIVERSITY

North Dakota State University (enrollment 14,000) has a rich history of providing high quality education since 1890 when it was founded as a land grant institution in Fargo, North Dakota. The institution has conducted research in various disciplines for more than 100 years. NDSU further refined its research goals in 1999, embarking on an expanded vision for its research enterprise. The University campus focused on its goal of creating a world-class research institution that forged partnerships with state, federal and private sector organizations. NDSU has consistently engaged in more than $100 million in research activities annually.

North Dakota political, business, educational and other leaders previously established a Higher Education Roundtable to address state economic and social sustainability issues. Enthusiasm and support for this undertaking and resulting recommendations came from several corners.

The State has broadened its economic base to include high technology to complement its traditional strengths in agriculture and extractive industries. The new thrusts of energy, electronics, and biotechnology, in concert with the State's Science and Technology (S&T) Vision, derive largely from university-based technologies and partnerships with the private sector. One result of the longer-term success of this strategy is that North Dakota, with its highly robust economy, has a projected $1 Billion budget surplus. It's little wonder why North Dakota and Fargo are now often cited as highly desirable places to live and work.

Media coverage about North Dakota, Fargo and North Dakota State University has increased significantly during the past four years. It has highlighted the breadth and depth of investments in research and development projects, activities between universities and the private sector and the attractiveness of living and working in Fargo. Additional details are provided on the fact sheet on the last page.

Moody's Advisory Services had this to say about NDSU… "An increase in North Dakota State University's budget provides evidence that state government is delivering on its commitment to transforming the university into a leading academic institution," and "In the longer term, the funding will provide better resources for students and thereby enhance ND's human capital."

After a comprehensive site visit, the North Central Association's Higher Learning Commission granted NDSU full accreditation. Their report cited "profound changes in the basic components of institutional excellence – people, programs, facilities, and funding. One consultant-evaluator said he had never seen such broad campus unity in all his years doing similar campus visits.

NDSU's focus on research and development has paid off. NDSU's importance in the scientific community is reinforced by the FY 2008 (most recent available) National Science Foundation survey results presented below:

- NDSU ranks 122nd out of 679 research universities in the U.S. based on total research expenditures. For fiscal year 2008, NDSU reported $115.5 million in research expenditures.

- When ranked by R&D expenditures among 554 *research universities without a medical school*, NDSU ranks 39th among the universities and colleges in the NSF survey.

- Based on research expenditures, NDSU is listed in the *top 100* research universities in the country

in several National Science Foundation research categories, including physical sciences, chemistry, social sciences and agricultural sciences.

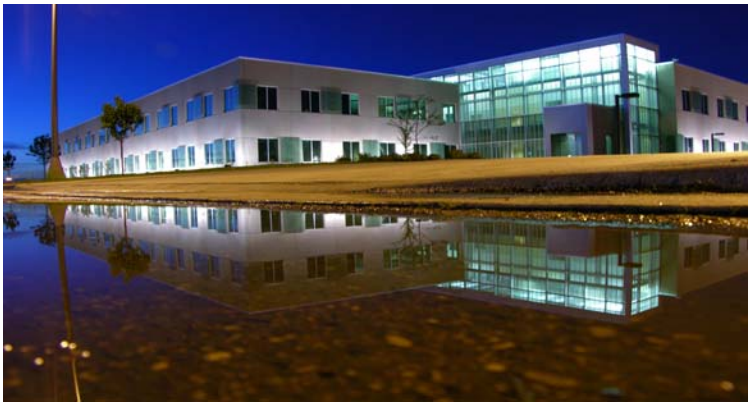
In the past 15 years, 15 faculty members at NDSU have been recipients of National Science Foundation CAREER Awards, which recognizes researchers likely to become academic leaders in the 21st century.

Under the Carnegie classification system, NDSU is categorized as a university with "high research activity."

As part of NDSU's strategy for leadership in the research and technology sector, in mid-2001 NDSU broke ground on a 55 acre research and technology park where university researchers and private industry combine talents to develop new technologies, methods and systems. Today the site has grown to include seven facilities, including the NDSU Technology Incubator, NDSU research facilities, and private sector buildings including Phoenix International (John Deere Company) and Appareo Systems.

NDSU CENTER FOR COMPUTATIONALLY ASSISTED SCIENCE AND TECHNOLOGY

Established in 2003, CCAST (formerly the Center for High Performance Computing) is in the early stages of building a significant computational capability that will serve to advance the discovery and research of NDSU's faculty, staff, and students and provide a regional resource in applications-driven computation to further partnerships with the federal, private, and university sectors.



