

**SOUTH DAKOTA BOARD OF REGENTS
SYSTEM VICE PRESIDENT OF RESEARCH
February 2005**

Governor's 2010 Research Initiative

Introduction

The 2004 Legislature appropriated \$3,715,861 in response to the Governor's 2010 Research Initiative. Approximately \$2.7 million of the appropriation was designated to develop a small number of highly focused, highly competitive research centers within the Regental system. The Centers are to have a focus on commercialization in addition to becoming self-sustaining through the acquisition of grant and other funding. The additional funds were used to establish a Board of Regents System Research Office, a Department of Tourism and State Development Commercialization Office and to provide a \$600,000 NSF EPSCoR grant cost share.

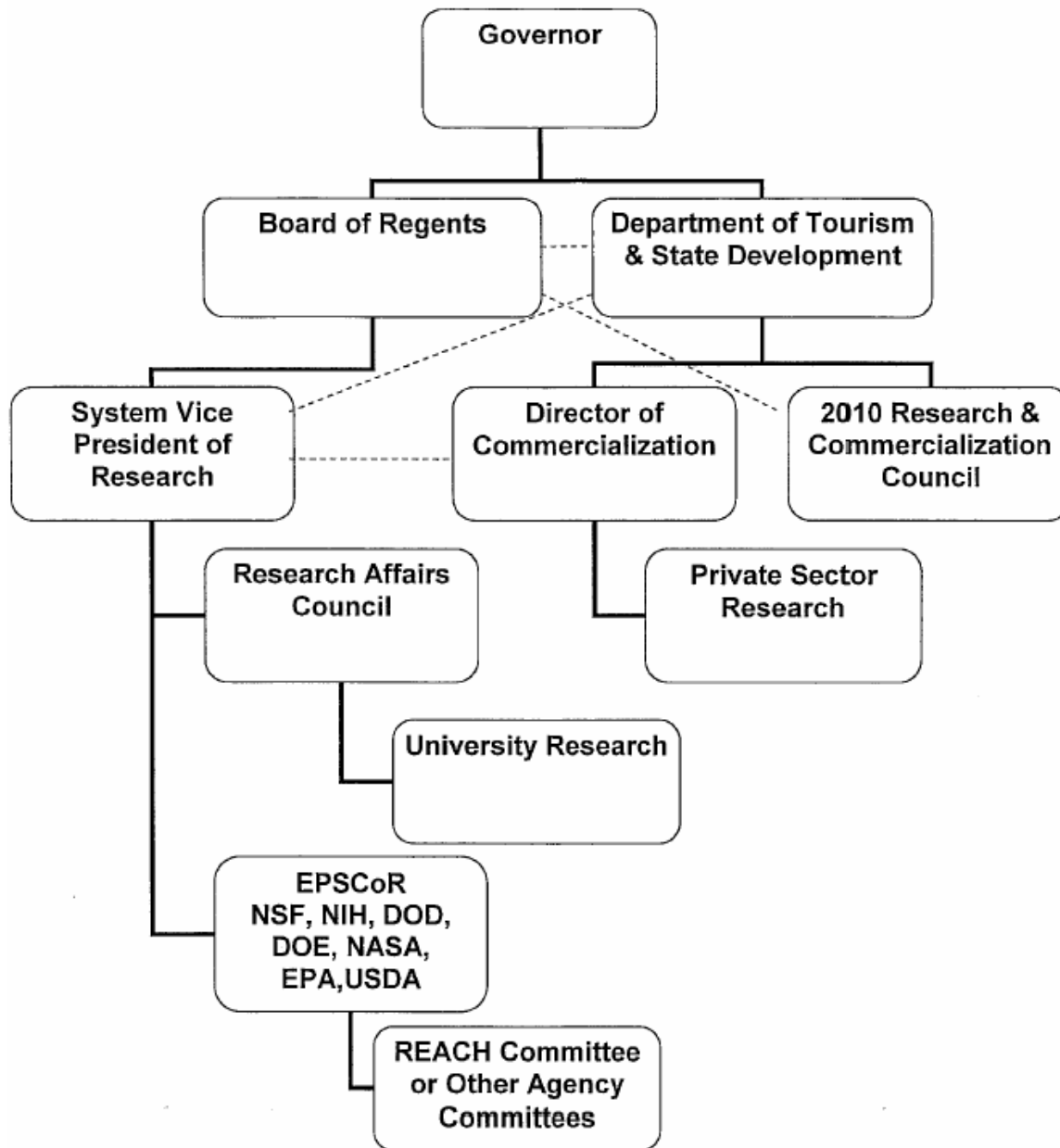
In July 2004, Daniel O. Farrington, D.V.M., Ph.D., was appointed System Vice President of Research (SVPR) for the South Dakota Board of Regents, with responsibility for working with the six state universities, state and federal agencies and the private sector to stimulate and build research capacity and performance within the state of South Dakota. He was previously Academic Vice President at Black Hills State University and spent over twenty years as a research executive in the pharmaceutical industry. In December 2004, Melvin Ustad, Ed.D. accepted the position of Director of Commercialization (DOC), Office of Tourism and State Development, with responsibility for facilitating commercialization of innovations and inventions resulting from university research and coordinating entrepreneurship activities in South Dakota. He was previously interim Vice President of Research at USD and has extensive experience in all phases of South Dakota Technology Based Economic Development. The Office will be located in the South Dakota Technology Business Center in Sioux Falls, South Dakota.

