SOUTH DAKOTA BOARD OF REGENTS

Fiscal Year 2017
Budget Request

September 2015
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FY17 Budget Priorities

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## South Dakota Board of Regents
### FY17 Board of Regents Budget Request
#### By Fund Source

<table>
<thead>
<tr>
<th>Base Priorities</th>
<th>General</th>
<th>Federal</th>
<th>Other</th>
<th>FTE</th>
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<tr>
<td>FY16 Base</td>
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#### Board's Requests

**Base Priorities**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>State HEFF Match - Year 4 of 4</td>
<td>$2,428,335</td>
<td></td>
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<tr>
<td>2</td>
<td>Utility Increase</td>
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<td>$89,272</td>
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<td>3</td>
<td>SD Opportunity Scholarship Funding</td>
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<td>$350,000</td>
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<td>4</td>
<td>Affordability - Tuition Freeze for Resident Students</td>
<td></td>
<td>$4,256,019</td>
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<td>5</td>
<td>Need Based Scholarship Funding</td>
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<td>6</td>
<td>Student Preparation in Math Initiative</td>
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<td>12</td>
<td>Federal and Other Fund Authority</td>
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**FY17 New Base Funding**

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**One-Time Priorities**

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<tr>
<th>Number</th>
<th>Description</th>
<th>General</th>
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<th>FTE</th>
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<tbody>
<tr>
<td>1</td>
<td>REED Network Equipment Replacement</td>
<td>$1,254,600</td>
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<tr>
<td>2</td>
<td>Research Equipment Pool</td>
<td>$2,000,000</td>
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<tr>
<td>3</td>
<td>Industry Sponsored Research Fund</td>
<td>$1,000,000</td>
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<tr>
<td>4</td>
<td>Capital Project Matching Fund</td>
<td>$10,000,000</td>
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<td></td>
<td>One-Time Funding</td>
<td>$14,254,600</td>
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**FY17 One-Time Funding and Specials**

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<thead>
<tr>
<th>General</th>
<th>Federal</th>
<th>Other</th>
<th>FTE</th>
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<tbody>
<tr>
<td>$14,254,600</td>
<td>$0</td>
<td>$0</td>
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</table>

### Notes

- **Percent Base Change**: 6.9% -1.3% 0.0% 0.7%
- **Percent Funding Change**: 6.9% -1.3% 0.0% 0.7%
- **Base Funding Change**: $13,933,762 ($2,000,000) $0 37.0
- **One-Time Total Funding Change**: $14,254,600 $0 $0 0.0
State HEFF Match – Year Four of Four

Maintaining our academic buildings

The Board of Regents’ goal is to increase the level of funding for state academic facilities for maintenance so they are safe, efficient, comfortable, welcoming and appropriate for a contemporary education. The goal is to reach an annual investment of 2% of the building replacement values. Today, the Board invests about $16M annually from HEFF and $1.64 per on-campus credit hour generating about $941K.

Today, the Board and the State are investing about 1.8% annually into maintenance and repair (M&R) based on the academic facility replacement value which is $1,260,246,417. The national standard is 2 - 3% of replacement value, assuming a 50-year life cycle for buildings and their systems. The dollars generated for M&R investment grows with any increase in credit hours. The amounts provided to the institutions are based on a formula that allocates the funds using replacement values and academic square footage.

In the past, the Board has increased the amount going into the M&R account by 5 - 6% each year. We need to invest $25.2M annually to reach 2%. The Board of Regents proposes the State provide base dollars totaling $2,428,335 for year four of the four-year plan. With a state investment over a four-year period, the M&R allocation at the end of the four-year period will equal approximately 2.0%.

The first three years of state funding brings the state annual contribution to $5,432,782.

<table>
<thead>
<tr>
<th>General Fund Request</th>
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<tbody>
<tr>
<td>$2,428,335</td>
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<table>
<thead>
<tr>
<th>FY17 Request Calculation</th>
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<tr>
<td>Replacement Values</td>
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<tr>
<td>2% M&amp;R Investment</td>
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<td>M&amp;R Fee Per Cr Hr</td>
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<tr>
<td>Projected Cr Hrs</td>
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<tr>
<td>FY16 M&amp;R Funds</td>
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<tr>
<td>FY16 HEFF Allocation</td>
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<tr>
<td>Estimated Increase</td>
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<tr>
<td>FY17 HEFF Allocation</td>
</tr>
<tr>
<td>2% Replacement</td>
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<tr>
<td>FY17 HEFF Allocation</td>
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<tr>
<td>M&amp;R Fee</td>
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<td>GF (3 years)</td>
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<tr>
<td>Additional Need</td>
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<td>Final Year Request</td>
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FY17 Utility Funding

_Funding utilities for academic buildings_

The Board of Regents’ system utility budget provides heating fuels, sewer, water and electricity to the two special schools and the academic facilities at the universities. Revenue facilities such as student unions and residential facilities must generate sufficient revenues to pay their utility cost.

The State has created a funding formula that uses projected cost increases and weather normalization to project budget needs. Additional square footage as well as yearly increases in water, sewer, and garbage rates will be considered.

Based on the BFM model, the needs for FY17 follow:

<table>
<thead>
<tr>
<th>FY17 Utility Projections</th>
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<tbody>
<tr>
<td>Electricity</td>
<td>$5,171,158</td>
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<tr>
<td>Heated Contractual</td>
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<td>Water</td>
<td>$591,579</td>
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<tr>
<td>Garbage &amp; Sewer</td>
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<td><strong>Subtotal</strong></td>
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<td>Additional Square Footage</td>
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<td>Energy Conservation Pool</td>
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<tr>
<td><strong>Total FY17 Utility Budget Projection</strong></td>
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<tr>
<td>FY16 Base Utility Budget</td>
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<td><strong>Increase for FY17</strong></td>
<td><strong>$89,272</strong></td>
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General Fund Request

$89,272
SD Opportunity Scholarship Funding

Ensuring the continued success of the SD Opportunity Scholarship

The 2015 Legislature passed HB1147 which increased the value of the award from $5,000 to $6,500, bringing the value of the scholarship to 20% of mandatory tuition and fees. The scholarship awards $1,300 a year for the first three years and $2,600 in the final year. The new amounts are awarded to students receiving the scholarship for the first time after July 1, 2015. As a result, the overall fiscal impact for the revisions made to the program through HB1147 will take an additional three years to surface. Overall, the scholarship encourages students to take the college preparation curriculum, maintain good grades, and attend college in state, making them much more likely to stay in South Dakota after they graduate.

Why is the Opportunity Scholarship important to higher education and the State of South Dakota?

