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Development of a STEM Collaboration Center to Maximize Efficiency and

Improve STEM Achievement for Hispanic, Low-Income and High-Need Students

INTRODUCTION

The University of New Mexico (UNM) proposes to develop a Science, Technology, Engineering

and Mathematics (STEM) Collaboration Center to implement strategies addressing the following

goals: 1) Improve STEM degree attainment for Hispanic, low-income and/or high-need students

by creating collaborative student support programs designed for first- and second-year students,

and 2) Improve STEM institutional efficiency by creating a University-wide infrastructure

designed to reduce duplication of services, monitor and achieve STEM goals, and develop shared

collaboration and accountability tools. The proposed STEM Collaboration Center (STCC)

establishes a large-university model for STEM student achievement promoting increased

collaboration between departments, improved STEM graduation rates, and improved STEM

achievement for students traditionally underrepresented in STEM fields. A STEM Collaboration

Center will expand the capacity for UNM faculty, students, and staff to share their findings and

best practices with others within the University, throughout the state and nationwide.

The STCC model involves strong collaboration from primary and secondary partners.

Primary partners are defined as UNM departments or administrative units that have agreed to

share in the leadership, design and implementation of specific strategies. Primary partners will

work with STCC and the Provost to institutionalize strategies upon completion of this grant, and

will assume oversight of the assigned strategy at that time. Secondary partners are defined as

UNM departments, UNM administrative units, regional community organizations or STEM

industry leaders who will provide additional involvement in the implementation of strategies.

This partner-based model will allow UNM to develop STEM programming that is: inclusive of

many specializations within the University, especially those related to STEM learning and educating underrepresented student populations; flexible and responsive in its curriculum, allowing for the adoption of emerging practices and technologies; supported by top-level administrators; and deeply integrated into institutional strategic initiatives.

UNM Overview: Founded in 1889, The University of New Mexico (UNM), NM's flagship university, is the state's largest public, four-year degree-granting institution. Located in Albuquerque with branch campuses in Los Alamos, Gallup, Valencia and Taos, UNM's total enrollment is 36,722 students (Fall 2012 data). As a Hispanic-Serving Institution, the University represents a cross-section of cultures and backgrounds. Of UNM total student population (all campuses), 38.8% (14,241) are Hispanic and 10.9% (3,998) are American Indian. The UNM Main campus enrollment is 29,100 students, with 21,008 Undergraduate, 6,262 Graduate & Professional School and 1,830 non-degree students.   Of UNM's total enrollment: 23,276 students (63.4%) are full time; 13,446 (36.6%) part-time (Fall 2012). UNM offers 238 active degree and certificate programs, including 99 baccalaureate, 75 masters, and 40 doctoral level programs (UNM Office of Inst. Analytics, 2012). UNM is the primary feeder destination for high schools in NM, attracting the most freshmen, Hispanic students and underrepresented students of any four-year institution (NM Higher Education Department, 2012).

UNM's Carnegie Basic Classification is "Research University with Very High Research Activity." UNM research injects millions of dollars into New Mexico's economy, funds new advancements in science and healthcare, and augments teaching by giving students valuable hands-on training in state-of-the art laboratories. In Fall 2012, the campuses of the University of New Mexico employed 3,995 faculty, 6,551 staff, and 5,061 students.

The world-class caliber of UNM STEM faculty and research laboratories along with internships at nearby national laboratories provide unparalleled opportunities to engage Hispanic, low-income and high need students in studies and research that can help launch their future educational and professional pursuits. UNM is one of only four Carnegie Research University Very High institutions in the nation also designated as a Hispanic-Serving Institution and the only state flagship university in the U.S. that is also a majority-minority undergraduate institution. UNM is accredited by the Higher Learning Commission with a special emphasis to work with students from diverse backgrounds. In Fall 2012 Hispanic students comprised 43% (8,604) of 21,008 undergraduate students and 49% of 3,424 incoming freshmen (first-year students) enrolled on UNM's main campus. UNM is positioned, therefore, to enroll and graduate a large number of Hispanic STEM students to supply the New Mexico workforce and to provide Hispanic candidates for graduate and professional schools nationwide.

I.   COMPREHENSIVE DEVELOPMENT PLAN

New Mexico Socioeconomic Challenges: New Mexico has a population of 2.1 million and is one of only four majority-minority states (The Economist, 2011). NM has a 61% minority population. 47% of New Mexicans are Hispanic or Latino (US Census State & County Quick Facts, 2014), the highest proportion of any state (2011 data, Brown & Lopez, 2013). At the same time, NM ranks 50th out of the states in poverty (Current Population Survey, Annual and Economic Supplement, 2011). A 2012 Census Bureau report reveals NM has the highest share of people living in poverty of any state (22.2%). Thirty percent of NM children, the second highest number among the states, live in poverty, and minority children are particularly at risk of living in poverty (Huffington Post, 2012). Poverty disproportionately affects Hispanics, with the national poverty rate for Hispanics at 25% and for White, non-Hispanics at 9% (Current

Population Survey, Annual and Economic Supplement, 2010). In New Mexico, this gap is even

higher, with the state poverty rate for Hispanics at 30% and for White, non-Hispanics at 12%

(US Census Bureau Population Survey, 2009). Children raised in poverty are far less likely to

attend college than those raised in middle-income and high-income families. Only 51% of low-

income high school completers enroll in college, compared to 81% of high-income completers

and 65% of middle-income completers (Pew Research Center, 2014). For those who reach higher

education, socioeconomic status (SES) is the primary predictor of six-year graduation rates

(Carnevale, 2008; Bowen et al., 2009).

