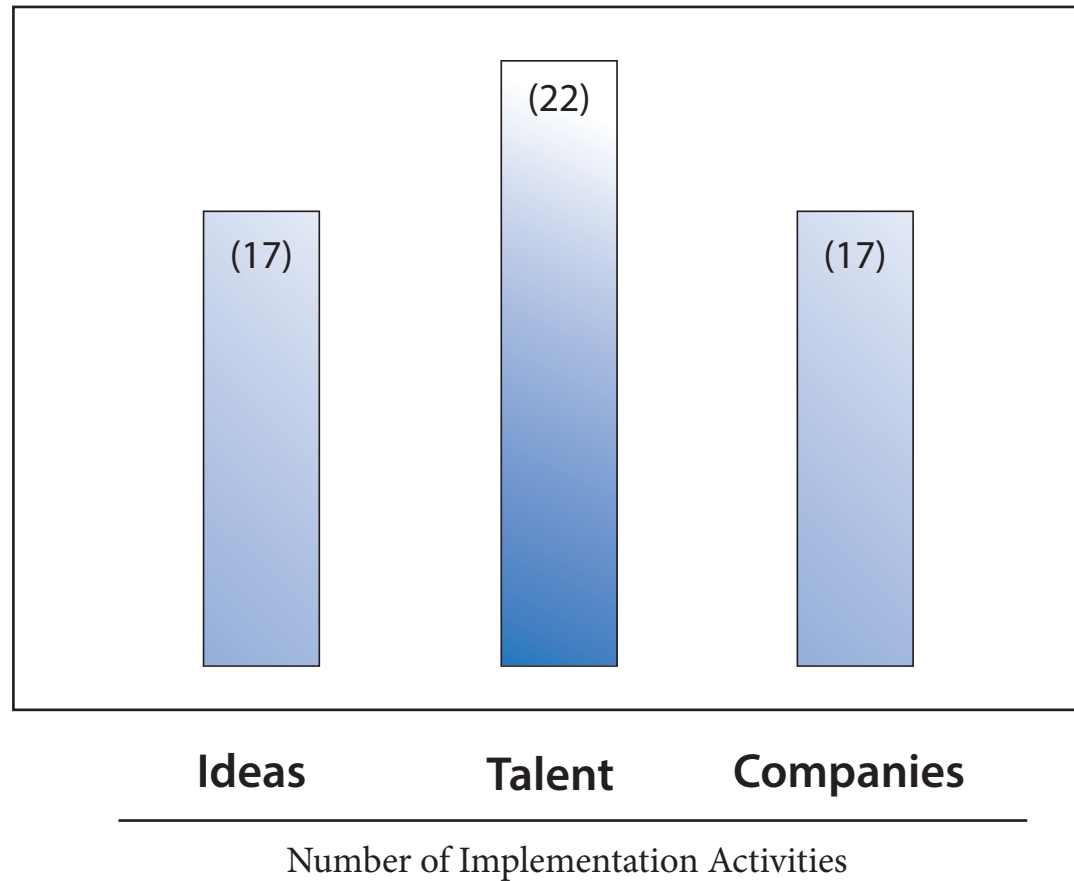


Implementation Activity

June 2014 - December 2014



2020 Vision: The South Dakota Science and Innovation Strategy

2020 Vision Management – Strategy Areas

<u>Initiative</u>	<u>Action</u>	<u>Responsibility</u>	<u>Outcome</u>
Strategic Area: Ideas			
Industry Partnering Functions within South Dakota Colleges and Universities	Implementation of BioSNTR Industry Seed Grants, which provide up to \$200,000 in total funding to seed collaborative research between Industry and faculty participating in BioSNTR.	SD EPSCoR GOED Board of Regents	Bolster Industry collaboration and involvement in BioSNTR through the provision of funding to address areas of Industry interest.
Industry Partnering Functions within South Dakota Colleges and Universities	Formation of Sanford Health – SDSU Human Nutrition and Wellness Collaboration. BOR provided a FY15 R&D Innovation Grant in the amount of \$170,000 to support the collaboration.	SDSU Board of Regents	Link Sanford Health and SDSU through ongoing collaborative R&D to advance the Human Health and Nutrition sector in SD.
Industry Partnering Functions within South Dakota Colleges and Universities	BOR advanced a one-time funding request for \$1,000,000 to start an Industry Sponsored Research Fund, which would provide matching funding for Industry Sponsored R&D.	Board of Regents in conjunction with Regental Institutions	The Governor did not include the one-time request for \$1,000,000 in his budget recommendation to the legislature. BOR will continue to pursue opportunities to expand and enhance collaborative R&D with Industry.
Strategic Investment in Research Areas and Assets Aligned with Target Industry Sectors.	BOR advanced a one-time funding request for \$3,049,500 to purchase research equipment to be utilized to further R&D in the five industry sectors identified in the 2020 Vision	Board of Regents in conjunction with Regental Institutions	The Governor did not include the one-time request for \$3,049,500 in his budget recommendation to the legislature. BOR will continue to pursue opportunities to expand its research infrastructure and facilitate R&D in the five industry sectors identified in the 2020 Vision.