A variety of data elements are evaluated each year to determine the ongoing impact of the Opportunity Scholarship for meeting program objectives. Since its inception, the program has provided funding to approximately 1,100 new students each year. Each year the Board of Regents creates the High School to College Transition Report to document the first year performance of students from the state’s school districts. When comparing the most recent graduating class against those graduates who enrolled in the Regental system prior to the start of the scholarship program, the level of remedial enrollments has shown a continuous decline. In particular, the overall number of South Dakota high school graduates who have required remediation in both English and mathematics has dropped by more than 8% when compared against high school graduates the year before the program began. More importantly, the number of students meeting ACT college readiness benchmarks in the areas of math, English, science, and reading has increased by more than 9%. And the number of high school graduates scoring 24 or higher on their ACT has shown a marked increased since the implementation of the Opportunity Scholarship. More South Dakota high school graduates than ever will become eligible due to the flexibility allowed for completing career and technical education courses as an alternative to completing two years of world or foreign language and legislation to allow any student with a 28 or higher on the ACT (yet not meeting the curriculum requirements). Finally, as one of the primary drivers for establishing the program was to ensure that a larger number of the state’s most talented students remain in the state after earning their degree, the placement data for scholarship recipients has averaged 69%.

The proposed funding would allow the Board of Regents to continue to award scholarships to deserving high school graduates.

General Fund Request

$350,000
Affordability – Tuition Freeze

Keeping tuition affordable for resident students

The goal of the Board of Regents is to keep higher education affordable and accessible to all South Dakota citizens. Additional state funding to support salary policy and operating inflation will allow us to hold tuition increases for state-support resident students to zero. The long-term goal is to reduce the net tuition per FTE (Full Time Equivalent Student). South Dakota is the highest in our region for net tuition per FTE, while being lowest in educational appropriations per FTE. Moving toward a 50/50 split between student support and state support will bring South Dakota closer to the regional and national averages.

College is an investment in the future. This investment provides an economic return to the state in the form of a highly skilled workforce that will attract high tech business and industry, creating a stronger tax base and higher quality of life for South Dakota citizens. Private benefits include better health and lifestyle choices, improved family life, and enhanced performance of children in schools, civic involvement, and greater opportunities for the next generation. Some of these benefits are derived directly from better opportunities for employment and earnings potential, but others are derived from learning to use critical thinking skills and making informed decisions throughout life.

Many states have had to increase tuition significantly to make up for losses in state appropriations. Data generated by the State Higher Education Executive Officers Organization (SHEEO) compares state appropriations per FTE and net tuition revenue per FTE. The data illustrate that the surrounding states support higher education at a higher level than South Dakota. You will note almost an inverse relationship between state appropriations per FTE and tuition per FTE. The U.S. average net tuition per FTE is $6,267 in comparison to South Dakota’s net tuition per FTE of $8,221.
A tuition freeze would provide an opportunity for South Dakota to move closer to the regional and national averages. Assuming a 2 to 3% transfer of responsibility between student and state support, 3 years will bring South Dakota closer to a 50:50 sharing of higher education costs.

The general fund request assumes a 3% salary policy with an additional 1% salary competitiveness increase and operating expense inflation.

Source: SHEEO State Higher Education Finance (SHEF) Report, 2014 (SHEF data adjusted for enrollment mix and cost of living, so numbers may differ from SD’s Fact Book)

<table>
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<th>4% Salary Policy</th>
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<tr>
<td>OE Inflation</td>
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<tr>
<td>Total Need</td>
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<tr>
<td>Resident Portion</td>
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<td></td>
<td>$3,623,333</td>
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<tr>
<td>HEFF, Salary ENH, and USF</td>
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<tr>
<td>Total Request</td>
<td>$4,256,019</td>
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Need-Based Scholarship Funding

Focusing on need-based scholarship programs

Access and affordability continue to be critical issues confronting higher education requiring states to make investments to ensure that academically accomplished students are afforded the opportunity for earning a college degree. When considering that approximately 66% of all new jobs over the next decade will require some form of postsecondary credential, the emphasis on improving higher education access and affordability will continue to be a critical concern for the United States and South Dakota. To address this issue, many states have made significant investments in comprehensive scholarship programs that emphasize need-based components designed to ensure that needy students are not discouraged from pursuing a postsecondary degree. However, when compared to other states, South Dakota\(^1\) has been ranked at the bottom (currently ranked 49\(^{th}\) just in front of Wyoming) when comparing the average per student general funding allocations used to provide need-based financial support to students.

Table 1

<table>
<thead>
<tr>
<th>State</th>
<th>Need-Based Funding(^1)</th>
<th>Merit Based Funding</th>
<th>Total Grant Funding</th>
<th>Pell Eligible Students</th>
<th>Need Funding Per Pell Eligible Student</th>
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<tr>
<td>South Dakota</td>
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<td>$4,011,000</td>
<td>$4,211,000</td>
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<td>$12.80</td>
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<td>North Dakota</td>
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<td>Wyoming</td>
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<td>Iowa</td>
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<td>Montana</td>
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<td>Nebraska</td>
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**Total/Average** $265,676,000 $55,663,000 $321,539,000 450,894 $589.22

South Dakota needs to continue to help students and families obtain the financial resources needed to address the affordability gap. When comparing the SDNBS (South Dakota Needs-Based Scholarship Program) funding amount to surrounding states, only Wyoming provides funding at a rate lower than South Dakota when supporting students in their need-based program (see Table 1 for a depiction of need-based funding allocations in surrounding states). Wyoming has the second lowest

\(^1\) Senate 237 stipulated that $1.5 million in one-time funding be placed in the Education Enhancement Trust Fund, and no more than 4% of the accrued value from the fund may be drawn out each year to support the program. To ensure funding for students during the 2015-2016 academic year, the legislature approved an allocation of $150,000 for FY16 only.
tuition cost in the U.S, so investing in need-based aid is not a concern. When comparing the total state general fund allocation against the total number of Pell eligible students, the $200,000 average for FY14-16 provides an approximately $12.80 for every needy student. When comparing this total against the per-student allocation for eligible students, even Wyoming surpasses our support with $21.28. These figures pale in comparison when evaluating the financial support provided by states like North Dakota ($698), Colorado ($658), or Minnesota ($1,113) which have made sizable investments over the past few decades to support financially challenged families.

It is evident that a sizable pool of state general funds would be necessary to establish a viable need-based scholarship program when considering that the average allocation in just the surrounding states is $589 per student. To begin addressing this inequity, the Board of Regents proposes a three-year plan to bring South Dakota closer to the regional average. For the first year, the Board of Regents is requesting $3 million in base funds to provide financial support to needy students at the six Regental institutions. Additional funding in year two and three of $3 million will bring South Dakota to approximately $585 per Pell eligible, up from the current $12.80 per Pell eligible student.
Student Preparation in Math Initiative

**Paving a pathway to success**

Student success continues to be the number one priority of the Board of Regents. Improving retention rates and ultimately graduating more students equates to greater opportunities for students and greater development of the South Dakota workforce. Likewise, a recognized need exists in South Dakota to educate and prepare students to enter the workforce in STEM fields (those related to science, technology, engineering and math). Math competency is a cornerstone of STEM education but one-fourth (1/4) of students arriving on Regental system campuses are unprepared for college-level math and require remediation. To increase the number of STEM graduates in South Dakota, we must improve student achievement in math. The Student Preparation in Math Initiative would provide financial resources to improve student preparation and competency in math skills. Programs vary by campus and include seeking opportunities to collaborate with K-12 partners for improved math success.