The patterns just described directly impact New Mexico educational attainment levels. NM

ranks 43rd in the nation in the percentage of the population who complete high school, and 35th in

the nation in percentage of the population who earn bachelor's degrees or higher (Closing the

Education Achievement Gap, Santa Fe Community Foundation, 2011). It ranks 48th in

percentage of teens who are not in school and who are not high school graduates. This

circumstance impacts New Mexico's state economy.

A National Center for Public Policy and Higher Education report (2008) forecasts NM

workforce to become more radically diverse, with the lowest level of education in the nation.

The decline in the number of workers with college degrees will result in a decrease in per capita

income from $17,281 in 2000 to $17,123 in 2020. Due to inflation, this represents a decrease in

buying power of at least $6,373, or 37% (Source: Bureau of Labor Statistics, CPI Inflation

Calculator, 2014). Considering NM's population of over 2 million, this represents an annual

income loss to New Mexicans of $317,528,018.

New Mexico STEM Challenges: As a majority-minority state with a fast growing minority

population, New Mexico's current and future directions are dependent upon the educational and

professional successes of its minority citizens. Projected Hispanic population growth will

generate a substantial increase in the percentage of Hispanic high school graduates over the next

decade. Whereas Hispanic and White non-Hispanic high-school graduates were approximately

equal in number a decade ago, Hispanic graduates will be more than twice as numerous as White

non-Hispanic graduates by 2021 (Western Interstate Commission for Higher Education, 2008).

The future of the state of NM rests substantially with its Hispanic population.

As a result, the need to increase the number of Hispanic STEM college graduates is critical to

New Mexico's future economic development. Between 2001 and 2011, the number of STEM

jobs in New Mexico grew by 14% (Wright, 2014), a rate that ties for 9th in the nation. Although

only 25% of NM workers over the age of 25 possessed a Bachelors or higher degree in 2010

(State of the Workforce, 2012), one study estimates 60% of all job openings in the state in 2018

will require an undergraduate or graduate degree, with 18% of the new jobs in STEM disciplines

(Georgetown University Center on Education and the Workforce, 2010).

UNM's Relationship with the Achievement Gap & STEM Challenges: With these challenges

in mind, UNM's STEM Gateway Program has spent the past two years analyzing institutional

data related to the STEM student experience at UNM. By examining the academic records of

first-time freshmen who entered UNM with a STEM-degree interest, STEM Gateway found that

639 students out of 1503 (43%) switched majors out of STEM and 444 (30%) dropped out of

UNM entirely. 334 students (22%) graduated with STEM degrees, and 86 students (6%) are still

enrolled in their STEM courses. Only 28% of students who entered UNM with a STEM-degree

preference achieved that goal or remain on track to do so (STEM Gateway Report, 2013). Thus,

graduation rates for UNM STEM students are actually lower than the national averages quoted in

the President' Council of Advisors on Science and Technology's Report *Engage to Excel*:

Economic projections point to a need for approximately 1 million more STEM professionals than the U.S. will produce at the current rate over the next decade if the country is to retain its historical preeminence in science and technology. To meet this goal, the United States will need to increase the number of students who receive undergraduate STEM degrees by about 34% annually over current rates.

*Currently the U.S. graduates about 300,000 bachelor and associate degrees in STEM fields annually. Fewer than 40% of students who enter college intending to major in a STEM field complete a STEM degree. Increasing the retention of STEM majors from 40% to 50% would, alone, generate three-quarters of the targeted 1 million additional STEM degrees over the next decade…*Retaining more students in STEM majors is the lowest-cost, fastest policy option *to providing the STEM professionals that the nation needs for economic and societal well-being* (PCAST, 2012).

The need for increasing STEM-degree graduates has been frequently stated for several decades (Rutherford, 1990; National Science Foundation, 1996; U.S. Department of Labor, 2007; Rising Above the Gathering Storm Committee, 2010). Increasingly, the call to action emphasizes the critical need to diminish the STEM-degree achievement gap between White-non-Hispanic and minority students (Anderson and Kim, 2006; Dowd et al., 2009; Higher Education Research Institute, HERI, 2010). In a nation seeking to diversify graduates in STEM disciplines and its STEM workforce, the results of UNM's STEM Gateway study are even more unsettling as it shows that UNM underrepresented STEM students are more likely than their White, non-Hispanic peers to switch majors or drop out of UNM altogether (Table 1).

Table 1. UNM STEM Graduation and Dropout Rates by Ethnicity and SES (STEM Gateway Report, 2013)		
SELECTED SUBPOPULATION OF STEM-INTERESTED 1ST YEAR STUDENTS	PCT OF THIS GROUP WHO GRADUATED WITH STEM BACHELOR'S DEGREES	PCT OF THIS GROUP WHO DROPPED OUT OF UNM
Hispanic students	18%	32%
Native American students	8%	50%
Low-income students	13%	35%
Non-Hispanic, White students	26%	27%

The findings from the STEM Gateway Report, detailed in Table 2, have been instrumental in the development of this proposal.