CCAST is located in the Research 1 facility at the research park. Additional expansion space is available in the Research 2 facility, giving the center a total of approximately 5,000 square feet.

This facility also houses the NDSU Center for Nanoscale Science and Engineering (CNSE). Established in 2002 under the direction of Dr. Philip Boudjouk, CNSE conducts large-scale, multidisciplinary research for government and industry. CNSE employs 60+ full-time staff as well as Faculty Associates, Graduate Research Assistants, and Undergraduate Research Assistants. Current core competencies include combinatorial science, wireless miniaturized electronics design and prototype fabrication, research on polymeric and hard protective coatings, and on materials for electronics and energy conversion.

More than 100 researchers have utilized CCAST for a variety of research programs. Some of the departments using CCAST include computer science, physics, natural and resource sciences, civil engineering, mechanical engineering, sociology/anthropology, chemistry and molecular biology, pharmaceutical sciences and coatings and polymeric materials.

Connecting to the National Research and Education Network Backbone

NDSU has been instrumental in the build-out of the Northern Tier Network – a regional initiative led by Internet2 institutions to provide a robust research network connection for educational institutions in the upper-northwestern states by creating a national backbone route across the northern United States.

NDSU recently transitioned from a 100 Mbps network connection to the Northern Tier's 10 Gbps network connections from Fargo to the University of Minnesota linking NDSU to the Internet2 Network.

CCAST DIFFERENTIATORS

CCAST is a unit within the Research, Creative Activities, and Technology Transfer (RCATT) Division. The Director reports to Vice President Boudjouk who reports directly to the President of NDSU, underlining the importance of the organization within the larger university structure. In addition to its own staff, CCAST engages faculty and students in major projects and has a policy of supporting campus research programs. Scientific discovery and technology development are important elements of the growth plan for CCAST.

THE POSITION

The Director of CCAST will report directly to Dr. Phil Boudjouk, Vice President of Research, Creative Activities and Technology Transfer (RCATT) at North Dakota State University.

CCAST exists today primarily as a high performance computing resource with a small staff for providing systems administration and user support to campus researchers. The purpose of this newly established position is to lead the development of CCAST and to integrate its expansion within and outside the NDSU campus to enable a wide range of constituents, current and future, to use these services.

CCAST will offer some of the most advanced thinking about, and implementation of, the use of all elements of computational tools to support and enhance solutions to practical scientific and research

topics. The goal is to provide innovative research at the junction of science and technology. Putting it another way, CCAST is not just another high performance computing center.

The emphasis will be placed on creating software solutions which broaden the research efforts and capabilities of various NDSU Colleges and Departments and to offer similar capabilities to potential private and public sector organizations nationwide. The scope of potential users is exciting and important to the broad scientific, engineering and technology communities.

THE OPPORTUNITY

It is rare that an opportunity presents itself to lead and manage the creation, molding and building of a state-of-the-art computational center. NDSU and the Office of RCATT are embarking on a new, cornerstone project which will continue to put the University at the forefront of creating scientific solutions to many of today's and tomorrow's technical challenges and opportunities across a wide variety of fields. The initial phase is funded by $18+ million in federal funding, but as the Center moves forward it will be expected to generate its own operating revenue and margin. CCAST will build upon and, where appropriate, partner with other university departments and centers on projects.

The Director of CCAST will have ample opportunity to demonstrate visionary and conceptual abilities in creating a strategy for CCAST operations. As well, the Director will be responsible for actually making the Center happen and flourish. A blend of salesmanship, scholarship at the highest level and highly competent hands-on experience and skills to manage and lead a broad range of scientists, scholars and researchers will be required to make this operation the success that is envisioned by all. Specifically, the Director will guide the development of CCAST, push the direction of its research, secure the funding and develop the contacts in the academic, scientific and end user areas.

For the right individual, this is an opportunity to have a significant influence and high visibility at a national level.

RESPONSIBILITIES

Reporting to the Vice President for Research, Creative Activities, and Technology Transfer, this position will have the unique opportunity of building a new, innovative, applications-driven research

computing center. The responsibilities of the Director include, but are not limited to the following activities:

- Serving as the administrative and scientific leader of the CCAST, including strategic planning, system management, marketing and communications, external relations with stakeholders, facility development and operations, finance and administration, human resources, project supervision, and other general management functions.
- Leading the development of energy-based research initiatives and maintaining an active role in research and development.
- Obtaining funds for the facility, new projects, and initiatives.
- Developing strategies to enable users of computational resources to take advantage of high-performance computing.
- Developing and implementing strategic plan(s) for the continued evolution of the Center.
- Growing capabilities and increasing the competitiveness of CCAST to enhance its value for partnering with the private, government, and university sectors.
- Providing opportunities for research and increased competitiveness for NDSU faculty and staff.