**South Dakota State University and South Dakota School of Mines & Technology – South Dakota Mathematics for Engineering Institute**

This collaboration between two institutions offering math-heavy engineering programs would focus on improving student math performance on several fronts. First, the institute would raise academic expectations for South Dakota’s high school students aspiring to a STEM degree by assisting high school teachers, parents, and students in understanding the math curricula required for a successful STEM graduate. Second, the institute would work to improve the process for identifying students requiring additional academic intervention and delivering those services at low cost. Third, the institute would review foundational math curricula and encourage the adoption of proven national best practices in math education. Fourth, the institute would study the results of their efforts in order to foster continual improvement in math education.

The South Dakota Mathematics for Engineering Institute would utilize a variety of strategies to promote STEM graduates through improved math education. The institute would promote teacher training and outreach by working with school districts, the Department of Education, and the South Dakota Council of Teachers of Mathematics to offer low cost or no cost expert professional development in calculus, computer science, and statistics. A Senior Semester Accelerated Math course for high school seniors would offer online and face-to-face sections to ensure access to college-level mathematics instruction at the high school level. Students entering SDSU and SDSM&T could access online preparation courses prior to their enrollment to reinforce math skills before the beginning of college classes. A Math Week (a higher-level version of a summer bridge program for those in need of math remediation) would allow students to arrive a week early to campus to participate in intensive review of algebra, trigonometry, or calculus. Math instructors would receive training in best practices for mathematics instruction as well as exposure to emerging...
pedagogical innovations. SDSU and SDSM&T would study the impact of the new initiatives to promote continual innovation and improvement in college and K-12 math education.

The **Student Preparation in Math Initiative** would fund, among other items, the Math Week summer program for incoming students, two Institute co-directors, mentors for math labs and dual enrollment programs, workshops for K-12 math teachers, and ongoing assessment of Institute initiatives.

**Northern State University – E-learning Expansion of Services in Partial Answer to Current SD Teacher Shortages**

Since 2001, the NSU Center for Statewide E-learning has fulfilled its legislative mandate with an open promise to help schools meet instructional challenges, partnering with about 96% of South Dakota’s public school districts. NSU E-learning proposes to build on its successful program to expand services is a partial answer to the current SD teacher shortage (especially the shortage in math teachers). This modest expansion in E-learning courses would create a safety net for schools unable to hire highly qualified mathematics teachers and offer continuity of instruction in places where teacher turnover is particularly challenging. The NSU Center for Statewide E-learning currently offers pre-calculus and AP Calculus AB and would expand to include Algebra I, Algebra II, and Geometry, reaching approximately 350 students per year.

NSU E-learning proposes creating an elite corps of world-class mathematics teachers, working in their respective communities, who lead a team of educational assistants in local schools to create and manage courses. Rather than locating teachers at the NSU campus in Aberdeen, NSU proposes a new model keeping outstanding teachers in their current locations where they actively participate in school and community affairs. NSU would employ the mathematics teachers as Non-Faculty Exempt positions supervised by the NSU E-learning Principal. Teachers would need appropriate academic credentials; in addition, teachers would need leadership skills to lead their respective instructional teams in schools.

The **Student Preparation in Math Initiative** would fund four FTE positions (three mathematics teachers and one technology position to support their work), in addition to three new DDN studios (one for each additional teacher with location depending on the teacher’s location).

**Black Hills State University – Co-requisite Remediation in College Math**

Currently, BHSU students requiring math remediation take MATH 095 Pre-College Algebra, a course that prepares students for college-level math but that does not grant college credits for student completion. Yet research shows many students who need remediation could be successful in college-level courses if they had additional support. Moreover, students who enroll in co-requisite college-level math courses complete degree programs at a higher rate than those in traditional zero-credit remedial courses. BHSU proposes a co-requisite college-level math class where students earn college credit while simultaneously completing co-requisite remediation with additional instructional support. DSU and USD are working with BHSU to also offer these co-requisite math remediation courses.

BHSU would split the students currently placed into MATH 095 into two groups. In the first group, students with qualifying ACT and placement test scores would enroll in MATH 102 College Algebra or MATH 103 Quantitative Literacy simultaneous to a two-hour co-requisite remedial course. Using this strategy, students would earn college math credits while receiving needed remedial support. In the second group, students would enroll in MATH 095 Pre-College Algebra as they do now but the course would have smaller class sizes offering an improved faculty-student ratio. If a student did not pass in the first semester of remediation, they would take the co-requisite option in the second semester, allowing them the opportunity to continue work on remediation while taking a college-level and credit-granting math course.
The Student Preparation in Math Initiative would allow BHSU to fund two additional full-time math instructors, create approximately twelve sections per year of both the two-hour co-requisite remedial classes and the corresponding three-credit college-level class, fund release time for faculty to prepare the developmental courses, fund undergraduate peer mentors to provide additional assistance to students in the classroom, and fund a math-specific Student Success Counselor to intervene when students in any math class are at risk.

University of South Dakota – Co-requisite Remediation in College Math

USD intends to focus on three main areas in undergraduate math education. First, USD will provide a co-requisite model for MATH 102 College Algebra in a joint effort with DSU and BHSU. In addition, USD will expand on their “emporium” approach for MATH 095 by requiring more student contact hours to improve success rates. Finally, USD will provide for supplemental instruction for Calculus I students to improve success rates (Calculus I is a major feeder course for STEM majors).

Students earning college credits for entry-level math courses perform better than students enrolled in remedial level courses that are non-credit earning. To that end, USD will join with DSU and BHSU to offer a co-requisite college algebra course that simultaneously provides remediation while allowing students to earn college credit. In addition, USD will expand the use of their “emporium” model, a mastery-based student-centered approach that allows students to not repeat content they have already mastered over multiple semesters should they retake a class (students “pick up where they left off.”) This approach has proven successful, as a recent USD study showed success rates in MATH 102 College Algebra improved from 58% to 72%. The standard approach for MATH 095 and MATH 102 is to have one hour in the classroom with an instructor (providing feedback, assisting with questions, providing weekly goals, etc.) and two hours in the emporium (answering individual questions). The proposed new model would include three hours in a classroom with an instructor along with the two hours in the emporium each week, giving students an additional two contact hours. Lastly, USD will provide additional mentoring and support services to students in the STEM-critical Math 123 Calculus I course to ensure STEM majors have adequate competency in mathematics.

The Student Preparation in Math Initiative would fund additional faculty to support summer workshops for K-12 teachers and additional math support services to students on and off campus (e.g., university centers), fund Graduate Teaching Assistant positions to conduct supplemental instruction sessions, expand twenty-seven Math 095 sections to the co-requisite model requiring an additional fifty-four hours of instruction time, and add two new computer labs required for the expanded courses.