Table 2. UNM Challenges Supporting the Goals and Strategies in this Application (STEM Gateway Report, 2013)	
FINDING	**SUPPORTING DATA**
The status quo in STEM education at UNM has NOT been highly effective for underrepresented or low-income students	• Hispanic students are only 65% as likely to graduate in STEM than their non-Hispanic peers • Low-income students are 43% more likely to drop out, and are 46% as likely to graduate in STEM • First generation students are 62% more likely to drop out, and are only 42% as likely to graduate in STEM
When STEM students switch majors to a non-STEM field or drop out of UNM entirely, they usually do so during their first two years	• 72% of STEM-interested freshmen do not earn STEM degrees
	• 57% of STEM-interested freshmen who drop out do so within their first two semesters, and 77% drop out within their first two years • 39% of STEM-interested freshmen who switch majors out of STEM do so during their first two semesters, and 73% switch majors within their first two years
	• The average number of credits completed by STEM students who drop out is 38, while the average number of credits completed by STEM students when they switch majors out of STEM is 45
	• Of all STEM-interested students who enrolled in a STEM gateway course at the 150 level or below (i.e., introductory chemistry or college algebra), only 23% went on to earn a STEM bachelor's degree
Most students currently take longer than four years to complete their bachelor's degrees	• 76% of STEM-interested freshmen who graduated took five years or longer to earn their bachelor's degrees • 34% of STEM-interested freshmen who graduated took six years or longer to earn their bachelor's degrees
Students struggle to get through the UNM pre-calculus mathematics sequence	• Of all STEM-interested students who enrolled in a math course lower than Calculus 1, only 15% went on to earn a STEM bachelor's degree • College Algebra, Pre-Calculus Mathematics, Intermediate Algebra and Trigonometry top the list of STEM enrollments that are least likely to lead to STEM degree graduation

Weaknesses: In relation to this application, UNM is faced with several key weaknesses in

academic programs and institutional management (Table 3).

Table 3. Academic Program and Institutional Management Weaknesses
• UNM lacks substantial STEM-intensive programming for students during their first two years. Once students reach their junior years, they begin upper division degree courses where they interact frequently with their major professors. During their freshman and sophomore years, however, they take lower division core math and science courses that are often taught by lecturers, part-time instructors and graduate assistants. These courses build a solid foundation of core knowledge and skills, but have limited connection to research or STEM careers. While UNM provides ample academic support services (tutoring, supplemental instruction, peer facilitated learning), the University does not provide

programming that helps 1st & 2nd yr students remain connected to their long-term goals.

- UNM lacks collaborative STEM programming between academic and student affairs units, especially for first- and second-year students. Improving STEM education for Hispanic, low-income and high-need students involves both sides of the University house. The academic side provides expertise in the STEM disciplines, in degree planning and in learning skills necessary to STEM success. The student affairs side provides expertise in career exploration, promoting self-efficacy, and serving traditionally underrepresented students. At UNM, there is insufficient collaboration between these silos.
- UNM lacks a set of institutional goals for STEM. While most educators at UNM would agree that the University should improve STEM degree attainment, especially for underrepresented students, there is no commonly held definition for what this means. It is difficult for UNM STEM programs to work towards improvement that is not defined, quantified or monitored.
- UNM lacks a set of tools that encourage efficiency, collaboration and accountability. For instance, when a department asks for student achievement data from the Office of Institutional Analytics, they do so individually without consulting other departments. However, the data they request is often similar to what other departments may request. There are few data-collection tools that encourage programs to align these requests, or to share their processes or findings with others. Likewise, there are no online tools that allow STEM support programs to objectively measure their impact.

Each of these academic program & institutional management weaknesses in turn create financial stability weaknesses for UNM. The New Mexico Legislature recently adopted a performance-based funding model for public colleges and universities. Three of the performance metrics in this new model directly relate to strategies proposed in this proposal: 1) increase the number of degrees awarded, 2) reduce the achievement gap in New Mexico, and 3) increase the number of students earning STEM degrees (Chisolm, 2013). These metrics are negatively impacted by UNM's high STEM attrition rates (Tables 1 & 2). Each underrepresented student who drops out of UNM or leaves STEM reduces tuition, state appropriations & performance revenues.

Strengths: UNM is strong in several areas related to its academic programs, institutional management and fiscal stability, including those described in Tables 4-6.

Table 4. UNM Academic Programs Strengths
• Diverse Student Body: UNM students represent a variety of cultures and backgrounds contributing to a rich educational experience, diversity in worldviews, and sharing of cultures while engaging in academic pursuits. UNM Main Campus minority undergraduate enrollment is 58.2%, with 43% Hispanic & 6.4% American Indian (Fall 2012).
• Nationally Ranked Programs: *Hispanic Business Magazine* recently classified seven of UNM

academic programs among the top programs of their kind in the nation, including UNM's rural and family medicine, clinical law, architecture, fine arts, and engineering programs.

- Array of Academic Programs, Courses, Offerings Appealing to Diverse Student Populations: UNM offers 238 active degree and certificate programs (99 baccalaureate, 75 masters, and 40 doctoral level). UNM offers courses taught in the classroom, via distance learning, or hybrid courses to allow students flexibility in their education. UNM supports a wide variety of bachelor and graduate degree programs (UNM Registrar's Office, 2012).
- Empirical Evidence and Research Utilized to Determine Best Practices: UNM has a long history of conducting and utilizing research in educational best practices (e.g, Dual Credit, Distance Learning, Hybrid Courses, and Learning Communities). UNM recognizes the importance of tracking student success and collecting data to ensure program effectiveness and accountability. Indeed, this data-informed decision-making is central to *UNM 2020 Vision Statement* and the *UNM Strategic Plan*.

