South Dakota Science and Technology Strategy

November 2, 2025

Higher Education Connections Workshop

Sanford Underground Research Facility (SURF)

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South Dakota Science & Technology Plan History

- South Dakota Science & Math Council-2000
  - NSF award to build “Science on the Move” mobile labs
- 2010 Initiative-2003
  - Sanford Underground Research Facility (SURF)
  - Governor’s Research Centers
  - BOR Competitive Research program
- South Dakota Science & Technology Plan-2010, 2016 & 2024
  - NSF EPSCoR requirement
  - Focused South Dakota state, federal and private investments

South Dakota Science and Infrastructure Plan
Research and STEM Education Discussion

October 24, 2024

Vice Presidents for Research and Chief Research Officers
South Dakota Board of Regents Universities

RTI INTERNATIONAL

Science and Technology Plan Development

- South Dakota REACH Committee lead
- SWAT Data Analysis
  - Economic Data (GDP, Employment, Other)
  - R&D Data (University, Industry, Funding Sources)
  - Interviews (Universities, State, Industry, Others)
- Develop State and University Strategic Plans

South Dakota academic R&D declined -0.9% per year

compared to 5.6% CAGR in other EPSCOR states over past 10 years

Table 1. South Dakota Total Academic R&D Expenditures ($M) and Compound Annual Growth Rates, FY2012, FY2017, FY2022

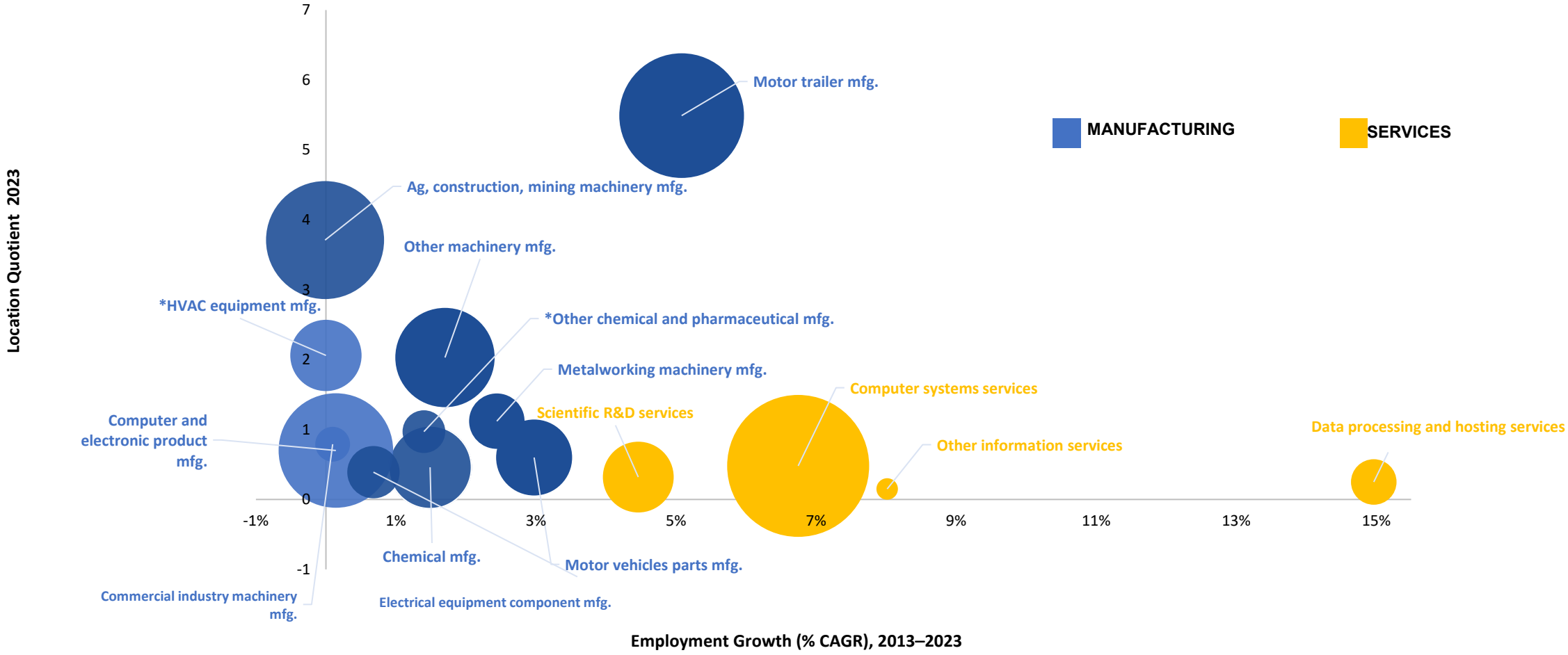
	2012	2017	2022	2012-2022 CAGR	2017-2022 CAGR
SDSU	$68.7	$63.4	$59.6	-1.4%	-1.2%
USD	$32.0	$28.4	$30.3	-0.5%	1.3%
SDSMT	$19.1	$15.5	$20.1	0.5%	5.2%
DSU	$5.7	$2.3	$4.7	-2.0%	15.4%
BHSU	$2.5	$2.1	$2.0	-2.1%	-1.2%
NSU	$0.0	$0.0	$0.3	N/A	N/A
Total	**$128.0**	**$111.7**	**$116.9**	**-0.9%**	**0.9%**

