

Synopsis: In 2004, the South Dakota Legislature appropriated \$3,715,861 to build university research capacity as part of Governor Rounds' 2010 Initiative. About \$2.7 million was designated to create a small number of highly focused and competitive research centers within the public university system. The centers' focus is commercialization, with the additional goal of becoming self-sustaining from grants and other funding. Remaining state funds were used to establish a regents' system research office, a commercialization office within the Department of Tourism and State Development, and to provide \$600,000 in cost share for National Science Foundation-EPSCoR grants.

Governor Rounds' 2010 Initiative provides a substantial investment in the state's scientific research infrastructure. Based on 2002 data shown in the following table, South Dakota will need to accrue and allocate substantial additional dollars to become regionally competitive in research and development:

Breakdown of South Dakota Research & Development Expenditures — 2002

State	Population	Population Rank	Total R&D Expenditures (in thousands \$)	Total R&D Expenditures (per capita \$)	Rank	Federal R&D Expenditures (per capita \$)	Rank	State, Local, Institutional R&D Expenditures (per capita \$)	Rank
IA	2,935,840	23	\$485,756	\$165.50	6	\$87.60	15	\$58.10	3
MN	5,024,791	21	\$504,257	\$100.40	33	\$59.80	30	\$27.60	34
MT	910,372	44	\$122,375	\$134.40	20	\$72.00	23	\$52.00	5
NE	1,727,564	38	\$266,930	\$154.40	11	\$51.70	35	\$80.90	1
ND	633,911	47	\$106,078	\$167.30	5	\$73.20	22	\$78.10	2
SD	760,437	46	\$38,449	\$50.60	50	\$29.10	50	\$16.80	49
WY	498,830	50	\$41,632	\$83.50	40	\$40.10	40	\$36.60	20

(Source: *The National Information Center for Higher Education Policymaking and Analysis, 2002;* <http://www.higheredinfo.org/>)

The 2010 Research and Commercialization Council, appointed by Governor Rounds, is identifying necessary steps South Dakota must take to strengthen research capacity at its public universities and translate that into economic development. In July 2004, the council recommended funding four 2010 research centers in the state.

Launching the 2010 research centers

Four centers were funded from 11 proposals received for consideration. These collaborative proposals represented five of the six state universities. The proposals were peer reviewed, ranked, and submitted to the 2010 Research and Commercialization Council for final consideration. The research centers chosen for funding are:

Center for Infectious Disease Research and Vaccinology, SDSU Department of Veterinary Science, \$780,000 – This center fosters research leading to the development of novel therapeutic and diagnostic technologies and products for infectious diseases in humans and domestic animals. The principal investigator is Dr. David H. Francis. This is a collaborative center with the USD School of Medicine. During the first quarter of FY05, four grants requesting a total of \$868,297 were submitted. Three grant awards totaling \$505,000 have been received. This funding equals 13 percent of the total five-year amount anticipated from the 2010 Initiative. Two refereed journal articles were published and 17 national or international scientific presentations were made. Positions for three senior research faculty, two research assistant professors, two postdoctoral research associates, one graduate student, three M.S.-level technicians, one B.S.-level technician, and a senior secretary have been announced.

South Dakota Signal Transduction Center, USD Cardiovascular Research Institute, \$900,000 – Cardiovascular disease and cancer are the most frequent causes of death in modern society. The center examines the pathways that regulate cell growth and differentiation, cell death, response to stress, and the maintenance of constant physiological conditions. The principal investigators are Dr. Martin Gerdes and Dr. Benjamin Perryman. A National Institutes of Health COBRE grant worth \$10,931,103 was submitted in October 2004. An American Hospital Association Scientist Development grant for \$214,500 was funded and an NIH competing renewal grant for \$1,756,250 has been submitted. Two research assistants, three research associates, one senior research scientist, and one postdoctoral fellow have been hired to date. Gerdes was an invited speaker at the International Heart Forum in Beijing. Two manuscripts were submitted for publication and two were published or accepted for publication.

Center for Accelerated Applications at the Nanoscale, SDSMT Department of Materials and Metallurgical Engineering, \$585,000 – This center focuses on research in the areas of nanoparticles and associated nanosensors, with particular emphasis on South Dakota mineral development. Dr. Shawn Decker, who joined SDSMT on Dec. 1, 2004, replaced Dr. Jon Kellar as principal investigator. This is a collaborative center with Dr. David Galipeau of the SDSU College of Engineering. Decker comes to SDSMT from the private sector and brings a broad range of nanoscale research and technical experience, including private-sector commercialization. Kellar will continue to serve as a senior research faculty member in the center. Staffing when completed will include 11 new FTEs—three at SDSU with Galipeau and eight at SDSMT. These will be the new center director, four Ph.D. students, two technicians, three postdoctoral students, and an administrative assistant. The review for a new Ph.D. degree in nanoscience and nanoengineering has been completed and awaits legislative funding. A speakers' series held last November at SDSMT focused on nanotechnology.

Center for the Research and Development of Light-Activated Materials, USD Department of Chemistry, \$503,741 – This center performs both basic and developmental research on materials with light-activated properties. This research is important to medical applications such as human tissue bonding, drug delivery, and anti-tumor agents, and is important to developing phosphors for sensors, new laser materials, and thin films that impart special properties and characteristics to the materials they coat. The center's principal investigator is Dr. Stanley May, in collaboration with Dr. Ron Utecht of the SDSU Department of Chemistry and Dr. Kaia Kloster of the Avera Research Institute. The center made significant progress in the first quarter of FY05. Subcontracts between the host institution and two participating institutions, Avera Research Institute and SDSU, were negotiated and approved. Two new graduate students at USD and one at SDSU were hired. Two undergraduate researchers were also hired at SDSU. Staffing requisitions were approved for two new faculty hires in the USD chemistry department and for one new senior research faculty member at the School of Medicine. Negotiations between PhotoBioMed and institutional participants are under way concerning ownership of present and future intellectual property arising from biological adhesive technologies.