Table 5. UNM Institutional Management Strengths

- State-of-the-Art Classrooms, Laboratories and Libraries: As UNM innovates toward more Collaborative Teaching and Learning Opportunities, UNM's new Collaborative Teaching and Learning building (CTL) is leading the way. Opened in Fall 2013, the CTL design is based on research showing student learning is enhanced when students actively learn together rather than passively alone. In addition, UNM University Libraries is the largest academic library system in the state and is housed in four libraries located on the central campus.
- Value of diversity and world-class caliber of Faculty and Staff: UNM boasts an outstanding faculty that includes a Nobel Laureate, two MacArthur Fellows, 35 Fulbright scholars and several members of national academies. Faculty members publish in many popular and professional journals including Scientific American, New England Journal of Medicine, and Nature. UNM professors have been quoted in such publications as Newsweek, Los Angeles Times, Business Week, and the New Yorker. They share their expertise on CNN, Nova, National Geographic & others. UNM Division of Equity and Inclusion provides leadership on UNM campuses promoting *Inclusive Excellence*. This process leverages diversity as a strength. In 2011, UNM Provost assembled the Provost's Diversity Council, who released in 2013 the *Diversity Council Framework for Strategic Action*.
- Institutional Strategic Planning: In 2012, *UNM 2020: A View to the Horizon* was initiated. The UNM Community undertook the process planning towards the year 2020. This inclusive process engaged more than 1,000 stakeholders. At the same time, UNM leaders developed goals that express important UNM values and objectives that will produce accelerated progress toward UNM 2020. Each Objective will change to reflect the work accomplished and yet to be completed. As such, UNM 2020: Vision and Strategic Plan is a living process/document. *UNM2020* was adopted in 2013.

Table 6. Financial Stability Strengths

- Fiscally Sound Institution: UNM is a fiscally sound institution as determined by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools.
- Growth in Sponsored Research, Contracts and Grant Awards: UNM increased 31% in federal contracts, appropriations, sponsored research, and grant support over a five-year period (FY 07/08 – FY11/12). In the same time period, UNM state, local, private contracts, grants and

gifts experienced a 19% increase (University of New Mexico Annual Audit Reports, and
supporting worksheet from UNM Controller's Office).

- Increasing Undergraduate Enrollment: UNM recently experienced explosive growth in
freshman enrollments. UNM has grown from 1,660 students (1996) to 3,225 (2008) to 3,424
(2012). Hispanic freshmen enrollment has increased by 31% (from 1,272 in 2008 to 1,660 in
2012), while White, non-Hispanic growth has declined by 17% from 1,376 (2008) to 1,139
(2012). (Fall 2008 & 2012 Official Enrollment Report, Registrar's Office).

Title V HSI Planning Process: Strategies selected for this proposal stem from a comprehensive

assessment of institutional challenges, weaknesses, strengths, opportunities and best practices.

In September 2012, UNM launched the Foundations of Excellence (FOE) self-study process.

Central to this effort was the clear objective of improving student achievement for traditionally

underrepresented first-year students.

*At UNM, our first-year students emerged several years ago as a majority-minority cohort. We
must utilize all available resources in a unified manner to assure that all students, irrespective of
wealth or privilege, have the opportunity to succeed. If we are unsuccessful, the economic
conditions and quality of life of our students and their families will not reach their full potential.
If we are successful, UNM will lead the way for other institutions across the country that are just
beginning to experience this demographic transformation* (UNM Foundations of Excellence
Final Report: The First Year in High Gear, 2013).

This year-long UNM FOE self-study involved more than 200 faculty, staff, students and

administrators who explored UNM's challenges and opportunities as they relate to first-year

student success and improved retention rates. At the conclusion of this process, more than 50

recommendations spanning nine dimensions were proposed to the President (Table 7).

Table 7. Selected FOE Recommendations Related to this Project
The University of New Mexico should:
• Link first-year students to their intended major sooner.
• Encourage improved preparation for first-year.
• Develop student learning outcomes for extracurricular and out-of-classroom experiences
• Develop student leadership and student activities to complement/augment classroom learning.
• Further develop and incorporate programs that help students transition successfully to UNM.
• Develop a comprehensive data system to report student outcomes across student programs.
• Create a culture of faculty, staff and administration engagement with first-year students.
• Enhance the tracking system for various subgroup populations on campus.
• Expand the set of programs in University College and Honors College to involve more first-year students, and focus more deliberately on including diversity issues.

- Expand offerings in service learning and community-engaged research that engages undergraduates both with local communities and in global contexts.
- Implement widespread and systematic explorations of factors impacting student success.
- Collect and analyze data regarding high impact practices at UNM.

In Fall 2013, UNM created the First-Year Steering Committee (FYSC) to oversee the implementation of high priority recommendations. During the same semester, UNM leaders began meeting to envision a STEM center that would address the recommendations of the FOE self-study from a STEM perspective. In spring 2014, a committee was formed to design the STEM Collaboration Center (STCC) model proposed in this application. This committee included FYSC co-chairs (the Associate Provost for Curriculum and the Dean of University & Honors Colleges) as well as the individuals in the following positions: Associate Provost for Curriculum, VP for Research, Associate VP for Student Affairs, Associate VP for Research, Dean of the College of Education, Associate Dean of the School of Engineering, Associate Dean of University College, two Associate Deans of Arts & Sciences, and STEM Gateway Director.