<p>Development of STEM education facilities to support training of teachers in STEM disciplines and engagement of K-12 students in STEM topics.</p>	<p>Renovate the Jonas Science Hall at Black Hills State University (BHSU) to support the training of teachers in STEM disciplines.</p>	<p>BHSU and South Dakota Science and Technology Authority (SDSTA)</p>	<p>Unique facility to prepare K-12 educators. Increased teacher readiness and proficiency in teaching STEM. BHSU Jonas Science Hall facility designs completed April 2014. First of the three construction phases is completed. Second phase is underway. All three will be complete by November 2015.</p>
<p>Development of STEM education facilities to support training of teachers in STEM disciplines and engagement of K-12 students in STEM topics.</p>	<p>Construct a new Sanford Lab Homestake Visitor Center in Lead, SD to feature the science of the Sanford Lab to engage all age levels in STEM topics.</p>	<p>Lead Area Chamber of Commerce / Homestake Visitor Center, South Dakota Science and Technology Authority (SDSTA), and Black Hills State University</p>	<p>Facility to engage general public including K-12 students in STEM topics. Generate excitement for STEM in general public including K-12. Facility designs completed in June 2014. Facility construction started July 2014 with a June 2015 completion.</p>
<p>Development of a BHSU multidisciplinary science facility deep underground at the Sanford Lab.</p>	<p>Supporting Black Hills State University (BHSU) proposal to SD Board of Regents (SDBoR) for a new cleanroom facility to be hosted on the 4850L of the Sanford Lab. South Dakota Science and Technology Authority (SDSTA) committed \$500K to prepare underground space to host the cleanroom.</p>	<p>BHSU and SDSTA</p>	<p>Expansion of science facility capacity deep underground to support multidisciplinary research for SD universities. Facility will lead to additional opportunities for undergraduate and graduate STEM research. SDSTA commenced rehabilitation of underground laboratory space in spring 2014 and it will complete in Feb 2015. Facility outfitting designs are completed and facility outfitting construction will start in February 2015 and be complete in June 2015. Experiment installation will occur</p>

