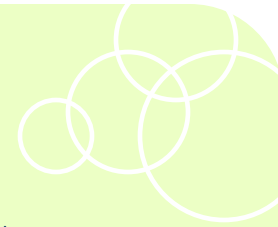


## SOUTH DAKOTA

South Dakota has employment specializations in agricultural feedstock and chemicals (location quotient of 2.48) and medical devices and equipment (1.43) and growth across all subsectors. Bioscience academic research expenditures also grew rapidly (137 percent) over the 2002–2006 period, to a total of \$49.8 million, led by medical sciences and agricultural sciences. The State saw \$4 million in bioscience venture capital investment in 2007 in the animal biotechnology sector. The 52 bioscience patents issued over the past 6 years were primarily in surgical and medical instruments.



### Recent State Initiatives

South Dakota continues to implement its 2010 Initiative, of which one goal is to become a recognized leader in research and technology development by 2010. In the past 2 years, two additional research centers focused on the biosciences were established and existing Centers expanded their bioscience capabilities. Bioscience-related research Centers include the following:

- **The Center for Bioprocessing Research and Development** is a multi-university and industry collaboration established in 2006.
- **The Center of Excellence for Drought Tolerance Biotechnology**, established in 2007, is a collaboration between South Dakota State University and industry partners that will be based at the Innovation Campus Research Park in Brookings.
- **The Center for the Research and Development of Light-Activated Materials and the Center for Accelerated Applications at the Nanoscale** in 2007 expanded their bioscience capabilities with the addition of a new Biomedical Engineering Ph.D. program.
- **The South Dakota Signal Transduction Center** is part of the Sanford Research initiative and collaboration with the Burnham Institute.
- **The Center for Infectious Disease Research and Vaccinology** is focused on development of diagnostics and treatment of animal and human infectious diseases.

In July 2007, the National Science Foundation (NSF) announced that it had selected the Homestake Mine site in South Dakota to be the site of the proposed **Deep Underground Science and Engineering Laboratory (DUSEL)**. NSF is providing \$15 million over 3 years to develop a design plan for the lab. The State Legislature and philanthropist T. Denny Sanford provided more than \$120 million to develop and operate an underground research facility at the 4,850-foot level. Bioscience research is currently underway on biological organisms that live in the extreme environment in the 8,000-foot mine. Additional bioscience research is planned as part of the DUSEL project.

### Major Industry Developments and Recent Successes

- Philanthropist T. Denny Sanford's gift of \$400 million to **Sanford Health**, formerly Sioux Valley Health Systems, in 2007 is being used to create a major biomedical research center, focused on children's health, in South Dakota. A Sanford Biomedical Research Park is under development, and the Burnham Institute will be establishing a research facility in Sioux Falls to collaborate with Sanford.
- South Dakota is home to two of the largest bio-energy companies in the United States—**Poet** and **VeraSun**—and the proposed site for the construction of a \$10 billion "green" oil refinery. Poet received one of the \$80 million Department of Energy grants to develop a cellulosic ethanol pilot plant. VeraSun recently merged with US BioEnergy, creating the largest publicly traded ethanol producer in the United States. VeraSun will be headquartered in Sioux Falls.

**Workforce 2025** has been undertaken to help meet the workforce needs of the bioscience and other technical industry sectors. This includes **Dakota Roots**, which has assisted 241 former South Dakotans to return from 40 states and identified 1,400 individuals who have an interest in returning to South Dakota; and **Dakota Seeds**, launched in 2008, which provides matching funds for internships and graduate assistantships related to science, technology, engineering, and mathematics.

## Pending Proposals

South Dakota is currently soliciting applications for development of new State-supported research and development centers. It is anticipated that one additional center will be created in 2009 and 2010.

For additional information on South Dakota's bioscience policies and programs, please see <http://www.sdreadytowork.com>, <http://www.workforce2025.com>, and <http://www.sdbio.org>.