In developing, prioritizing and designing STCC strategies, members of the planning committee studied empirically proven high impact practices and met individually with the directors of the following UNM departments: El Centro de la Raza (Hispanic student services), College Enrichment and Outreach Program (first-generation student services), ENLACE (Hispanic K-20 pipeline organization), Health Sciences Center, UNM Career Services, Accessibility Resource Center, ResearchMatch (undergraduate research opportunities website), Office of Student Academic Success, Graduate Resource Center and the Office of Institutional Analytics. To incorporate student priorities and suggestions, planning committee members also met with 32 undergraduate STEM students in a focus group setting. The design for STCC proposed in this application was finalized and approved by the Provost and the University President in April 2014.

Opportunities: With the challenges faced by the state of New Mexico, including high poverty rates and low rates of educational achievement, opening access to STEM professions among underrepresented, low-income and high need students is important to providing NM's citizens a chance to succeed and prosper. In addition, Albuquerque and the surrounding Southwest region have a growing technical base that continues to need a highly educated and qualified workforce to compete in the world marketplace. As NM high-tech industry continues to grow - attracting small business entrepreneurs as well as supplying employees for larger companies (e.g. Intel, Los Alamos and Sandia National Laboratories) - the need for such a workforce increases. If NM is to keep these industries and continue attracting new high-tech industries, entrepreneurs and small businesses, the state needs to keep pace with demand for professionals who have attained advanced STEM education and degrees (NM Economic Dev Dept, 2014; Arend, 2013).

UNM is positioned to be a leader in addressing state and national needs in STEM education and diversification of the STEM workforce. UNM has a diverse student population mirroring the socioeconomic diversity of the state. With such a large pool of diversity, and as a research-intensive flagship university and Hispanic-Serving Institution, UNM is poised to assume a leadership role in building STEM education best practices for traditionally underrepresented students. At the institutional level, the STEM Collaboration Center has the opportunity to improve UNM by creating stronger connections between faculty-led STEM academic departments and staff-led student and academic support programs, and by creating a model for improved efficiency. Finally, UNM has the unique opportunity to lead the way in embracing national demographic shifts. As stated in UNM's Division of Equity and Inclusion's vision statement, "*Since the University of New Mexico looks today like most universities will look tomorrow, UNM will become a model for diversity and inclusive excellence*" (2014).

a) Delineation of the institution's goals for academic programs, institutional management, fiscal stability, based on outcomes of described analysis related to proposed Title V activity.

This project aligns with UNM's top-level strategic efforts to improve academic success,

especially for underrepresented students. Table 8 documents UNM's strategic goals related to

this project. Each plan element listed is intended to positively impact academic attainment for

Hispanic, other minority, low-income, and high-need students. Table 9 links these institutional

goals to the Title V SWOT analysis and project goals.

Table 8. UNM Institutional Goals Related to UNM Title V Application
From the Regents Focus Area for University President
IG1: Reduce the achievement gap for underrepresented students IG2: Improve 3rd semester retention rates IG3: Established result/outcome focused performance measures IG4: Actively reach out and collaborate with community organizations and stakeholders
From the UNM 2020 Vision Statement
IG5: UNM will be a place where walls and silos are almost non-existent in a culture that respects diversity in everything it does. IG6: UNM will be highly coordinated, integrated and non-duplicative. IG7: UNM will be a school where undergraduate and graduate research opportunities abound. IG8: UNM will set the national standard for innovation that goes far beyond "segmentation" initiatives to more inclusive sharing that brings diverse perspectives to challenges shared by all.
From the UNM Strategic Plan Goals and Objectives
IG9: Improve retention rate to 80% and graduation rates to 50% by 2015 IG10: Develop counseling & software that will facilitate degree customization for students IG11: Implement process for continuous evaluation of programs for relevance and investment IG12: Take a leadership role in cultural, social and educational revitalization of the community

Table 9. Relationship of Institutional Goals to Title V SWOT Analysis and Project Goals		
Problems from SWOT Analysis	**Aligned Institutional Goals** (see Table 8)	**Aligned Project Goals**
Status quo in UNM STEM education has not been effective for underrepresented, low-income students; When STEM students drop or switch, they usually do so during their first two years; Students struggle to get through pre-calc; UNM lacks substantial early STEM-intensive programming; Most students take longer than 4 years to complete STEM bachelor's degrees	IG1, IG2, IG4, IG7, IG8, IG9, IG10	Improve STEM degree attainment for Hispanic, low-income and high-need students by creating collaborative student support programs designed for first- and second-year students

UNM lacks collaborative STEM programming	IG4, IG5, IG6, IG12	Improve STEM institutional efficiency by creating a University-wide infrastructure designed to reduce duplication of services, monitor and achieve STEM goals, and develop shared collaboration and accountability tools
UNM lacks institutional STEM goals; UNM lacks online collaboration & accountability tools	IG3, IG6, IG8, IG9, IG11	

b) Measurable objectives related to reaching each goal; timeframe for achieving objectives.