			in the second half of 2015.
Building SD state-wide database	Expand successful launch of the database system among informal STEM programs statewide and increase critical data points to track students into postsecondary education.	SDBOR SD EPSCoR	Current efforts include expanding the database network with 2016 data pulls to authenticate validity of the program. To date every entity using the system reports a minimum of 50% less work load and 400% increase in event efficiency.
Building SD state-wide website of informal STEM programs and activities	To develop a website (page) that allows individuals to review informal STEM educational opportunities across the state.	SDBOR SD EPSCoR	In progress. With new funding, new partners, and institutional turnover this system is expected to be up and running by mid-year.
Expand Diversity Consortium efforts	Selectively increase industry participation and manage academic involvement.	SDBOR SD EPSCoR	Ongoing. The SDBOR Director of STEM Partnerships assuming 50% effort with the SD DOE College Access Grant program allows further expansion of this effort.
Governor's Research Centers	FY 2015 funding	GOED	Two centers funded in FY 2015 and Sustainability Plan requested for BioSNTR
Proof of Concept	Funding of projects	GOED	13 applications received 7 research projects funded 7 patent applications funded
Children's Health	National recruitment of leading researchers in the area of developmental biology and genetics of children's disease.	Sanford Health	Receipt of a number of extramural grants including several from NIH
Type 1 Diabetes	Establishment of a local and national clinical trials infrastructure	Sanford Health	Completion of a phase II clinical trial in type 1 diabetes. Planning of future trials.
Rare Diseases/Genetics	Establishment of a web interface for registry of patients with rare diseases	Sanford Health	Organizations that represent patient groups at the national level are participants in this

			registry.
Breast Cancer	<p>---Participant and developer of a national risk assessment tool for breast cancer.</p> <p>---Establishment of the only CLIA certified lab (mandated by FDA for application of actionable treatment for patients) in the Dakota's that can use genomic information for disease diagnosis.</p> <p>---Development of clinical trials infrastructure that using genomics in conjunction with CLIA validation for therapeutics.</p>	Sanford Health	<p>---Roll out of risk assessment tool. Incorporation of genetic component to this tool under development.</p> <p>---Quicker diagnostics and application of genomic information for patients. Adds a research component to understanding breast cancer.</p> <p>---Additional clinical trials now in planning.</p>
Imagenetics	Development of personalized pharmacogenetic testing	Sanford Health	Clinical testing of patients to maximize drug dosing
Strategic Area: Talent			
Incentives to Encourage Students to Pursue STEM Degrees and Rewards to Institutions for Producing Graduates in High Need Areas	Develop Student Technology Fellow pilot program for the summer of 2015 to focus on data analytics with respect to research.	Board of Regents in conjunction with Regental Institutions SD EPSCoR	Address an area of increased demand in the workforce by providing professional development to up to 10 Student Technology Fellows in the area of data analytics.
On-campus Policies, Training & Systems to Facilitate Entrepreneurship, Commercialization and Intellectual Property Development	Implement BOR Strategic Plan to further technology transfer and commercialization on our campuses and promote investments in research areas supporting the target sectors identified in the 2020 Vision.	Board of Regents in conjunction with Regental Institutions	The Board of Regents Strategic Plan, which was approved at their October meeting, calls for an increase in annual grant and contract expenditures from \$97M to \$150M by 2020, an increase in license agreements from 15 to 25 annually by 2020, and an increase in license agreement with start-up companies from 8 to 15 annually by 2020.

On-campus Policies, Training & Systems to Facilitate Entrepreneurship, Commercialization & Intellectual Property Development	Host technology transfer workshops at USD, SDSU and SDSMT.	Board of Regents in conjunction with SDSU, USD and SDSMT	Engage and educate faculty on campus to promote and facilitate a culture which fosters entrepreneurial and commercialization activities.
Promote STEM Study at all Education Levels	Develop Information Technology dual credit program.	Board of Regents South Dakota Department of Education	Increase IT interest and preparation at the high school level through the delivery of Computer Science 105 and 150 coursework for school districts in the state. Goal is to create a pipeline for IT certificate and degree programs.
Position and Expand Master's Degree Programs to Produce Talent for the Target Sector Industries	Develop MS in Industrial Engineering (SDSMT)	Board of Regents SDSMT	The proposed MS in Industrial Engineering (SDSMT) is under review by the Board of Regents.
Incentives to Encourage Students to Pursue STEM Degrees and Rewards to Institutions for Producing Graduates in High Need Areas	Implement BOR Strategic Plan, which in-part, advocates for increased funding for SD Opportunity Scholarship and increased STEM graduates	Board of Regents in conjunction with Regental Institutions	The Board of Regents Strategic Plan, which was approved at their October meeting, seeks to increase the number of annual STEM graduates from 1,630 to 1,950 by 2020 and bolster funding for SD Opportunity Scholarship program. Governor's budget recommendation includes an increase in funding for SD Opportunity Scholarship to return value to 20% of 4-year tuition cost (\$6,500). Roughly one in three recipients pursue STEM degree programs.
SD Robotics	Assist the SDRA in restructuring their association to build participation, program quality, and sustainability	SDBOR SDRA and Board	In progress. FY 2014/2015 has been a year of transition. The former SD Robotics Association and board members are in transition to be housed under SD EPSCoR affiliate institution Augustana College. The west