## Bioscience Industry Base, 2006

Industry Subsector	South Dakota		United States	
	2006	2001-06 Change	2006	2001-06 Change
<b>Agricultural Feedstock &amp; Chemicals</b>				
Establishments	23	90.5%	2,183	3.8%
Employment	727	158.6%	105,846	-6.1%
Location Quotient	2.48		n.a.	
Direct-Effect Employment Multiplier	4.98		11.22	
Total Employment Impact	3,625		1,214,709	
Average Annual Wage	\$59,298		\$67,870	
<b>Drugs &amp; Pharmaceuticals</b>				
Establishments	2	-33.3%	2,654	1.9%
Employment	76	22.8%	317,149	4.0%
Location Quotient	0.09		n.a.	
Direct-Effect Employment Multiplier	5.15		9.92	
Total Employment Impact	392		2,880,242	
Average Annual Wage	\$53,894		\$86,892	
<b>Medical Devices &amp; Equipment</b>				
Establishments	35	-5.8%	15,215	0.3%
Employment	1,678	13.6%	422,993	-0.9%
Location Quotient	1.43		n.a.	
Direct-Effect Employment Multiplier	2.75		4.85	
Total Employment Impact	4,622		1,980,128	
Average Annual Wage	\$49,050		\$59,441	
<b>Research, Testing, &amp; Medical Laboratories</b>				
Establishments	45	43.9%	22,857	32.7%
Employment	359	17.5%	449,991	17.8%
Location Quotient	0.29		n.a.	
Direct-Effect Employment Multiplier	1.98		3.25	
Total Employment Impact	712		1,440,500	
Average Annual Wage	\$77,009		\$71,284	
<b>Total Private Sector</b>				
Establishments	27,460	8.8%	8,575,730	10.2%
Employment	314,775	5.9%	113,463,842	3.1%
Average Annual Wage	\$29,829		\$42,272	

Note: n.a. = metric is not applicable.

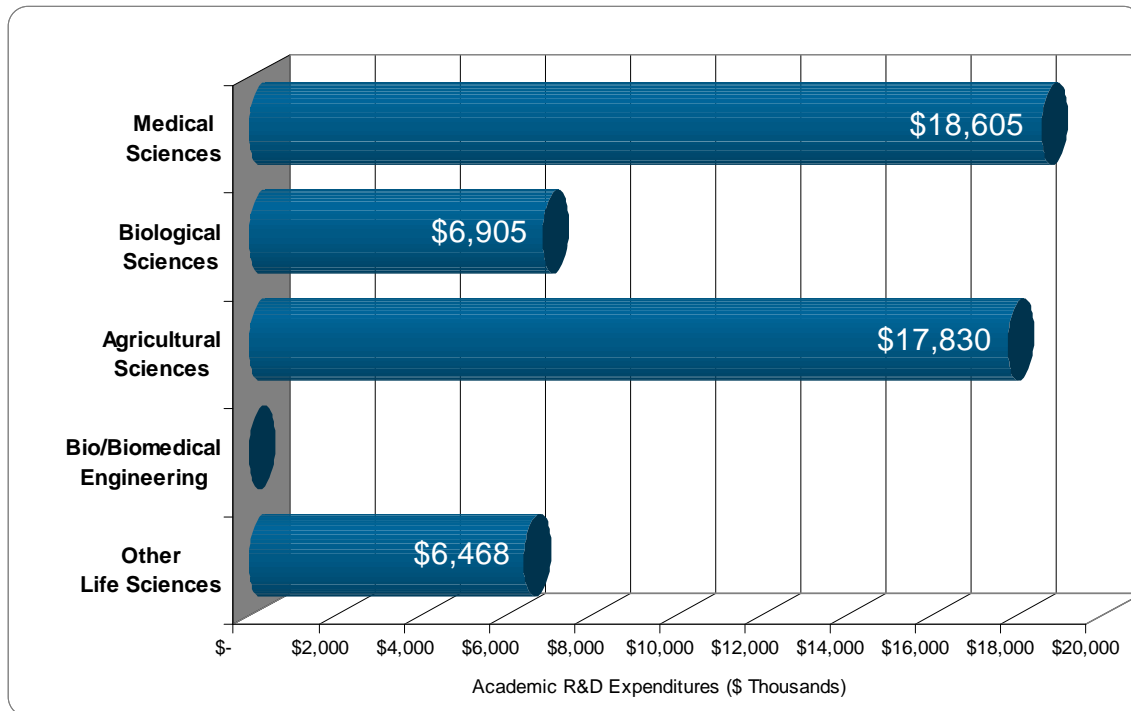
## Additional Bioscience Performance Metrics