STCC will implement strategies that address the problems, institutional goals and project goals

described above. By implementing the strategies described in this application, the University of

New Mexico will meet the following overall measurable objectives.

Table 10. Measurable Objectives And Timeframe For Achieving The Objectives					
	Grant Annual Targets				
Objectives	**By Sept. 2015**	**By Sept. 2016**	**By Sept. 2017**	**By Sept. 2018**	**By Sept. 2019**
MO1. Compared to 2013-14 historic data, increase the *number* of Hispanic, low-income and high-need first-year students who go on to earn STEM bachelor's degrees within four years by:	N/A*			7%	10%
MO2. Compared to 2013-14 historic data, increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who go on to earn STEM bachelor's degrees within four years by:	N/A*			7%	10%
MO3. Compared to 2013-14 historic data, increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who return to UNM for their second year by:	2%	5%	7%	10%	15%
MO4. Compared to 2013-14 historic data, increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who return to UNM for their third year by:	N/A*	2%	5%	7%	10%

MO5. Compared to 2013-14 historic data, decrease the *proportion* of Hispanic, low-income and high-need first-year students who go on to switch majors away from STEM degrees within two years by:	5%	10%	15%	15%	15%
MO6. Compared to 2013-14 historic data, increase the *number* of Hispanic, low-income and high-need STEM-interested undergraduate students who are enrolled at UNM by:	N/A*	7%	9%	12%	15%
*Since STEM Collaboration Center projects focus on first- and second-year students, it is not anticipated that this outcome will be influenced during this grant year					

c) Methods & resources to institutionalize practices developed under the proposed project:

UNM plans to absorb project strategies that data show to be beneficial to the University as it

changes over the coming five years. UNM has a strong record of institutionalizing successful

grant-funded strategies. After the most recent HSI project, UNM institutionalized more than

80% of strategies in the original proposal. For each proposed strategy, a primary University

partner has agreed to work closely with STCC in development and implementation. Throughout

the five years of this grant program, each primary partner will work with the UNM Provost to

identify and secure funding to institutionalize the strategy after the conclusion of the grant. After

the conclusion of the grant, the strategy will move under the supervision of the primary partner

(Table 11). Secondary partners have also been identified to provide additional support for

implementation. This model for alignment and collaboration will ensure high levels of

institutional buy-in and advocacy for the continuation of successful programs.

Table 11. List of Project Strategies; Partners Set to Absorb them Upon Grant Completion	
STRATEGY	**PARTNER(S)**
STEM Summer	First Year Steering Committee (FYSC)
STEM Graduate	Office of Academic Student Success
Discover STEM Conference	Career Services
STEM Leadership Academy	Honors College and El Centro de la Raza
Provost Committee on STEM Student Success	Provost Office
DataMart Tools	Office of Institutional Analytics
Annual State of STEM Report	Provost Office

d) Institution's five-year plan addressing services to Hispanic & other low-income students

Table 12. UNM Five-Year Institutional Plan to Improve Hispanic and Low-Income STEM Achievement
2014-2015, Year 1
• Increase participation in Honors College among Hispanic, minority and low-income students. • Increase Hispanic and low-income student participation in undergraduate research through the further development of the research-match.unm.edu system. • Pilot a partner-advising model between El Centro de la Raza (Hispanic student services) and the College of Arts & Sciences Advisement Center that connects students to their academic programs sooner while still providing cohort support. • Analyze UNM High Impact Practices to determine which programs, courses and impact practices most strongly correlate to graduation for first-year Hispanic, low-income and underrepresented students. • Strengthen support for Hispanic undergraduate students seeking access to graduate school
2015-2016, Year 2
• Develop a STEM Living Learning Community. • Based on the high impact practices identified in 2014-2015, develop a strategic plan to improve first-year student success for Hispanic, low-income and underrepresented students. • Expand the partner-advising model developed in 2014-2014 to other colleges and schools. • Expand support for Hispanic students participating in undergraduate research by El Centro de la Raza (Hispanic students services office), and develop El Centro programming to strengthen professional development skills for Hispanic students
2016-2017, Year 3
• Institutionalize the strategies of the HSI-funded STEM UP and STEM Gateway programs, including: STEM Course Redesign, Peer Learning Facilitators, STEM Transfer Center and STEM Degree Transfer Articulation Program. • Create a UNM Undergraduate Research Center designed to strengthen and expand undergraduate research opportunities, especially for Hispanic, low-income & STEM students. • Develop international/intercultural learning opportunities for Hispanic and low-income students, including travel abroad. • Strengthen the P-20 pipeline for Hispanic students in Albuquerque, specifically through the inclusion of El Centro and other Hispanic-serving UNM programs.
2018-2019, Year 4
• Expand resources for Hispanic and low-income students to participate in out-of-classroom experiential, research-oriented and community-based learning opportunities. • Expand the capacity of Student Affairs programs to seek and obtain grant and other institutional funding.
2019-2020, Year 5
• Establish a $500M to $1B endowment by 2021.

II.   ACTIVITY OBJECTIVES

UNM is proposing a single activity *Development of a STEM Collaboration Center to Maximize*

Efficiency and Improve STEM Achievement for Hispanic, Low-Income and High-Need

Students. This activity includes the following strategies: 1) STEM Summer, 2) STEM Graduate,

3) Discover STEM Conference, 4) STEM Leadership Academy, 5) Provost Committee on STEM

Success, 6) DataMart Tools, and 7) Annual State of STEM Report.