Dakota State University – Math Remediation Before Students Arrive on Campus

DSU's current math remediation programs focus on college students, an approach that does not solve the long-term challenge of preparing students for college-level math prior to campus arrival. Meanwhile, the popularity of the dual credit program provides a new forum to reach students earlier and to provide support to high school math teachers. DSU proposes four different efforts to improve the teaching of math in grades 6-12. These efforts include training and utilizing university supervised high school math teachers to teach a co-requisite college algebra course at high schools, implementing a summer bridge placement program to
help students avoid remedial math classes, creating an online tutoring center, and developing a middle school math teaching certification.

DSU first seeks to develop a MATH 102 College Algebra course for students needing remediation in conjunction with the related efforts at USD and BHSU. In addition, DSU would develop and offer a co-requisite dual credit math course that allows high school students to get the remedial work they need while simultaneously earning MATH 102 College Algebra credits. Offering a co-requisite dual credit course would require developing and providing a two-week training session for high school math teachers, serving to increase awareness of college-level math expectations and allow high school teachers to serve as teaching assistants in dual credit math courses taught by university personnel. DSU’s second initiative is to create a summer bridge workshop giving incoming students an opportunity for three days of intensive math review prior to college classes and taking math placement exams. DSU would also invite high school math teachers to the summer bridge program to receive additional training and to expose those teachers to the expectations of college-level math. The third DSU initiative is to design and offer a middle school math qualification program for education majors to provide training on newly adopted math education standards and to recognize the need for a certification focusing on middle school mathematics. Lastly, DSU proposes using appropriately prepared undergraduate students to staff an online tutorial support center for students enrolled in dual credit, online, and on-campus courses in MATH 104 and below.

The Student Preparation in Math Initiative would fund a Math Director to serve as the teacher of record in high school co-requisite remediation math courses, offer the summer bridge workshop and fund teachers to attend, provide scholarships and faculty stipends for the middle school math education program, and prepare undergraduate students to work in the proposed online math tutoring center.
SD National Guard and State Employee Tuition Support

Simplifying and maximizing tuition support and reimbursement

The Board commissioned a review of the university tuition structure a couple years ago to look at simplifying our tuition and fee structure, assessing residency policies, and looking at alternative tuition strategies to incentivize student behavior. The work to date has resulted in clean-up of residency statutes, elimination and simplification of program fees, and the adoption of a child of alumni program. The Tuition Structure Review Committee continues to look for ways to simplify our tuition and fee structure. One way of doing so would be to include the University Support Fee (USF) in the per credit hour charge for tuition. This would simplify our tuition and fee structure and make our cost more transparent. The USF is currently $93.80 per credit hour for residents, and $110.25 for non-residents at BHSU/DSU/NSU and $117.45 at SDSM&T/SDSU/USD. The USF use is similar to tuition. Many of the dollars are used to support faculty, staff and instructional support. This fee is difficult to explain to parents and students because it is essentially the same as tuition. Rolling USF into tuition is a logical approach to simplification.

The change would also assist active service members (active duty, reserves, and active reserves) including National Guard personnel to maximize their reimbursement from federal tuition assistance. These military personnel currently do not get reimbursed for fees under the federal tuition assistance rules. Making USF part of the tuition rate will allow military personnel to get reimbursed for a greater portion of their costs. We have 815 active duty and reserve military personnel that would benefit from rolling USF into tuition. The benefits of combining the university support fee with tuition at this time would improve federal tuition assistance reimbursement for these students by about $281.40 per three-hour course.

We have 359 National Guard and Air Guard students that get a 50% state tuition reduction. Rolling USF into tuition would mean that they would get a bigger state tuition break. The National Guard revenue loss would be around $314,638, again, because they would get a 50% reduction on a bigger base. 124 of these National Guard and Air Guard members are receiving federal tuition assistance. With the proposed change, National Guard members would get an additional benefit of $140.70 per three-hour course between state assistance and federal assistance.

State employees and teachers would get a greater discount based on current statute which provides a 50% “tuition” reduction. The estimated revenue loss that comes with the bigger discount would be $75,415.

This request is for $390,054 to cover the tuition loss for state employees and National Guard members. The federal tuition assistance benefit increase to National Guard members and active duty personnel would be well beyond this amount.
American Indian Education and Support

**Paving a pathway to success**

Student success continues to be the number one priority of the Board of Regents. Improving retention rates and ultimately graduating more students equates to greater success for students and development of the South Dakota workforce.

Our goal is to develop a system-wide plan to strengthen retention of American Indian students. In Fall 2011, the system admitted 159 American Indian students and in Fall 2012, 90 of these students were enrolled for a retention rate of 57%. At the same time, 4,616 freshmen were admitted into the system Fall 2011 and 3,493 in Fall 2012 for a retention rate of 76%. Thus, retention of American Indian students is 19 percentage points lower than all students. This discrepancy, as well as the fact that American Indians comprise 9% of South Dakota’s population and only 1.58% of the total university population, must be addressed.

We suggest permanently funding a central office (BOR) position to serve as a liaison to high schools and college-bound American Indian students and their families with the goal of navigating college application, financial aid application, scholarship application and the other processes necessary to be accepted and ready to go to college. This person will not represent any one university, but will promote post-secondary education and serve as a resource for all six campuses. The success of this position will depend heavily upon linkages and coordination with all campuses and often he/she will engage resources (e.g. staff, students) from the campuses to assist with information sessions, campus visits, etc.

While the position is located at the BOR office in Pierre, the majority of time is spent at high schools and in larger American Indian population centers such as reservations working directly with high school officials, high school students and their families. This person must be in communication with high schools and may even bring high school officials together for in-service education on assisting college-ready American Indian students.

Engagement of the campus-based American Indian student network will be critical as success will happen only if collaboration between the central position and campus professionals occurs.

Integration with staff of Gear Up and TRIO programming as well as with tribal college/university staff will be important to ensure this effort compliments and supplements existing efforts.

The central position’s responsibilities will be to assist high school students in preparing for college. This will include working with high school and tribal officials in identifying the college-bound American Indian students and assisting these students:

- Taking the ACT and getting scores submitted to appropriate campus(es);
- Applying to college(s);
- Completing the FAFSA;
- Identifying and applying for scholarships;
- Completing other applications such as housing, meal plan, summer orientation, etc.; and
- Linking to other campus-based student success programs such as summer bridge, TRIO, American Indian Centers/advising, special orientation programs, and other campus resources as appropriate.

**General Fund Request**

$75,332
1.0 FTE
Support for Commercialization Activities

Emerging Sources of Entrepreneurship, Talent and Economic Competitiveness

Nationally competitive, high performing research and teaching universities enable and support faculty to compete successfully for grants and contracts, to conduct successful grant-funded research, to engage successfully with private sector partners, and to move research-derived inventions to the market place. Fostering private sector engagement and moving research-derived inventions to the market place are two critical components to capitalizing on the economic development potential of our institutions. Across the country, university affiliated research parks are playing a critical role in accomplishing the foregoing.