CANDIDATE QUALIFICATIONS

Applicants will be measured against the qualifications presented below:

Required Minimum Qualifications

- Education: Masters of Science or Engineering
- Comprehensive knowledge of and experience in high-performance computing, strategic computing direction, and system architecture, deployment, and operation
- Demonstrated experience managing a complex technical organization
- Demonstrated record of creating, developing, and sustaining research programs
- Record of at least 4 years of increasing levels of responsibilities and success in planning and executing large R&D projects, budgeting, organizational and personnel development
- Effective interpersonal, oral, and written communication skills that will foster collaborations on multi-disciplinary and multi-sector programs
- Ability to understand issues in a broad range of sciences
- Considerable knowledge of funding agencies and managing agency-funded projects
- U.S. citizenship or U.S. permanent resident status

Strongly Preferred Qualifications

- Ph.D. in a science or engineering discipline
- Demonstrated experience building a high-quality research organization
- Experience with university-affiliated research centers
- Demonstrated success in obtaining competitive funding
- Experience as a mentor of graduate students and/or postdoctoral fellows
- Knowledge of compliance policies and procedures related to research
- Experience with materials modeling and simulation
- Demonstrated experience in energy-related research

North Dakota State University is committed to attracting and supporting a staff of men and women which fully represents the racial, ethnic and cultural diversity of the nation. NDSU is an EOI. Women and traditionally underrepresented groups are encouraged to apply.

INFORMATION

This search is being conducted by
Brown Schroeder and Associates, Inc.
www.brownschroeder.com
Please contact Susan Gittins at sgittins@brownschroeder.com

North Dakota is an open records state; all applications are open to media and public access.

CCAST CURRENT HARDWARE AND SOFTWARE CAPABILITIES

In addition to the hardware and software capabilities presented below, NDSU has secured funding to procure additional hardware, software, and personnel.

Hardware

8 core Nehalem shared-memory server with 96 gigabytes of RAM with access to an Nvida S1070 GPGPU co-processor

96-node/192 core cluster with 3.06GHz XEON-HT processors and 224 gigabytes of distributed memory and 3.84 terabytes of distributed storage

32-node/256 core cluster with 2.66 GHz 5430 Penryn processor and one terabyte of distributed memory and five terabytes of distributed storage

32-node/256 core cluster with 2.66 GHz 5550 Nehalem processors and 1.5 terabytes of distributed memory and five terabytes of distributed storage. Currently undergoing an expansion to 512 cores and 3 terabytes of distributed memory and 10 terabytes of distributed storage. Upgrade will include a 10 gigabit low-latency Myrinet inter-connect.

Dedicated Oracle database server

Software

SLURM scheduling and resource management system

TCP/IP and Myrinet based Open MPI.

Version 10.4 of Portland optimizing C, C++ and FORTRAN compilers with support for GPGPU/CUDA auto-parallelization

Gaussian 03 Electronic Structure modeling code with GAUSSVIEW visualization software.

GAMESS Electronic Structure modeling code with MacMolPlt visualization software.

Schrödinger Molecular Simulation

MARC/MENTAT Finite Element Analysis

LS-DYNA Finite Element Analysis

FEMLAB Finite Element Analysis

Cluster and shared memory implementations of NAMD Molecular Dynamics simulation software with CUDA enabled VMD visualization software. CUDA optimized NAMD available on large shared memory

LAMMPS Molecular Dynamics

Accelrys Materials Studio

Maya 3D Rendering

Oracle database Enterprise Edition Release 2

Mathematica simulation software

MATLAB simulation software

General open source development tools based on the GNU compiler suite and tools

GIT source code management system

In early 2002, U.S. Senator Byron Dorgan proposed a Red River Valley Research Corridor. Today, more than $586 million of funding from federal sources has been invested in this area. The Research Corridor efforts led to creation of more than 10,000 jobs from 2002 to 2006, resulting in a $759 million economic impact in the region. In the first four years of the Research Corridor initiative, North Dakota's academic research expenditures increased 77.4%. In the process, Fargo and other cities have become magnets attracting additional investments in research centers, specialized facilities and high tech related activities. In April 2009, the National Science Foundation released a report saying that North Dakota is the third fastest-growing state for federal research projects.

In 2005, North Dakota Governor John Hoeven proposed and the North Dakota Legislature committed to a $50M program aimed at creating high-technology economic development opportunities in the state. The North Dakota Economic Development Centers of Excellence (ED-COE) Program was established to address knowledge-based economic development with a goal of using university research to promote the commercialization of new products, create high-technology jobs, and foster entrepreneurship. Today, the ED-COE program has had an estimated $329 million in estimated total impact to North Dakota's economy; has led to creation of more than 2,000 jobs; has led to partnerships with 132 companies and has resulted in 17 new or expanded businesses.