Table 13. Activity Objectives and Alignment to Project Goals
PROJECT GOAL 1: Improve STEM degree attainment for Hispanic, low-income and high-need students by creating collaborative student support programs designed for first- and second-year students. Activity Objectives A01-A05 will measure progress towards Goal 1.
AO1. In the first grant year, 50 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in STEM Summer. In each subsequent grant year, 60 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in STEM Summer.
AO2. In the first grant year, 10 students will re-enter their STEM degree program or accelerate their STEM degree progress with assistance from STEM Graduate strategy. In each subsequent year, 30 students will re-enter their STEM degree program or accelerate their STEM degree progress with assistance from STEM Graduate strategy.
AO3. In the first year of the grant, 250 STEM-interested students will participate in the Discover STEM Conference. In each subsequent year, 400 STEM-interested students will participate in the Discover STEM Conference.
AO4. In the second grant year, 40 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in the STEM Leadership Academy. In each subsequent grant year, 60 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in the STEM Leadership Academy.
AO5: Compared to 2013-14 first-year cohort data, the *number* and *proportion* of Hispanic, low-income and high-need first-year students who participate in STEM Summer, STEM Graduate, Discover STEM or STEM Leadership Academy and then who go on to earn STEM bachelor's degrees by September 2019 will increase by 20%.
PROJECT GOAL 2: Improve STEM institutional efficiency by creating a University-wide infrastructure designed to reduce duplication of services, monitor and achieve STEM goals, and develop shared collaboration and accountability tools Activity Objectives A06-A09 will measure progress towards Goal 2.
AO6. In each grant year, at least 4 collaborative STEM activities will be sponsored by Provost Committee on STEM Success (PCSS).
AO7. In each grant year, at least 4 DataMart tools will be created by STCC.
AO8. In each grant year, one State of STEM report will published and submitted to the PCSS, Provost and President, and be made publicly available on the STCC website.
AO9: By September 2019, the PCSS Collaborative Initiatives, DataMart Tools and State of STEM Report will save UNM $89,000 in expenditures and 6,500 personnel hours

Table 14. Alignment of Title V SWOT Analysis Problems, Proposed Strategies, and Activity Objectives		
PROBLEMS	**STRATEGIES**	**Activity Objectives**
Status quo in UNM STEM education has not been effective for UNM or low-income students; When STEM students drop or switch, they usually do so during their first two years; Students struggle to get through the pre-calc sequence; UNM lacks substantial early STEM-intensive programming; Most students take longer than 4 years to complete STEM bachelor's degrees	STEM Summer	AO1, AO5
	STEM Graduate	AO2, AO5
	Discover STEM Conference	AO3, AO5
	STEM Leadership Academy	AO4, AO5
UNM lacks collaborative STEM programming	Provost Committee on STEM Success	AO6, AO9
UNM lacks institutional STEM goals; UNM lacks online collaboration & accountability tools	DataMart Strategy	AO7, AO9
	State of STEM Report	AO8, AO9

III.   IMPLEMENTATION STRATEGY AND TIMETABLE

Comprehensive identification of the implementation strategy for each activity: UNM proposes a single activity ***Development of a STEM Collaboration Center (STCC) to Maximize Efficiency and Improve STEM Achievement for Hispanic, Low-Income and High-Need Students.*** STCC will implement the following strategies: 1) STEM Summer, 2) STEM Graduate, 3) Discover STEM Conference, 4) STEM Leadership Academy, 5) Provost Committee on STEM Success, 6) DataMart Tools, and 7) Annual State of STEM Report.

These strategies are designed to address the challenges and weaknesses described in this proposal, while capitalizing on the strengths and opportunities presented. Strategies build upon the findings of relevant studies, projects & high impact practices described in Tables 24 & 25 on pp 31-33. For the purpose of this application, STEM disciplines include: Chemistry, Computer and Information Technology Science, Engineering, Geosciences, Life Sciences, Mathematical Sciences, Physics and Astronomy, STEM Education and Learning Research; Health Sciences and selected Social Sciences (Anthropology, Economics, Psychology and Sociology).

Extensive partnerships to support programming: In order to implement strategies effectively,

STCC & its partners will collaborate with diverse community organizations (Table 15).

Table 15. Community and Industry Partnerships to Improve STEM Achievement
• **Mission Graduate:** Mission Graduate is a cradle-to-career education partnership in Central New Mexico, which includes the counties of Bernalillo, Sandoval, Torrance, and Valencia. STCC will partner with Mission Graduate on the STEM Graduate program and the STEM Student Leadership Academy.
• **InnovateABQ.** Innovate ABQ is a collaborative initiative among UNM, government and the business community designed for companies, entrepreneurs and investors to create new technologies and provide entrepreneurial education and support. During the Discover STEM Conference, Innovate ABQ will partner with STCC in introducing first- and second-year students to locally-developed emerging technologies.
• **New Mexico Collaborative Research and Development Council (NMRDC).** This Council includes representatives from New Mexico's prestigious national laboratories, including Sandia National Lab, Los Alamos National Lab, Air Force Research Lab, Kirtland Air Force Base, White Sands Missile Range, and Holloman Air Force Base 96 Test Group. STCC will partner with the NMRDC on the STEM Summer Program, the Discover STEM Conference, and on the STEM Leadership Academy.
• **UNM STEM Technology Centers.** STCC will invite representatives from UNM technology centers to participate in the development and implementation of the STEM Summer Program, the Discover STEM Conference and the STEM Leadership Academy. These centers include the Center for Emerging Energy Technologies, the Center for High Tech Materials, the Center for Micro-Engineered Materials.
• **Local Technology Companies.** STCC will leverage the industry connections of the UNM STEM academic departments and those of technology centers to develop partnerships with regional technology companies. These companies, including Intel and EMCore, will be invited to participate in the Discover STEM Conference.
• **Moriarty Edgewood School District (MESD), Albuquerque Public Schools (APS) and other regional districts.** STCC will partner with school districts to provide civic engagement opportunities to students during the STEM Summer program, and to invite Hispanic, low-income and high-need students to Discover STEM conferences.