Research parks and technology transfer offices are emerging as strong sources of entrepreneurship, talent and economic competitiveness for regions, states and nations. They have become a key element in providing the infrastructure necessary to support the growth of today’s knowledge-based economy. They connect researchers, students and companies to create an environment that fosters collaboration and innovation and promotes the development, transfer and commercialization of university-derived technology.

With strong support from their local communities and constituencies, South Dakota State University and the University of South Dakota have both established university affiliated research parks; SDSU, USD and SDSM&T have established technology transfer offices; and, the three have made commercializing university-derived technologies a priority at their respective institutions. While our institutions are making progress in advancing university-derived technologies into the marketplace, the personnel costs associated with providing the resources necessary to properly advance the same can place a severe strain on operations, hindering the rate at which our university research is advancing South Dakota’s economy. As such, $600,000 is requested to provide annual operational support of $300,000 to both the USD Discovery District and the Research Park at SDSU. The appropriation will be utilized to develop, operate and maintain the physical parks, market assets, and provide the support services necessary to effectively develop, nurture and advance early stage companies and technologies. This request is aligned with 2020 VISION: The South Dakota Science and Innovation Strategy (April 2013), advances the Board of Regents’ Research and Economic Development goals, and will serve to bolster research and commercialization capacity within the state. Additionally, the $600,000 in funding will be leveraged by a 1:1 match from local partners vested in advancing commercialization and economic development efforts in their respective regions.
Center for the Prevention of Child Maltreatment

Committed to the Safety of Children

Since 2014, the Jolene’s Law Task Force has studied the devastating impact of child sexual abuse in South Dakota. The Task Force’s work has included policy recommendations to improve the State’s recognition of, response to, and prevention of child maltreatment and sexual abuse through victim support, public and private collaboration, and the use of research and evidence based practice. This work has created an opportunity for South Dakota to emerge as a regional and national leader in the identification and prevention of this problem. The research is clear – prevention efforts are a successful strategy to stop the cycle of child abuse. With this context in mind, the University of South Dakota (USD) in partnership with the Jolene’s Law Task Force proposes a Center for the Prevention of Child Maltreatment. The Center aims to contribute to the State’s overall public health by playing a significant role in strengthening the State’s culture related to preventing and responding to child maltreatment.

Professional education in health and human services is critical in translating policy into practice. USD’s broad expertise in psychology, counseling, social work, public health, medicine, nursing, law, and education provides unparalleled opportunities to offer education related to the prevention of child maltreatment and sexual abuse. The USD Center for the Prevention of Child Maltreatment will coordinate education, outreach, and research initiatives that increase public awareness and prevention of child maltreatment and sexual abuse throughout the State. The Center will actively engage education partners (public and private universities, tribal colleges, and technical schools), state and tribal governments, and professional organizations in determining training needs. In addition, the Center will develop and deliver learning competencies and training programs appropriate for all levels – from students’ first learning about child maltreatment, to skills for counselors, teachers, and social workers who work with victims, to legal and health professionals who may require specialized training for licenses and certifications. Research within the Center will benefit the State by identifying the latest prevention and treatment techniques and providing data management and analysis assistance to state agencies. The Center for the Prevention of Child Maltreatment at the University of South Dakota will operate under the following broad guidelines:

1. Develop competencies, curricula, consistent training standards, and professional development opportunities for mandatory reporters of child maltreatment and sexual abuse in partnership with state, community, and academic organizations;
2. Facilitate the creation of community, state, and education partnerships to advocate against child maltreatment and sexual abuse;

3. Identify potential funding sources and develop inter-professional grant proposals for research and practice related to treating and preventing child maltreatment and sexual abuse;

4. Collaborate with state, regional, and national stakeholders, and provide leadership in developing research areas addressing child maltreatment and sexual abuse; and

5. Provide assistance/expertise to Board of Regents institutions on creating new degree programs related to child maltreatment and sexual abuse as well as revising/creating courses in fields requiring mandatory reporter training.

The proposed funding includes support for 1.0 FTE position to lead the Center and work with inter-professional teams at USD and across the state (12-month professor in social work and/or public health with a doctorate, expertise in child maltreatment issues, and strong research and grant experience). Two graduate assistants to perform data compilation, analysis and management assistance. Operating resources will support general supplies and materials

**General Fund Request**

$210,725

1.0 FTE
Small School Initiative

Investing in Student Success

BHSU, DSU, and NSU need additional resources to improve retention and student success. Investments in new priorities is a bigger challenge for smaller institutions. Below you will find a proposal from each school detailing how additional funds would be used to improve retention and advance student success.

Northern State University

Total Request - $170,514 and 1.0 FTE

Students come to NSU with a wide variety of needs and expectations. The ability of students to successfully complete their college education may depend on the university’s ability to not only provide quality instruction in the classroom but also on the university’s ability to provide the services to support and fulfill the students’ social and emotional needs.

The items below represent services that will provide NSU students with the resources and support they need in order to be successful.

Career Readiness

Strategic Priority 2 in NSU’s recently unveiled strategic plan is to “Prepare students for careers of today while equipping them for a changing future marketplace.” With the popularity of dual credit courses, an increasing number of students will enter college at a point where they will be making career choices much sooner that students did in the past. Providing students with an employment based opportunity in areas such as financial services, bio-technology, education and international programs will enhance their education and improve their career readiness.

NSU fills a vital role in teacher education in the State of South Dakota. Many schools have found it difficult to find qualified teachers in areas of critical need. These areas include elementary and secondary education, high school career and technical education, high school math and high school science. Students interested in these areas need to be incentivized to complete their student teaching experience in school districts lacking qualified educators in critical need subject areas. Incentives will make a student more likely to seek student teaching opportunities where they may not have previously considered. The goal would be to partner with school districts committed to mentoring student teachers in all aspects of the profession.
NSU is requesting $88,634 to be used to support workforce development by partnering with businesses and school districts interested in attracting graduates who are prepared for the rigors of the job as a result of quality classroom instruction combined with an employment-based experience. This individual would serve as a liaison between the campus and the business community to ensure that curricular changes are relevant to meet employer needs and student preparedness to meet the demands of a highly competitive, globally focused, rapidly changing workforce. Approximately $60,000 would be used to fund the salary and benefits for a Coordinator of Career Readiness. This individual would work with businesses and school districts to understand exactly what skills graduates need to possess in order to meet their needs. Partnerships would be established and students would be paid a stipend to be placed with each of the potential future employers. The request includes $24,000 for student stipends. The remaining $4,634 included in the request will be used to cover travel to school districts and businesses as well as basic office supplies.