			river coordinator relocated to Florida. There is opportunity to expand FIRST Robotics with SDSU in 2015 and provide training to schools.
Expand research opportunities for students in tribal communities	Assist in the redevelopment of the Timber Lake Regional Science Fair that serves the Cheyenne Eagle Butte Reservation and Standing Rock Reservation communities.	SDBOR SD EPSCoR Timber Lake School District Cheyenne Eagle Butte Tribal Community	Expanding West River science fairs to provide more opportunities for tribal and rural schools has been discussed and opportunities to expand are being considered for 2016 allowing the local school districts to include costs for hosting a fair in their budgets. This effort also provides for workshops for teachers, parents, and students to help students design relevant research projects
Expand research opportunities for students in Tribal communities	Assist in the re-development of the Timber Lake Regional Science Fair that serves the Cheyenne Eagle Butte Reservation and Standing Rock Reservation communities.	SDBOR SD EPSCoR Timber Lake School District Cheyenne Eagle Butte Tribal Community	While this effort has been underscored by its president and East River coordinator transitions in the workforce this past year there has been a slight increase in membership. 2015 focus will be on membership enrollments, tribal college activities, and industry collaboration.
IT Academy	Outreach	GOED, Bright Planet, Falls Foundry, EMPE	Series of IT/computer science outreach activities designed to generate student/parent interest in IT careers and develop basic programming skills are scheduled for spring 2015.
IT Academy	Outreach	GOED, USD	Outreach activities to all campuses, press release, and emails to all BOR students to inform students about IT academy opportunity. GOED also recruited

			<p>business partners for internship and employment opportunities.</p> <p>18 participants in CSC 180 introductory course for IT Academy and 21 applications for summer program.</p>
Build Dakota	Tech Scholarships	GOED-Dept. of Ed	Governor committed \$25 million to match \$25 million Denny Sanford donation to fund scholarships for high demand technical school programs. 300 scholarships projected annually over the next 5 years.
Dakota Seeds	Outreach	GOED & Dept. of Ed	Outreach to k-12 schools guidance counselors to promote Dakota Seeds program of high school students, IT/Analytics program and Build Dakota Scholarships
Workforce Development	Grants	GOED	GOED provided \$1 million to match community investments in workforce development efforts. RFP process with awards made to 14 South Dakota communities.
NSF TCUP, NSF PEEC, NSF EPSCOR RII T1, USDA NIFA Tribal Research program, NSF RIG, NIH BRIN, NSF EPSCoR Biofuels, NASA EPSCoR Wireless	Adopted a constructivist pedagogy in Math, Science, and Technology (MST) Department for BS degrees in Natural Science and AA degrees in Life Sciences and Pre-engineering.	OLC Math, Science, and Technology Department	<p>Retention rate has risen from 20% to 60%; quadrupled its number of annual graduates (2 to 8), and placed 96% of its students in jobs on the reservation or in grad school (2014 data).</p> <p>2014 1. Program-level outcomes assessment in progress</p>
NSF TCUP Phase III	Using LiDAR to monitor Missouri River Bank erosion	One OLC full-time staff Two OLC research students	LiDAR data assists the tribe in evaluating the effectiveness of the current mitigation measures