In 2006, the U.S. Department of Commerce Economic Development Administration awarded the NDSU Research and Technology Park the National Excellence in Technology-Led Economic Development Award.

Top National Rankings
Gallup's 2009 *Job Creation Index* named North Dakota the best job market in the nation, which Gallup credited to the state's energy production and commodity markets.

North Dakota ranks 2nd in the nation in state competitiveness according to the 2009 edition of the Beacon Hill Institute's *State Competitiveness Rankings*. In the area of technology, the state rose six rankings in the annual survey to 14th. The index takes into account research funding, patents issued, proportion of scientists and engineers in the labor force and the importance of high tech companies.

In CNNMoney's list of *Best Places for Jobs*, Cass County, including Fargo, ranked first in the nation. The publication noted that Fargo is "a bustling community with friendly neighbors and job opportunities."

In CNNMoney's list of *Best Places to Live*, Fargo ranked 81st. "While the biggest employers have been concentrated in farm and construction equipment manufacturing, tech companies like Microsoft are now breaking ground alongside John Deere and Bobcat."

In its 2009 *Best Places to Launch* list, CNNMoney.com ranked Fargo-Moorhead as number 3 in its list of best metro areas for small business start-ups. "Fargo is noted more for its rich farmland … than for being a high-tech hotbed. But that perception is slowly changing. Senator Byron Dorgan has actively promoted eastern North Dakota as a tech corridor – an effort entrepreneurs say is paying off. …Local businesses cite North Dakota State University and easy air and road access … as key local advantages."

The American Institute for Economic Research identified *America's 75 Best College Cities* and ranks Fargo at number 15 among college towns under 250,000 residents. Criteria for the ranking included academic R&D expenditures per 100,000 residents, as well as entrepreneurial activity, brain gain and unemployment.

What Others Are Saying

The New York Times, April 5, 2010
"Over the next 40 years, [Joel] Kotkin argues, urban downtowns will continue their modest … revival. …but Kotkin also points to surging low-cost hubs on the Plains, like Fargo…"

Maine Sunday Telegram, February 9, 2010
"North Dakota has had a steady rise and now ranks in the top 10 in per capita income in the nation. It is an economic development success story, mostly well hidden. In recent years, North Dakota has benefited from oil development in the western part of the state, but its overall record is much more that of a determined, consistent policy of improving the state's competitiveness."

The Financial Times, August 5, 2009
"Last year, the state's economy grew at the fastest pace of any in the U.S. and unemployment, at just 4.2 percent, is the country's lowest. A fertile mix of natural resources, frugality and a plains-state work ethic have made North Dakota one of the most productive states in the U.S."

The *New York Times*, July 27, 2008
Referring to Fargo and North Dakota State University, "Over the last five years, the number of people employed here has grown by 13 percent, more than twice the national rate; 31 percent of the class of 2006 stayed in Fargo. …many graduates are enticed by high-paying jobs at biotech and software companies, including a huge division of Microsoft."

Moody's Economy.com. Inc., June 2007
"An increase in North Dakota State University's (NDSU) budget provides evidence that the state

government is delivering on its commitment to transforming the university into a leading academic institution…funding will secure faculty and staff…while also enhancing university-related investment into the local economy."

The *Wall Street Journal*, August 2006
"Fargo Moorhead is a thriving metropolis of slightly less than 200,000 that grew over 20 percent between 1990 and 2000," reads a Wall Street Journal article. "As entrepreneurial activity has expanded, Fargo [Moorhead] is being transformed. Its downtown is home to hip clothing stores and a great boutique hotel. There's even a thriving art scene."

The American Enterprise, July/August 2005
"Once considered an oddity in tech cities, the greater Fargo region of some 180,000 people is becoming a force not only in software, but in electronics manufacturing, research and development and biotechnology." – The U.S. Brain Belt by Joel Kotkin

USA Today, Feb. 23, 2004
"Fargo has blossomed into a hip, college town, enjoying the fruits of prosperity…industrial parks are full of thriving small businesses. North Dakota State University is the economic engine in the middle of it all."

Links to Additional Information:

1. North Dakota State University – www.ndsu.edu
2. NDSU Research, Creative Activities & Technology Transfer – www.ndsu.edu/research
3. NDSU Center for Computationally Assisted Science and Technology – www.ndsu.edu/chpc
4. NDSU Research & Technology Park – www.ndsuresearchpark.com
5. Red River Valley Research Corridor – www.theresearchcorridor.com