Note: 2023 preliminary data indicates South Dakota academic R&D expenditures grew to $132.3M in 2023.

Within Manufacturing and Technical Services

South Dakota R&D-intensive companies and industries are adding jobs

Figure 3. South Dakota Specialization (Location Quotient) and Compound Annual Growth in High-Tech Manufacturing and Service Industries, 2013–2023



Vision

“South Dakota will invest in research and commercialization to drive economic growth and diversification and to educate a highly prepared STEM workforce.”

Mission

“To invest in developing the technical and business skills that will encourage the next-generation of South Dakotans, and students educated in South Dakota, to build their careers and to launch and scale new companies in South Dakota.”

The Challenge

- South Dakota business and academic R&D expenditures have fallen over the past 10 years ranking the state 50th nationally.
- The number of S&E doctoral degrees awarded is growing much slower than the national average.
- The economy is highly concentrated in agriculture, financial services, healthcare, and tourism, and needs diversification into additional high value-added, exportable industries.

SWOT analysis for expanding SDSU research

Strengths

- USDA is SDSU's major federal funder followed by HHS; the dollar value of awards with these agencies are higher today relative to 10 years ago
- Successes leverage good working relationships with farmers, commodity groups, and ag companies and national trends in precision ag, climate, and rural health

Weaknesses

- SDSU has lost key researchers resulting in declines in NSF, NASA, DOE research awards
- Difficult to build teams in terms of both faculty (startup packages low) and graduate students (no hard funding for PhDs)
- Not a deep enough bench to win larger awards

SDSU

Opportunities

- Benchmark what other R1 are providing in terms of research infrastructure
- Use external consultants to review and advise on submissions
- Work on undergrad to grad pipeline

Threats

- Competitive landscape for federal research grants, faculty, and graduate students; challenging to compete with R1 and R2 universities in "destination" states
- Poaching of faculty who get R01 or other significant external grants

South Dakota State University Research Goals

Strategic plan goal to elevate SDSU to a R1 research university

2030 Plan Metrics

345 grant awards
(133 federal grant awards in 2023)

320 enrolled research doctoral students

$103M in total grant awards

78 doctoral degrees awarded
(42 in 2022, 38 in 2023)

$121M in total research expenditures
($71.3 in 2023)

SWOT analysis for expanding USD research

USD

Strengths

- Biomedical research strengths in neuroscience, cardiovascular, immunology and microbiology, cancer
- Research strengths in Chemistry, Physics, Biology, emerging strength in Computer Science
- Responsive, flexible pre-award and post-award support

Weaknesses

- No next-10-years vision and plan for research and no Associate Deans for Research
- Partial tuition remittance and no health insurance makes USD less competitive for recruiting PhD students
- Low startup packages and salary support make faculty recruitment and retention challenging
- Not enough faculty to lead an NIH COBRE
- Hospital is in Sioux Falls; medical school is in Vermillion

Opportunities

- Develop a vision and strategic plan for research that includes recruiting and retaining faculty and graduate students
- Partner strategically with industry and institutions, including tribal colleges, inside and outside the state, to develop competitive proposals
- Market and promote USD research

Threats

- Inability to provide faculty counteroffers, declining number of graduate students in some degree programs make it difficult to recruit and retain faculty
- R2 institutions executing on strategies better positioned to retain and recruit faculty, students, and external grants