The Board of Regents established a Research Affairs Council to serve as an advisory group to the SVPR. The Council consists of the chief research officer from each Regental University and the State EPSCoR Director in an ex-officio capacity. The Council will provide leadership and coordination for the System's research agenda and for maximizing the System's investment in infrastructure.

The Governor's Office established the South Dakota 2010 Research and Commercialization Council to provide oversight of the 2010 Research Initiative, to make recommendations for funding of 2010 Research Centers, and to aid and help the commercialization process for technology transfer and innovation. The Council consists of the heads of the State Office of Tourism and State Development, and the Bureau of Finance and Management, the Executive Director of the South Dakota Board of Regents, a member of the South Dakota Board of Regents, and five public members at large. The System Vice President of Research and Director of Commercialization serve the Council in an advisory capacity.

These two councils and their activities will be extremely important as the 2010 Research Initiative is implemented.

Governor's 2010 Research Initiative Relationships



2010 Research Centers

A competition was held in early 2004 to select the 2010 Research Centers. Eleven proposals were received for consideration. The proposals were very collaborative and represented five of the six state universities. These proposals were peer reviewed by external reviewers, ranked by the Research Affairs Council and submitted to the Research and Commercialization Council for their final consideration and recommendation.

In June 2004, four centers were selected by the council for funding. At a recent Research and Commercialization Council meeting, the four 2010 Center Directors provided their FY04 baseline metrics, FY05 first year metrics and a brief status report concerning their Center's activities to date. The Centers are making good progress and will become valuable assets as we start to implement the State's Research Initiative.

The 2010 Research Centers' status reports and their award levels are as follows:

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 (excluding the 2010 grant). This funding equals 13% of the total five year amount anticipated from the Governor's 2010 initiative. Thus far in FY05, two refereed journal articles were published and 17 national or international scientific presentations were made. No new personnel have yet been hired from Center funding, but positions for three new senior research faculty, two new research assistant professors, two postdoctoral research associates, one graduate student, three new M.S. level technicians, one B.S. level technician, and a senior secretary will be announced, during second quarter FY05.

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 totaling \$10,931,103 was submitted in October, 2004. This is a Center and infrastructure building grant. 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 for the project to date. Dr. Gerdes was an invited speaker in September at the International Heart Forum in Beijing, China. Two manuscripts were submitted for publication and two were published or accepted for publication to date for FY05.

Center for Accelerated Applications at the Nanoscale, SDSM&T 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 SDSM&T on December 1, 2004, has replaced Dr. Jon Kellar as principal investigator. This is a collaborative center with Dr. David Galipeau, SDSU College of Engineering. Dr. Decker comes to SDSM&T from the private sector and brings a broad range of nanoscale research and technical experience, including private sector commercialization. Dr. Kellar will continue to serve as a senior research faculty member in the Center. Center staffing when completed will include eleven new FTEs, three at SDSU with Dr. David Galipeau and eight at SDSM&T. These will be the new Center Director, four Ph.D. students, two technicians, three postdoctoral students and a center administrative assistant. The nanoscience and engineering Ph.D. degree review has been completed and is awaiting the Legislature's funding decision on this matter. The Star-Of-The West Speaker Series held on November 16, 2004 at SDSM&T focused on nano-technology.