**Summer Bridge Program**

The purpose of a summer bridge program is to bring students to campus four weeks prior to the start of the regular fall semester to begin the transition from home to college. The population served by the summer bridge is American Indian and low income students. During this program, students not only earn credit for coursework, but they also become acclimated to life on a college campus before the general student population arrives. They learn about studying, financial aid, the library, counseling and career development and much more. They connect with academic advisors and faculty as they begin to develop social relationships with their classmates. These activities help students build confidence and a sense of belonging. This helps students feel more secure as they cross the bridge from home to college.

Through a First in the World grant, NSU has been able to hire an individual to coordinate a summer bridge program which took place in the summer of 2015. The First in the World (Jump Start) funds will be available for three years. Private grant funds provide meals for the participants and cover the cost of the reduced tuition in 2015 while NSU will provide housing, residence life staff and programming. However, to sustain the program and provide the type of experience that will make an impact on our ability to retain and graduate this population of students, additional funds are needed. An important element of the Summer Bridge is to help students feel connected to the campus and the community year round. This request includes $15,000 to be used to employ Summer Bridge students throughout the summer months. NSU would partner with private businesses and governmental agencies to provide these students with meaningful, productive work experience. This request also includes funds that would be used to hold basic social events which are a key element in helping students connect with the campus and with one another. Providing students with opportunities to work and socialize will help them build confidence in their ability to successfully complete their education.

**Interpreter services**

In recent years, students’ needs for interpreters has increased. The South Dakota Department of Rehabilitation Services provides reimbursement for a portion of the cost of these services when provided to qualified students participating in their program. Although all students needing the services of an interpreter are encouraged to work with the Department of Rehabilitation Services, not all students qualify. NSU contracts with certified interpreters at the rates approved by the Department of Human Services. Funding is needed to assist with the shortfall between the costs incurred to provide interpreters and the reimbursement received through the Department of Human Services. NSU’s shortfall in FY15 was approximately $50,000 and for FY16 it is anticipated that the shortfall will be nearly $75,000.
Black Hills State University

Total Request - $225,057 and 3.0 FTE

BHSU is requesting $225,057 to fund three full-time positions to facilitate enrollment; to support recruitment-related activities; to serve as the essential transition bridge between recruiting and retaining unique student populations; to effectively communicate with and provide assistance and support to prospective, new and existing students with a seamless transition from inquiry to program of study to graduation and ultimately to a career.

American Indian Students

Over forty years ago, Black Hills State University was one of the first higher education institutions in the United States to recognize American Indian Studies as a unique discipline. Today, BHSU boasts the largest percentage (5%) of American Indian students in the South Dakota Board of Regents system. During the fall 2014 term, there were 243 American Indian students enrolled. BHSU provides a major and a minor in American Indian Studies and houses a Center for American Indian Studies. The Center provides a student-friendly foundation for a variety of activities including the recently-funded Jump Start Program, bridge program, academic advisement and student tutoring. Emerging initiatives include a Masters in American Indian Studies (currently under review in the Board of Regents office); a doctorate in American Indian Studies; and a collaborative agreement with Crazy Horse featuring a range of degree and non-degree options in the southern Black Hills.

Ready Adult/Transfer Students

For the last three years, the BHSU graduating class has been comprised of an average of 47% of students who transferred to BHSU to complete their degree. In addition, 32.5% of the BHSU student population is age 24 or older. These numbers reflect an important characteristic of the students at BHSU: adult learners who most likely are transfer students. These students require specialized services when transitioning to BHSU with transcript evaluation, financial aid needs and retention initiatives which are different from traditional aged students.

Career Counseling

The primary issue is to further develop resources that students need to help them determine what career(s) they wish to pursue and what majors will help them secure their goal. Helping students understand how the world of work is changing, setting career goals, and guiding them academically and personally to attain their goals will ensure they’re seeing the relevance of a college education as a key requirement for their success. Providing them with career related internships, co-op experiences and summer employment opportunities will assist our students in their career goals. It will also advance workforce development in South Dakota. An important feature of this initiative is that it provides an exciting forum for the University to engage executives from the public and private sectors to participate in campus activities. It will also provide faculty and staff with...
first-hand, relevant knowledge from high level executives and their organizational representatives that will make the career advising experience more relevant for our students.

**Dakota State University**

**Total Request - $138,455 and 2.0 FTE**

**Academic Advisors**

Currently, all academic advising at DSU is completed by faculty in addition to their instructional and research responsibilities. The two academic advisors requested will be dedicated to working with students on course registration, course change advising, creating academic plans, as well as career exploration and awareness. Using the Starfish early alert system, these two individuals will also work closely with students who may require academic intervention throughout the semester. The advisors will also provide on-going advising assistance/training for faculty who currently advise within colleges. This proactive approach to academic advising is expected to improve retention and student success.
Federal Authority Adjustment

Reduction of Federal Authority

Black Hills State University

Federal Authority .......................................................... ($2,000,000)

Black Hills State University is seeking to reduce excess federal authority. Therefore, requesting a decrease of their budget.
Other Authority Request

*Increase due to enrollment growth*

*University of South Dakota*

\[ \text{FTE} \quad 20.0 \]

The University of South Dakota is seeing growth in enrollment and is seeking state-support tuition supported FTE. Additional student fee supported FTE are requested to accommodate student success needs in sports medicine, strength and conditioning.
One-Time Funding
REED Network Equipment Replacement

Network upgrade

Network routing equipment acquired in 2008 for the Research Education and Economic Development (REED) network being managed by the Bureau of Information and Telecommunications (BIT) needs to be upgraded in order to continue receiving vendor maintenance and support. BOR has worked with BIT to determine the cost estimate for updating the REED network routers. There are 11 routers in the REED network. The total estimated cost for upgrading the routers is $1,254,600. Included in this estimate are spares kept in Pierre by BIT. BIT’s expectation is the BOR will fund the router upgrade and has made no provision for funding it. Per our discussions with BIT, we believe they would support this appropriation request.

REED Network History

In 2007, BOR institutions were connected to Internet2 through a single 155Mb connection through Northern Lights at the University of Minnesota. By 2007, our neighbor states and the national backbones had all adopted a 10 Gb standard for networking connections. In 2008, the REED network connected to the Great Plains Network in Kansas City at 2 x 10 GB. The connection to GPN was enabled through an agreement with University of Nebraska to share their fiber connection already in place to Kansas City. Recognizing the need for a redundant connection to the national backbone, the BOR was able to win an NSF grant in partnership with North Dakota to connect the states with a multiple 10G connection through Aberdeen to Fargo. The second connection for the REED network not only provided redundancy to the national backbones it also enabled us to update our agreements with our neighbor networks.

The REED network was created with multiple 5x10G capability for each connection in the backbone. Initial connections were done with 2x10G connections at each site. With 3 excess waves available we agreed to provide Nebraska with a backup 10G connection to the Northern Lights Gigapop at the University of Minnesota. At the same time, we were able to make an agreement with the Northern Lights Gigapop to provide a backup connection to the Great Plains Network in Kansas City using the same 10 Gb backup connection we were providing to Nebraska.