SWOT analysis for expanding SDSMT research

SDSMT

Strengths

- Relatively high number of faculty (N=269) with federal research funding (2019-2024 1H) relative to size of school
- Faculty supportive of R2 goal with concomitant investment in research infrastructure by administration
- Strongest growth in research funding by NSF and pursuing big awards, including ERC

Weaknesses

- Institutional strategy and plan to bring discretionary funds to invest in strategy implementation
- Remote location and lack of name recognition is a challenge to recruiting high-quality graduate students; enrollment is declining
- No institutional bridge funds available to support graduate students if there is a lapse in external funding

Opportunities

- New president search provides an opportunity to recruit someone with a vision for research at SDM
- Participation in NIH BRIN may increase access to seed funding and ways to recruit graduate students
- CHIPS and Science Act increases research funding opportunities for EPSCOR states
- Use NSF REUs, NSF NRT, NASA Fellows to build pipeline of high-quality graduate students

Threats

- Strong labor market demand for engineers incentivizes domestic students to enter industry after Masters (rather than pursue a PhD)
- Intense competition for high-quality graduate students and faculty
- Competition for undergraduate students and impact on enrollment

South Dakota Mines Research Goals

Strategic plan goal to increase the productivity of research and scholarly activities

5.1 Obtain a Doctoral Research University Carnegie R2 classification
- Goal of 20 PhDs conferred

5.2 Expand the research enterprise
- Goal of $20M a year

2028 Metrics

5.3 Increase knowledge and skills of research development including proposal preparation

5.4 Increase the awareness and involvement of undergraduates in research

5.5 Develop state-of-the-art facilities and IT that bolster research, instruction, and communication

5.6 Reduce the administrative burden on grants to allow faculty to focus on research

5.7 Encourage entrepreneurial pursuits related to intellectual property

SWOT for Expanding DSU Research

DSU

Strengths

- Specialization in cyber operations, computation, informatics with doctoral programs in these fields (10 new hires)
- Most faculty interested in applied research
- Applied Research Lab leveraging strong alumni network to pursue federal contracts

Weaknesses

- Largest federal awards support educational outreach and scholarships (NSA, NSF)
- Few faculty with federally supported research that is basic research (one recent NIH AI/ML for Health Equity)
- Faculty have limited time for research; high teaching load (3:3, 4:4), summer months involved in camps
- No degree programs in statistics, physics

Opportunities

- Explore DoD EPSCOR, NSF, etc., as research funders
- Expand sponsored research across every college through clear research expectations, reduced teaching loads, increased salaries, creative approaches to providing graduate research assistants

Threats

- Strong competition and poaching of cyber and computational faculty and graduate student talent
- Challenge of straining staff between enrollment growth, especially PhD program growth, and research growth

Dakota State University Research Goals

Strategic plan goal of increasing the productivity of research and scholarly activities

2027 Milestones

Faculty will increase their peer-reviewed publications and creative works by 10%.	Sponsored **research will have $12 million** in annual expenditures.
Research and Economic Development will have generated 10 new research jobs.	Faculty participating in sponsored research for the first time will increase by 50%.
The number of **staff participating in sponsored research will increase by 25%.**	The number of **students participating in sponsored research will increase by 25%.**

Black Hills State University Research Goals

Strategic plan goal to increase the productivity of research and scholarly activities

2028 Goals

Nurture Student Experience	Evaluate and Develop Academic Programs.
Build a Supportive Work Environment	Evaluate and Develop a Revised Brand Identity