Center for the Research and Development of Light-Activated Materials, USD Department of Chemistry, \$503,741– The Center (CRDLM) 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. This is a collaborative center with Dr. Ron Utecht, SDSU Department of Chemistry and Dr. Kaia Kloster, Avera Research Institute. The CRDLM has made significant progress in the first quarter of FY05 in advancing the goals of the Center. Subcontracts between the host institution (USD) and the other two participating institutions, Avera Research Institute and SDSU, have been negotiated and approved by the appropriate officers. Two new graduate students have been hired at USD, and one new graduate student has been hired at SDSU. Two undergraduate researchers have been hired at SDSU. Staffing requisitions have been filed and approved for two new faculty hires in USD chemistry. The positions have been advertised and formal review of applications began on October 15th. Over 60 applications were received. A staffing requisition has been filed and approved for one new senior research faculty in USD School of Medicine. Formal written invitations have been issued for membership on the CRDLM advisory board. Negotiations between PhotoBioMed (PBM) and CRDLM institutional participants (USD/SDSU/Avera) are underway concerning ownership of present and future intellectual property arising from naphthalimide and non-naphthalimide biological adhesive technologies.

A total of seven new senior scientists, eight post-doctoral students, seven Ph.D. students, eight graduate associates, and eleven technicians are expected to be brought into the university system in the first two years of the Centers' activity.

New Ph.D. Programs

Ph.D. programs are an essential component of the State's research infrastructure as graduate students bring the creative and innovative talents so necessary for successful research and development programs.

The three new proposed Ph.D. programs are closely linked to the 2010 Research Initiative Centers to provide synergy and additional critical mass to these research areas:

The combined MD/PhD program will support three of the 2010 Centers and is expected to contribute to proposals for future research centers.

- The Signal Transduction Center (USD): This Center is a logical placement for students while they are in the research phase of their MD/PhD program.
- The Center for Infectious Disease Research and Vaccinology (SDSU): School of Medicine faculty members are involved with this Center and MD/PhD students are expected to work with faculty members associated with this Center.
- The Center for Light-Activated Materials (USD & SDSU): The Center has a significant component associated with biomedical applications.

Faculty and students in the new Ph.D. program in Computational Science and Statistics will support the 2010 Centers in Infectious Disease Research and Vaccinology, Signal Transduction, Accelerated Applications at the Nanoscale, and Research and Development of Light-Activated Materials. The new program will lead to applied research in a variety of areas that may include: artificial neural networks, biological computing, biological information processing, biological modeling, biostatistics, computational biology including transport processes, computational chemistry, ecological modeling, and spatial data modeling.

The new Ph.D. program in nanoscience and nanoengineering will prepare graduate students who can support economic growth in this technologically important area. The Ph.D. program will attract graduate students who will work in the 2010 Center for Accelerated Applications at the Nanoscale. The new Ph.D. program will help the Center recruit and retain faculty and make the Center more competitive for federal research grants.

Conclusions

The Governor's 2010 Initiative includes a substantial investment in the scientific research infrastructure in the state. The goal is to increase the role of university research in South Dakota's economic development and to expand and exploit academic research and development. It is important that university research and development be recognized as an industry in itself. In any Technology Based Economic Development initiative, having a sufficient level of funding is critical. The proposed new Ph.D. programs will be a critical component in helping meet our goals and objectives. Based on the data presented in Table 2, South Dakota will need to allocate

and accrue substantial additional dollars in support of targeted Technology Based Economic Development activity in order to be regionally competitive.

TABLE 2:

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	58.1	3
MN	5,024,791	21	\$504,257	\$100.40	33	\$59.80	30	27.6	34
MT	910,372	44	\$122,375	\$134.40	20	\$72.00	23	52	5
NE	1,727,564	38	\$266,930	\$154.40	11	\$51.70	35	80.9	1
ND	633,911	47	\$106,078	\$167.30	5	\$73.20	22	78.1	2
SD	760,437	46	\$38,449	\$50.60	50	\$29.10	50	16.8	49
WY	498,830	50	\$41,632	\$83.50	40	\$40.10	40	36.6	20

All data reported from The National Information Center for Higher Education Policymaking and Analysis, 2002 (latest) report: <http://www.higheredinfo.org/dbrowser/index.php?measure=70>

A recent report from the SDSU, South Dakota Agricultural Experiment Station (AES) concerning return on investment of state general funds gives an example of the value of the state's investment in research. The direct economic return on the \$8.7 million State general fund appropriation to the University was \$11.5 million; a 132% return. The emphasis of public research, however, is to create economic and quality-of-life benefits to the state. Recent economic impact analyses of agricultural research indicate that the impact of FY03 AES funds was \$46.6 million. AES research activities have been linked with improvements in South Dakota agriculture for 116 years. If the annual impact of AES research on South Dakota's \$18 billion agriculture industry has been only 5%, the annual impact of its long-term commitment is roughly \$750 million. The return on investment of State general funds is clearly significant to the state and its citizens. As the 2010 Initiative matures, it is expected that the same type of stimulation to the South Dakota economy will occur and that the return on investment of State general funds will be significant.