The REED network has provided us a robust network that allows us to collaborate with researchers in other states as well as within South Dakota. The network has addressed concerns about the ability to move data at high speeds and provides us with a redundant stable network environment for both I1 and I2 traffic. Having REED helped win initial support for DUSEL from both the NSF and the DOE. In addition, it has helped win grants from NSF both for researchers and the ND-SD network connection.

Future of REED

The cycle described above is beginning to repeat. All of our neighbor networks have either upgraded to a 100 Gb standard in their backbones or are in the process of upgrading. Both the Great Plains Network and the Northern Lights Gigapop have upgraded their connections to Internet2 to 100 Gb. In order to continue enjoying the benefits of an advanced network we need to discuss and plan for a 100 Gb backbone upgrade to the REED network.

General Fund Request

$1,254,600
Research Equipment Funding

Growing the Research agenda

The goal is to provide one-time funding to assist the campuses in making critical research equipment purchases that will be used to facilitate research and development activities in the five industry sectors established in the 2020 Vision.

The 2020 Vision: The South Dakota Science and Innovation Strategy was developed in 2013 by the South Dakota REACH committee to guide state research initiatives and emphasizes making strategic investments in research and development activities that can best stimulate economic development across five critical industry sectors. To establish these five sectors, federal data sources were used to establish projections for industry sectors with the highest potential growth rates through 2020. From this analysis, five key industry clusters were identified that are expected to produce the highest potential economic development for South Dakota over the next seven years. These five industry sectors include:

- **Value Added Agriculture and Agribusiness:** Crop production and/or farm management with significant ties to each of the four other industry sectors.

- **Energy and Environment:** Renewable (solar, wind power, geothermal, biofuels) and non-renewable energy production (coal, and future oil and gas production).

- **Materials and Advanced Manufacturing:** Advanced material development in the area of healthcare and firearms, as well as manufacturing to leverage expansion in renewable and non-renewable energy.

- **Human Health and Nutrition:** Bioscience and biotech firms and the healthcare industry extending ties into pharmaceutical and medical device/instrument manufacturing.

- **Information Technology/Cyber-Security/Information Assurance:** Security needs of the banking industry and protection of electronic medical records within human health.

Research is a vital component of higher education in South Dakota and of universities nationwide. Nationally competitive research and teaching universities have the capacity to enable and sustain faculty members’ abilities to compete successfully for grants and contracts, to conduct successful grant-funded research, to engage private sector partners and to move research-derived inventions to the marketplace.

One-time funding of $2,000,000 is being requested to purchase equipment to facilitate research and development activities in the five industry sectors established in the 2020 Vision. Appendix A contains examples of the type of equipment sought; however, the actual equipment purchases will be vetted and approved by a seven member committee comprised of representatives from the Legislature, Board of Regents, GOED and the State EPSCoR Office.

Additional detail can be found in the Appendix.
Industry Sponsored Research Fund

*Growing collaborative ventures in research*

The 2020 Vision Strategy is, at its core, a collaborative venture between the state, public, and private sectors to build the capacity to produce and grow new ideas, talent and the companies that will power South Dakota’s future innovation-rich, higher value economy. Intertwined throughout the 2020 Vision Strategy is the importance of establishing industry partnerships with our colleges and universities. Synergistic industry partnerships are an integral component in our effort to stimulate applied/translation research, create sustainable research centers, enhance commercialization and ultimately create jobs and grow our state’s economy. Additionally, in an increasingly tight federal grant environment, many agencies are placing a greater emphasis on state/institutional capacity for fostering industry partnerships.

While our institutions are making progress in the area of industry partnership, we continue to lag significantly behind our counterparts with respect to business-performed research and development (R&D) as a percentage of private-industry output. This indicator represents the role of R&D in a state’s business activity. A high value for this indicator indicates that the businesses within a state are making large investments in their R&D activities. South Dakota ranked 46th in the nation in 2011 (most recent year available), with Wyoming, Alaska, Louisiana and Mississippi comprising the remainder of the bottom five.

A $1,000,000 allocation to an Industry Sponsored Research Fund is being requested. The parameters of the fund would remain flexible to meet the needs of industry, which includes both for-profit and non-profit entities; however, a key requirement would be a 1:1 cash match from industry to partner with Regental institutions to engage in meeting their research and development needs. A review committee would be established to review proposals and make recommendations to the executive director of the Board of Regents. The executive director would make the decision on project funding.

**Top 3 Benefits**

- Leverages the State’s investment with industry contributions,
- Allows industry to drive the research agenda, increasing the probability of commercialization and job creation; and
- Those who help write will also underwrite. Including industry at the onset enhances the likelihood of sustaining the research beyond the term of the State’s initial investment.

**General Fund Request**

$1,000,000
Capital Project Matching Fund

Investing in infrastructure

Finding the funds to support capital facility remodels, renovations, or new facilities is always a challenge. Historically, remodels, renovations, or new facilities are funded by the students through HEFF, federal funds, or private fundraising. The dollars become even more limited when the projects are not traditional academic facilities. The recent support from the State for the Swine Unit is an example of a project that advances state priorities and has an educational component.

Being able to tell donors or industry partners that the State is supporting a facility and is willing to fund a portion of it goes a long way.

South Dakota’s higher education institutions will play a critical role in the production of the talent that will be responsive to target industry sectors growth and prosperity in the years to come. For South Dakota postgraduate education to fulfill its role, it must have the capacity to produce graduates with the skill sets and knowledge targets the industry sector employers need and value. An integral component of creating that capacity is physical infrastructure. Strategic investments in higher education’s physical infrastructure will aid in producing the talent necessary for South Dakota to compete in the modern economy.

This request is for a $10M matching fund for capital projects. The money would be used as a match to private fundraising to support capital facilities remodels, renovations, or new facilities that would support state priorities. Those state priorities might include STEM discipline facilities, facilities to support agricultural or animal industries, or research facilities to support developing SD industries. The money would be matched 4 to 1 with private dollars and the proposed projects will be vetted by a committee made up of legislators, regents and GOED.
Appendix
# Research Equipment Funding