### Summary of State Performance in Selected Bioscience-related Metrics

	South Dakota	United States	Rank
Academic R&D Expenditures, FY 2006			
Total (\$ thousands)	\$72,790	\$47,760,402	52
Bioscience R&D (\$ thousands)	\$49,808	\$29,307,628	49
Bioscience Share of Total R&D	68.4%	61.4%	
Bioscience R&D Per Capita	\$63.17	\$98.10	
Change in Bioscience R&D FY 2002–2006	136.9%	36.9%	
NIH Funding, FY 2007			
Total (\$ thousands)	\$15,648	\$21,066,389	49
Per Capita Funding	\$19.65	\$69.84	
Change in Funding, FY 2002–2007	18.1%	11.2%	
Higher Education Degrees in Bioscience Fields, AY 2006	631	143,433	42
Employment in Bioscience-related Occupations, 2006	1,930	588,520	44
Bioscience Venture Capital Investments, 2002-2007 (\$ millions)	\$4.0	\$51,260.9	45
Bioscience and Related Patents, 2002-2007	52	121,817	51

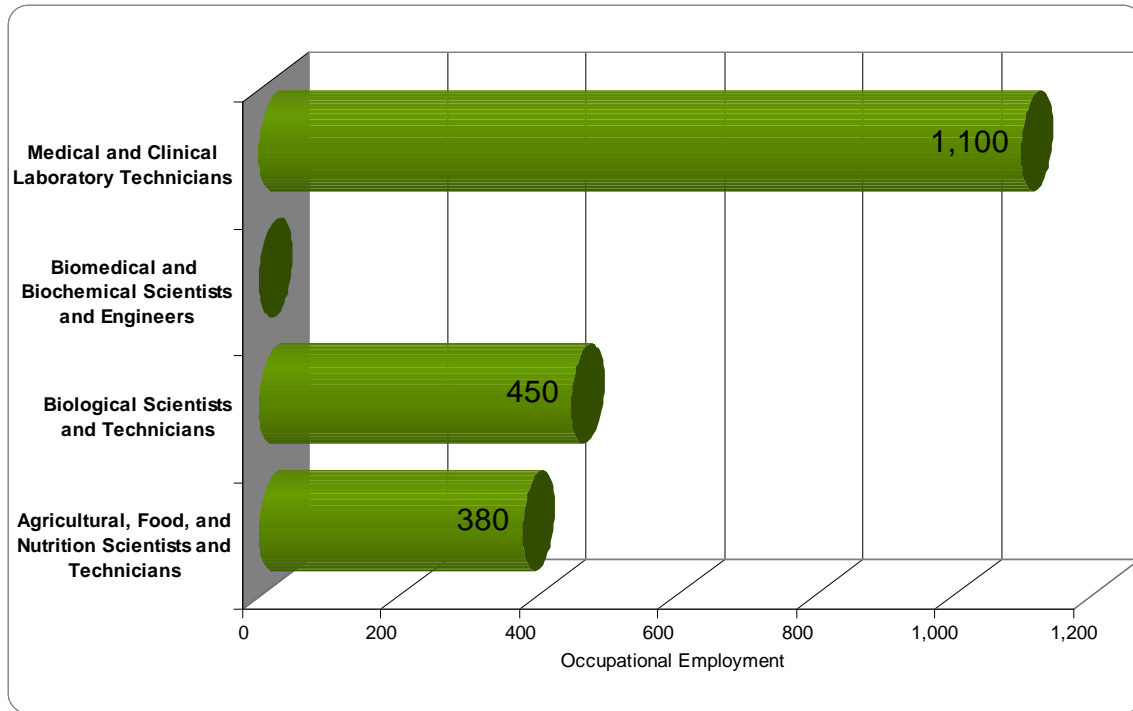
## Bioscience R&D Base

### Bioscience Academic R&D Expenditures in South Dakota, FY 2006

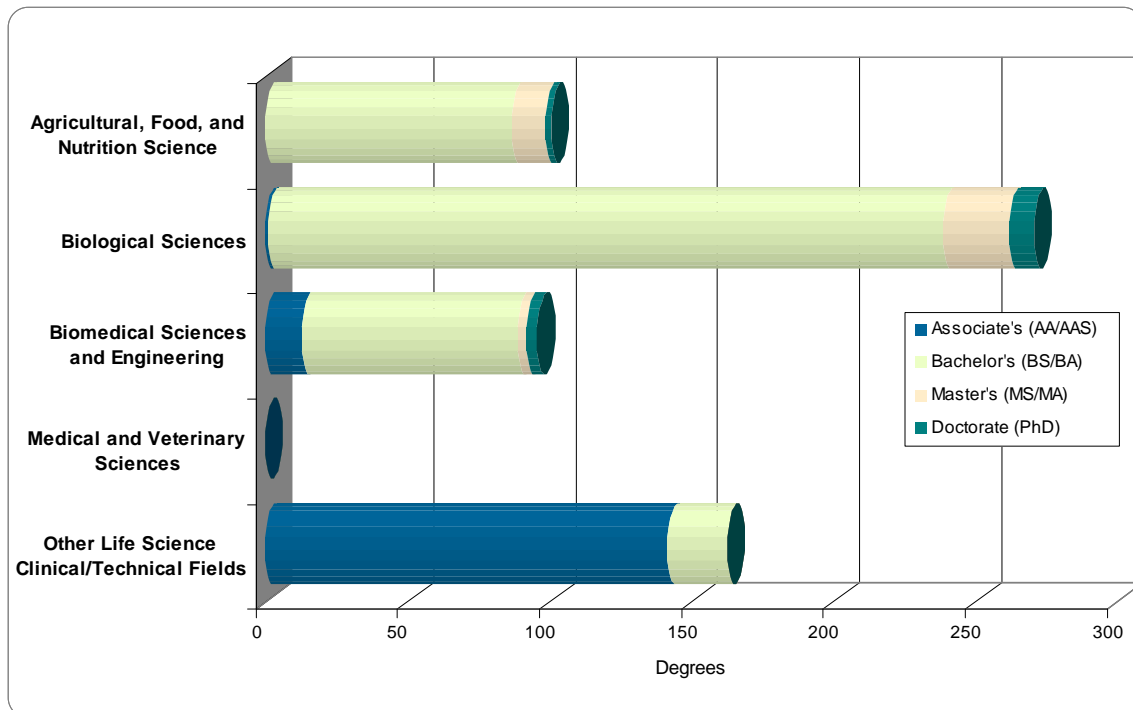


## Bioscience Talent Base

Bioscience-related Occupational Employment in South Dakota, 2006

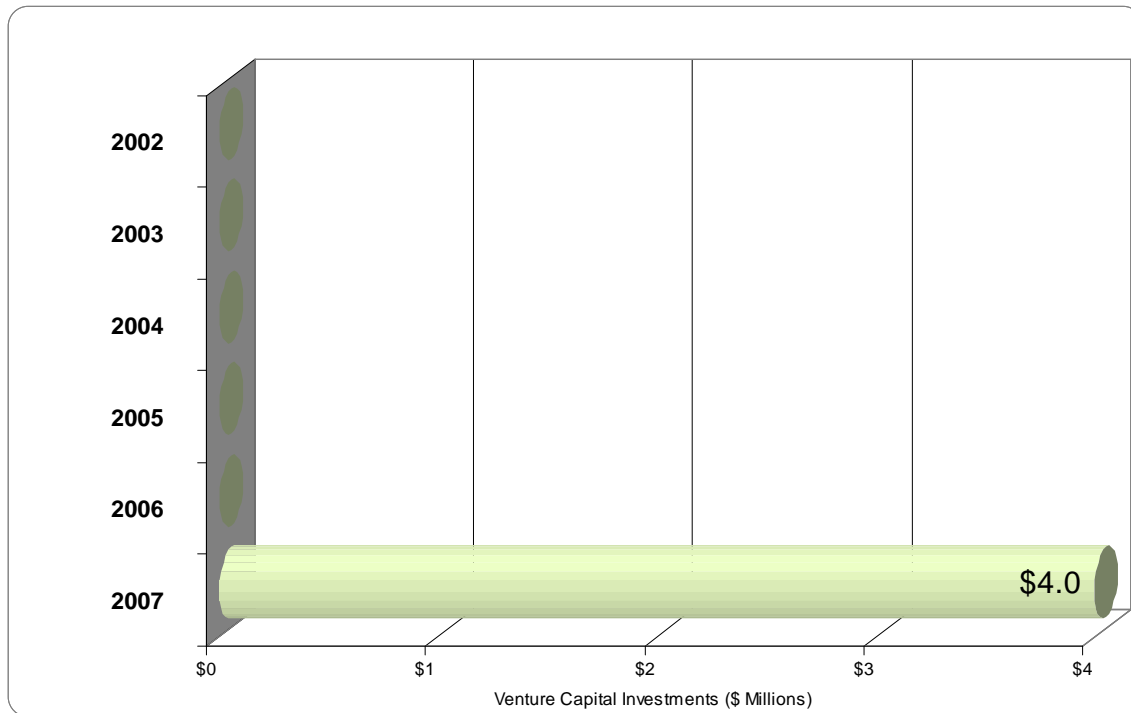


Bioscience-related Degrees in South Dakota, AY 2006

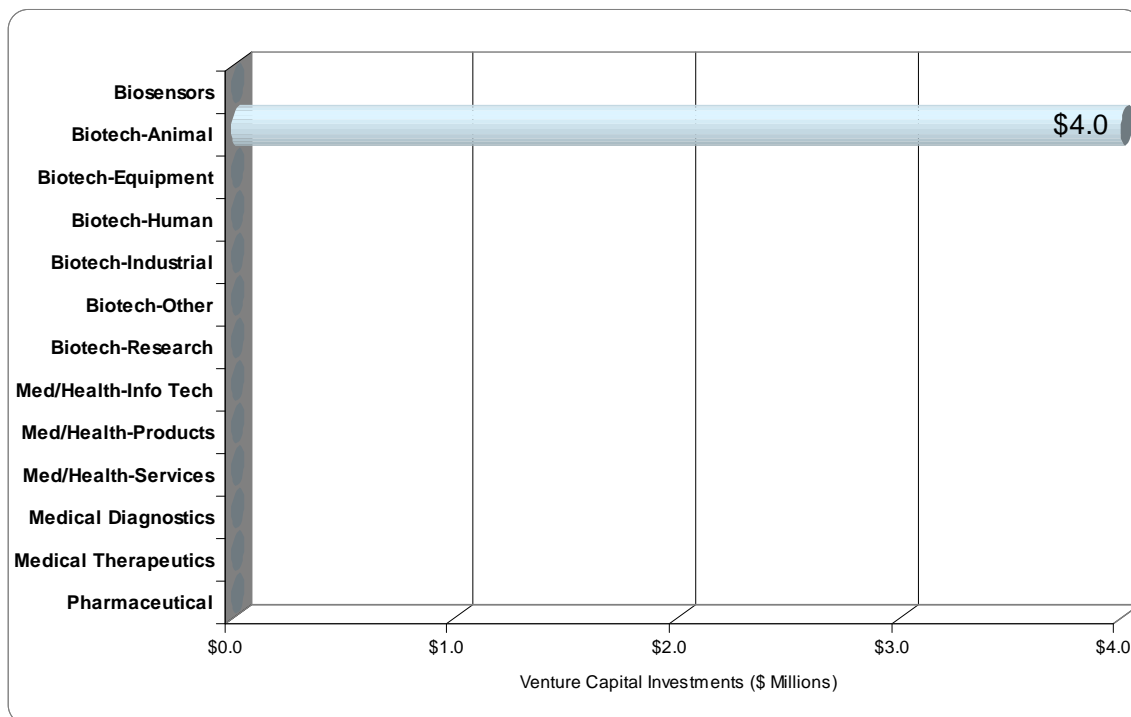


## Bioscience Venture Capital

### Bioscience-related Venture Capital Investments in South Dakota, 2002–2007

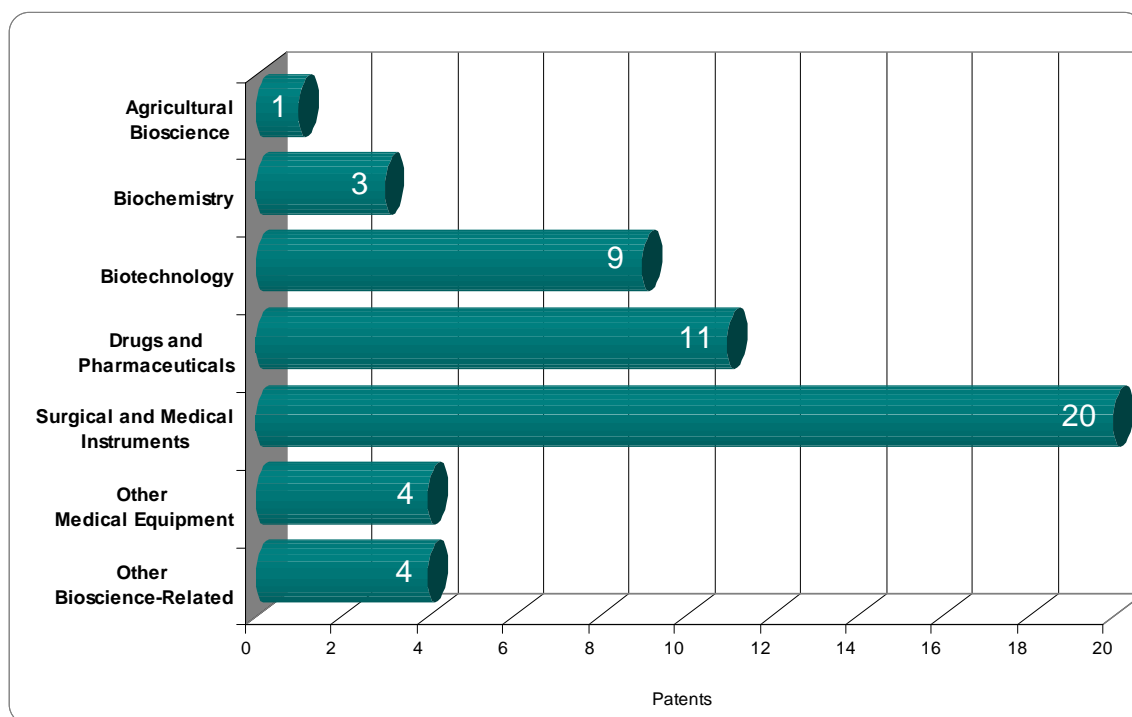