SWOT for Expanding NSU Research

Northern State University Strategic Plan Goals

1. Build an enrollment growth strategy

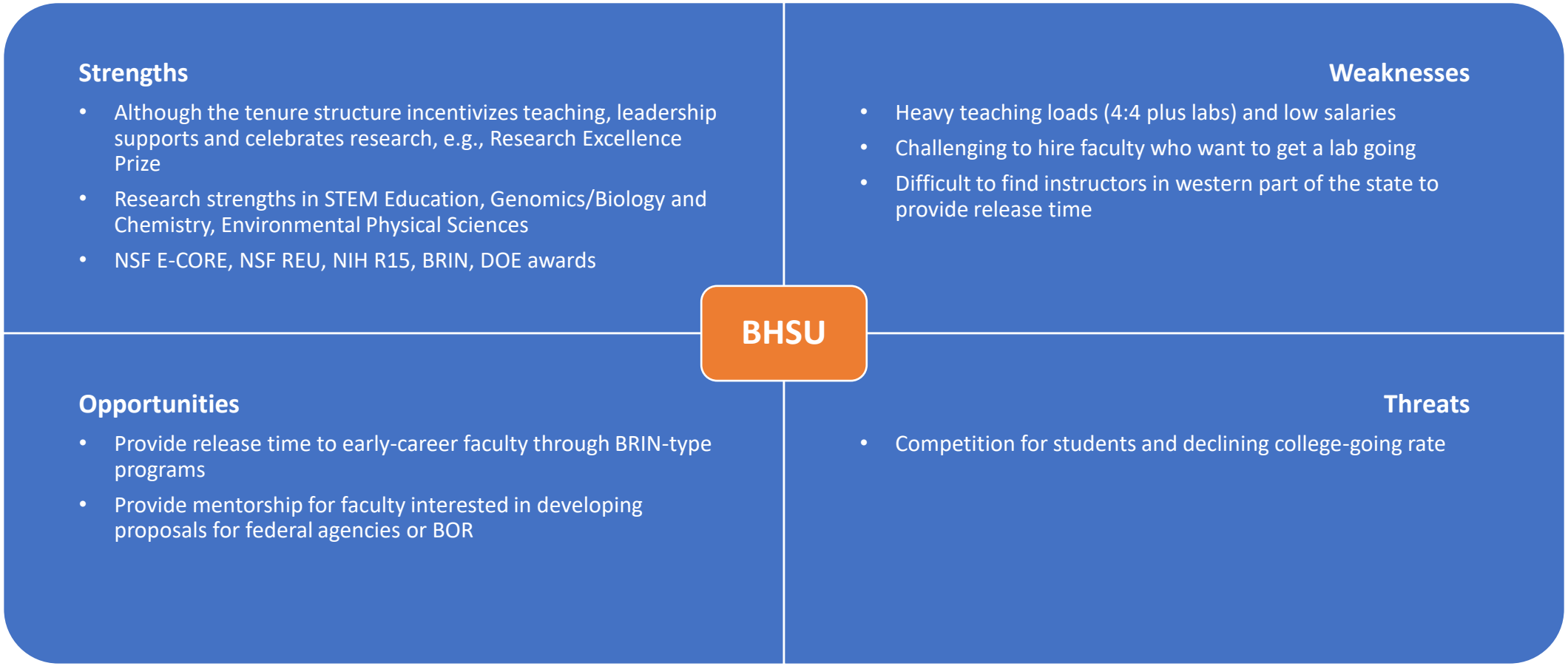
2. Build a welcoming culture

3. Build collaborative partnerships

4. Engage the campus and community to ensure long-term fiscal sustainability

5. Provide an outstanding college experience focused on experiential learning

SWOT for Expanding BHSU Research



Strategy

1. Increase South Dakota's total academic R&D expenditures **to $180M by 2030** (from $117M in 2022) by increasing state R&D expenditures **by 5.6% per year**.
2. Advance technology commercialization and the growth of innovation-based based companies in South Dakota.
3. Launch a 10-year, $50M state initiative to invest in faculty recruitment, develop PhD students, and university-industry research programs.
4. Leverage federal contracts and programs to build public-private research and commercialization partnerships in four high-priority opportunity areas:
   - Cybersecurity
   - Underground robotics and automation
   - Bioprocessing and precision ag
   - Clinical research and rural health
5. Develop a South Dakota "grow our own" STEM talent initiative that builds the K-12 pipeline through PhD/faculty.
   - Provides applied STEM summer experiences for K-12
   - Provides STEM research and internships for undergraduates
   - Provides support to pursue S&E degrees through postdocs

Current Federal Science Priorities

- Artificial Intelligence—Prepare students and current workforce to effectively utilize AI.
  - K-12 AI Challenge—Competitions for K-12 schools AI training and use of AI.
- Quantum Computing—Utilizing quantum computing to support and make R&D more efficient.
- Biotech—More industry collaborations for research and workforce development.
  - 70% of computer science PhDs are not US citizens and other STEM disciplines have similar percentages.
- User driven research.

Potential Next Steps for STEM Education & Workforce Development Collaborations

- Professional development program focused on grant writing and management.
- Advocate for changes in BOR research programs to more effectively support the S&T plan.
- Work with industry to develop collaborations (internships, apprenticeships, research collaborations).
- Collaborate on future NSF E-CORE and E-RISE proposals.
- Collaborate on proposals for other federal and private sector opportunities.
- Other ideas.