## Examples of Potential Equipment Purchases

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
<th>Campus</th>
<th>Other Universities/Companies</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-RAY Photoelectron Spectrometer</td>
<td>$680,000</td>
<td>SDSMT</td>
<td>USD, SDSU, BHSU, NDU, NDSU; Aspen Aerogels; FMC Corporation; Giner Inc.; SAFT Corporation; Paperbattery Co.; Innovative Materials and Processes, LLC</td>
<td>This unique surface-sensitive quantitative spectroscopic technique measures elemental composition, empirical formula, chemical state, work function, electronic states and even hybridization of the elements. X-Ray Photoelectron Spectroscopy (XPS) is not available in South or North Dakota. Furthermore, acquisition of Versa Probe II will enhance STEM education (in at least 12 courses at 6 universities; &gt;200 students/year). In FY14 SDM&amp;T submitted the multi-university (USD, SDSU, BHSU, NDU and NDSU) and multi-PIs proposal to NSF-MRI - status: not funded.</td>
</tr>
<tr>
<td>Fluorescence Cell Sorter</td>
<td>$525,000</td>
<td>SDSU</td>
<td>USD, SDSMT, BioSNTR members and several companies</td>
<td>Flow cytometric cell sorting is an essential capability for biotechnology research, such as physiology, protein engineering, and genetic engineering. Having access to a cell sorter will be essential for the BioSNTR collaboration.</td>
</tr>
<tr>
<td>Pilot-scale Bioreactor System</td>
<td>$170,000</td>
<td>SDSU</td>
<td>Biology/Microbiology, Companies: Prairie AquaTech, CyanoSun, MedGene</td>
<td>Used for small scale fermentation production systems. Will be used for biofuels, food safety, and vaccine R&amp;D.</td>
</tr>
<tr>
<td>Genomic Data Analysis System</td>
<td>$100,000</td>
<td>SDSU</td>
<td>Vet/Biomedical Sciences, Biology/Microbiology, Animal Science, BioSNTR members, Pharmaceutical Sciences. Companies: Medgene, Tranzderm</td>
<td>The need for genomic and proteomic analysis is becoming fundamental for biological research programs.</td>
</tr>
<tr>
<td>High Performance Liquid Chromatography</td>
<td>$100,000</td>
<td>USD</td>
<td>BioSNTR, cGMP, Industrial Partner Projects</td>
<td>HPLC will be used to analyze pharmaceutical products and medical devices manufactured by companies and researchers using USDs Good Manufacturing Practices lab</td>
</tr>
<tr>
<td>Gel Permeation Chromatography (GPC)</td>
<td>$40,000</td>
<td>USD</td>
<td>BioSNTR</td>
<td>GPC will be used to study biodegradation of plastics used as carriers for drug delivery. This information will be used to develop next generation drug eluting stents and other drug eluting medical devices.</td>
</tr>
<tr>
<td>Atomic Force Microscope (AFM)</td>
<td>$80,000</td>
<td>USD</td>
<td>NSF and SPACT</td>
<td>A modern AFM will allow researchers in Materials Chemistry to measure surface structures and film thicknesses as small as a few millionths of an inch. This capability is critical in all nanomaterials research.</td>
</tr>
<tr>
<td>Forensic Research Laboratory</td>
<td>$22,500</td>
<td>DSU</td>
<td>Industrial Partner Projects</td>
<td>Develop applied research on mobile equipment, perform preliminary analysis to support future NSF grants, and enhance undergraduate and graduate computer forensic courses</td>
</tr>
<tr>
<td>Analytics Cyber-infrastructure Equipment: 5 multi-node mid-level servers, VMware software, storage, and networking equipment</td>
<td>$80,000</td>
<td>DSU</td>
<td>Industrial Partner Projects</td>
<td>Augment capacity of DSU’s Big Data Analytics cluster to better meet the research in this area and facilitate collaboration opportunities with industry partners.</td>
</tr>
</tbody>
</table>
## Research Equipment Funding

### Examples of Potential Equipment Purchases

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
<th>Campus</th>
<th>Other Universities/Companies</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNT CVD growth system</td>
<td>$70,000</td>
<td>NSU</td>
<td>Black Hills State, South Dakota State University, Dakota State University, University of South Dakota, and South Dakota School of Mines and Technology, Poet and Glacial Lakes Energy, 3M Aberdeen, IKOR Inc, and other BioSNTR members.</td>
<td>Carbon Nanotubes (CNT) are a new form of carbon potentially useful for many different nanotechnologies, from materials to electrical circuits. Research into the production and properties of this material is ongoing worldwide. The proposed new Chemical Vapor Deposition (CVD) system will be used to grow and investigate properties of CNT upon various substrate samples (e.g., silicon wafers), using various CVD methods. The system consists of a tube furnace, a supply of appropriate gases used in CVD (e.g. CO, H2, CH4), a gas-handling/delivery system, and sample preparation facilities and supplies. This system will be used for both research by faculty members, and as a lab apparatus used by students for carrying out laboratory exercises in advanced chemistry courses (e.g. physical chemistry, inorganic chemistry, and analytical chemistry).</td>
</tr>
<tr>
<td>Optical wafer inspection microscope with 400X magnification</td>
<td>$10,000</td>
<td>NSU</td>
<td>Black Hills State, South Dakota State University, Dakota State University, University of South Dakota, and South Dakota School of Mines and Technology, Poet and Glacial Lakes Energy, 3M Aberdeen, IKOR Inc, and other BioSNTR members.</td>
<td>This instrument will allow detailed optical inspection and characterization of CNT grown on opaque substrates such as silicon wafers, to a degree not available on the biological microscopes currently available in the NSU College of Arts and Sciences.</td>
</tr>
<tr>
<td>Large-bore tube furnace</td>
<td>$10,000</td>
<td>NSU</td>
<td>Black Hills State, South Dakota State University, Dakota State University, University of South Dakota, and South Dakota School of Mines and Technology, Poet and Glacial Lakes Energy, 3M Aberdeen, IKOR Inc, and other BioSNTR members.</td>
<td>A large-bore tube furnace will allow the preparation of larger-sized nanotube samples, e.g. full silicon wafers covered with CNT. This furnace will be used in conjunction with the CNT CVD growth system described above.</td>
</tr>
<tr>
<td>Potentiostat</td>
<td>$25,000</td>
<td>NSU</td>
<td>Black Hills State, South Dakota State University, Dakota State University, University of South Dakota, and South Dakota School of Mines and Technology, Poet and Glacial Lakes Energy, 3M Aberdeen, IKOR Inc, and other BioSNTR members.</td>
<td>A potentiostat will allow a wide variety of wet chemistry and electrochemistry investigations. This instrument will be used by students as a lab apparatus for carrying out laboratory exercises in advanced courses in analytical chemistry and inorganic chemistry. The instrument will also be used by faculty members for research, especially investigations related to incorporation of CNT into electronic devices.</td>
</tr>
<tr>
<td>Low-Background Gamma-Ray Spectroscopy System</td>
<td>$200,000</td>
<td>BHSU</td>
<td>Sanford Lab, Major Physics Collaborations at Sanford Lab</td>
<td>The gamma-ray spectroscopy system will be housed in the BHSU Underground Campus. It will be utilized by faculty, grad students and undergrad students to characterize the impurity levels in detector components for the major physics collaborations at Sanford Lab. It can be also used by geologists wishing to characterize the radioactivity levels and has potential applications within Homeland Security, the National Nuclear Security Administration and the Department of Defense.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,112,500</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

### Glossary:

- **SPACT**: Security Printing and Anti-Counterfeiting Technology
- **NSF**: National Science Foundation
- **NIH**: National Institutes of Health