### Bioscience-related Venture Capital Investments in South Dakota by Segment, 2002–2007



## Bioscience Patents

### Bioscience-related Patents by Classification Group in South Dakota, 2002–2007



## State Bioscience Contacts

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### Source Notes:

**Employment, Establishment, and Wage Data:** U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) industry data provided by the Minnesota IMPLAN Group, 2001 and 2006.

**Employment Multipliers:** U.S. Bureau of Economic Analysis RIMS II Employment Multipliers, 2005 (most currently available).

**Academic R&D Expenditures:** National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges, 2002 and 2006.

**NIH Funding:** National Institutes of Health – Office of Extramural Research, Award Trends – Dollars Awarded by State, 2002 and 2007.

**Higher Education Degrees:** National Center for Educational Statistics, Integrated Postsecondary Education Data System (IPEDS), 2006.

**Occupational Employment:** U.S. Bureau of Labor Statistics, Occupational Employment Statistics (OES) survey data, 2006.

**Venture Capital:** Thomson Reuters VentureXpert Database, 2002-2007, as of May 1, 2008.

**Patents:** U.S. Patent & Trademark Office data as available from the Thomson Reuters' Delphion Patent Analysis Database, 2002–2007, as of May 1, 2008.

For a more detailed discussion of the data and methodology used please see the Appendix to the full national report.