			<p>used to control erosion and helps the USGS demonstrate other strategies to delay or stop the erosion in the future.</p> <p>2014</p> <ol style="list-style-type: none"> 1. Pilot project with CU Boulder Archeology planned for summer. 2. Use of 3D animation software being tested for use in digital LiDAR mapping and recreation of cave systems at Wind Cave National Park.
NSF TCUPS/PEEC	Collaborative project-based service learning/research to determine if culvert under the road to the planned community will sustain a 100-year flood.	One full-time staff Two OLC research students	Research is in process.
NSF EPSCoR	Partnership with owner and CEO of Vita Royal Products Inc. to determine toxic heavy metals concentrations and organic uranium complexes in mining effluent and local drinking water supplies	One full-time staff One OLC research student Recruiting SDSU faculty and laboratories in progress	Proposal in hand Potential funding identified
Company sponsored internships	Participation in Dakota Seeds and internships for high school students.	SAB Biotherapeutics	Developing necessary documents for internship offers.
Graduate Student development in partnership with USD and SDSU	Development of "Cancer" and "Translational Research" tracks in the BBS PhD program at USD. Participant in PhD in Biochemistry with SDSU	Sanford Health, USD, SDSU	Greater training opportunities at the graduate level
SPUR (and NSF-REU) undergraduate research program	Developed 10 week undergraduate research	Sanford Health, Augustana College	Obtained an NSF REU grant for training undergraduates in

	experience in Biomedical Science in partnership with Augustana College		cellular and molecular biology. This one of only about 30 programs in the USA. Increases talent pool for graduate programs.
PROMISE program	Lab experiences for middle and high schoolers. ---10 week research scholarships for high schoolers ---one day career fairs in science for high schoolers ---STEM partnerships	Sanford Health	Development of a greater pool of future undergraduate and graduate students. ---greater awareness in the community of research and why it is important.
Strategic Area: Companies			
Increase awareness and build industry collaboration of STEM programs in communities throughout South Dakota.	Utilizing database and Partnership activities help provide awareness of STEM programs within industries geographical area and in statewide initiatives.	SDBOR	With the availability of the SD EPSCoR database greater outreach to industry has been available for 2015. The pilot site reported in 2014 that they had a 10% increase in industry participation with 70% less effort by using the database.
Support industry with training to maximize their return in STEM efforts including internships and research collaboration with students.	Design a guide and provide workshops that assist industry in maximizing collaboration with students through internships and research opportunities that give value to the student as well.	SDBOR SDEPSCoR SD Gov. Office of Economic Development	Ongoing. Industry guide expected to be completed with workshop activities beginning in mid-2015
Entrepreneurs in Residence	Implementation	GOED-SDSM&T-USD	SDSM&T hosted 15 entrepreneurs in residence for two days in October to tour Governor's Research Centers and identify product-business opportunities. Calx Aqua received a \$500,000 investment, Mat Peabody is the EIR & CEO.

			<p>Craig Arnold EIR & CEO of Nanofiber Separations has several collaborations in the aerospace and medical applications.</p> <p>SBA FAST Proposal supporting EIR was not funded by SBA.</p> <p>USD has established an EIR program with two entrepreneurs in Residence.</p>
Technology Business Accelerator	Award	SD Tech. Bus. Center-GOED	The South Dakota Technology Business Center received a \$50,000 SBA award to enhance the business accelerator program.
NTEC2	Panel Presentation	GOED	<p>South Dakota was one of three states selected to present at the NTEC2 Global 1000 conference. The Technology Business Accelerator, Entrepreneur in Residence and Proof of Concept programs along with 11 participating companies were presented by the SD Panel at the NCET2 Global 1000 conference in San Jose, CA on Oct. 1, 2014. Joseph Wright, SDSM&T (Entrepreneur in Residence), Pam Boehm, (Technology Business Accelerator), Mel Ustad (GOED-Proof of Concept) and Mark Luecke (SD Innovation Partners) were the panelists. The companies presented have had numerous follow-up communications with large companies and investors</p>

			attending the conference.
Biotech Summit	Outreach	SD Bio & GOED	The BioSNTR and how biotech companies can interact with the Center was the focus of the 2015 Biotech Summit. Adam Hoppe, Dan Engebretson and Mel Ustad presented on the BioSNTR and EPSCoR project followed by round table discussions on topics related to BioSNTR and EPSCoR.
SAB Biotherapeutics	Investment	GOED	GOED and the Sioux Falls Development Foundation make a \$3 million investment into SAB Biotherapeutics as part of a \$12 million equity raise.
Livestock Biotech Conference	Outreach	GOED-SD Bio Assoc.	South Dakota hosted the 2014 international livestock biotechnology conference in October. The Bio Association selected Sioux Falls for the conference that brought people from throughout the US and world.
USD Research Park	Research Infrastructure	GOED, USD, Sioux Falls	GOED and USD conducted a feasibility study on development of a shared use GMP facility in the USD Research Park. The study is scheduled to be completed in January 2015.
International Biotech Conference	Outreach	GOED	Governor Dugaard participated along with two other governors on a panel highlighting state biotechnology initiatives in June 2014 in San Diego. BioSNTR and NSF EPSCoR highlighted.
Created private company for development of products from Tc bovine technology.	SAB Biotherapeutics, Inc created from Sanford Applied Biosciences to	BioDak LLC Sanford Health	Completed July 1, 2014

	further develop products from Tc Bovine.		
Private Equity Raise	Series A private equity raise initiated	SAB Biotherapeutics	Continuing
cGMP Manufacturing Facility	Completed build and set up of Phase 1 cGMP plasma fractionation manufacturing capability at Sanford Center.	SAB Biotherapeutics Sanford Health	Successfully completed first lot of cGMP product for Phase 1 clinical material for MERS CoV indication including plasma fractionation and final fill finish with completion of batch records, quality control and quality assurance.
Provide teachers in K-12 STEM education an opportunity to tour industry and use information gathered in classroom	3 high school teachers toured and interviewed 6 biotech companies. Video was taken to show use as support in the classroom.	SD Biotech EPSCoR	Twelve videos produced are accessible on SD Biotech's website and Sanford PROMISE's website for any educator to use. Plans are to continue these tours as the money is available.
Sanford Applied Biosciences	Continued development of transchromosomal bovine for production of human antibodies ---development of commercial opportunities for therapeutic and reagent development with federal government, universities and pharmaceutical companies. ---intellectual property development. ---applied research and development	Sanford Health	Major collaborations with Naval Medical Research, US Army Research, Harvard Medical School, Bristol Meyers Squibb, Kyowa Hakko Kirin ---development of human antibody therapeutic candidates for infectious disease, cancer, autoimmunity and inflammation ---direct development of antibodies for influenza (pandemic and seasonal), dengue, filoviruses, alphaviruses, HantavirusMERS CoV, human cancer antigens and others ---funding from business contracts as well as Department of Defense
Exemplar Genetics	Academic collaborator	Sanford Health	Phase I SBIR grant progressed to Phase II Another Phase I SBIR being

			prepared for progression to Phase II
Eutubics	Academic collaborator	Sanford Health	Phase I SBIR received

Submission by:	Color Code
Turman/Lukkes - SDBOR	Blue
Lebrun/Headley - SDSTA	Rust
Eddie Sullivan – SAB Bio	Green
Hannan LaGarry – OLC	Purple
Mel Ustad - GOED	Red
Phillip Huebner – BOR STEM	Gray