UNM's implementation strategy is designed to meet its two priority goals.

Goal 1: Improve STEM-degree attainment for Hispanic, low-income & high-need students by creating collaborative student support programs for first- and second-year students

STCC will develop four collaborative strategies designed to meet this goal: 1) STEM Summer,

2) STEM Graduate, 3) Discover STEM Conference, and 4) STEM Leadership Academy. For all

strategies, student recruitment efforts will be designed to maximize participation by Hispanic,

low-income and high-need students. Partners have been chosen based on their ability to bring

their unique expertise to program design and to help recruit these student participants. STCC

and all partners will work closely together with support from the Provost Committee on STEM

Success (page 27) and the STCC Oversight Council (page 37). Strategies provide both depth and

breadth and work in harmony to increase student participation. For example, the Discover

STEM Conference will serve many students (breadth) while the STEM Summer strategy will

include up to 90 days of participation for each student (depth). The Discover STEM Conference

will be leveraged to generate student interest for the STEM Summer strategy.

Three of these strategies will reach students when they are most likely to drop out of UNM or

switch away from their STEM major. Thirty percent of UNM STEM-interested freshmen drop

out of the University before completing a STEM bachelor's degree.   Nearly 60% of these

students leave during the spring or summer of their first year. Seventy-seven percent leave

within the first two years (Source: STEM Gateway Report, 2013). The Discover STEM strategy

will engage these students during their first spring semester; STEM Summer will engage them

during their first summer; and the STEM Leadership Academy will engage them during the fall

semesters of their first and second years.

Strategy 1A: STEM Summer: The STEM Summer strategy will engage first- and second-year

students in a series of STEM-focused high impact practices (Table 24 on p. 31) delivered

through empirically proven methods (Table 25 on p. 32). To allow students to participate in

initiatives that most resonate with their interests and career goals, STEM Summer will be offered

in a modular format (Table 16). Students may elect to participate in one or more modules as

their schedules permit. For students who need summer income to help pay college costs, the

modular format will also allow students to hold part-time on-campus or off-campus jobs while

still engaging in one or more modules. Additional modules will be added as feedback is

collected from STEM Summer participants, advisory councils and other stakeholders.

Participation in STEM Summer will be open to all undergraduate first- and second-year students,

but will be designed for and marketed primarily to Hispanic, low-income & high-need students.

At the conclusion of each module, participants will complete surveys to assess the quality of

the strategy, and reflect on what they learned in the context of their coming semester. Student

participation in STEM Summer will be tracked and measured against achievement outcomes

(3rd & 5th semester retention; STEM-degree persistence; STEM graduation).

Table 16. STEM Summer Implementation Strands and Partners
IMPLEMENTATION STRANDS. STEM Summer modules include the following: • **National Laboratory Exploratory Experience (LabEx).** UNM will partner with NM Research & Development Council members to introduce students to cutting edge research, technology and facilities. Members include Sandia National Laboratory, Los Alamos National Laboratory, the U.S. Air Force Research Laboratory, White Sands Missile Base, and Holloman Air Force Base 96th Test Group. • **Field Experience (FieldEx):** Students will visit various research sights associated with UNM faculty members. During these visits, faculty members and their graduate assistants will introduce students to the fundamental concepts, technology and methods of their research. Students will also develop networking contacts with faculty members and GAs. • **Career Capsule:** Students will participate in four types of in-depth STEM career exploration activities: 1) self-assessment of academic strengths, 2) exploration of career opportunities, 3) exploration of job market trends, and 4) development of a degree and professional pathway leading to the STEM career of their choice. Students will have the opportunity to work with the Graduate Resource Center to begin planning for STEM graduate schools early enough to maximize their undergraduate experience. • **Undergraduate Research:** Students will participate in faculty-sponsored undergraduate STEM research opportunities. Students will learn the basics of data collection, storage and analysis, and will become more familiar with the scientific method in a research context. To facilitate a comprehensive learning experience, STCC will provide spring and summer graduate assistants for each participating faculty research project (up to three projects per summer, serving up to 30 students each summer). During the spring, the GAs will design summer learning activities, and during the summer they will teach and supervise the undergraduate researchers, all in collaboration with the faculty researchers. • **STEM Internships:** STCC will work with UNM Career Services to identify and foster STEM summer internships that fit within the modular format. In the STEM summer up to 30 students will participate in these internships with priority given to internships that provide compensation to interns. • **Math Boost:** Students will have the opportunity to participate in a math acceleration workshop. This two-month program will utilize the ALEKS system to assess each student's initial math level, and provide prescriptive online lessons to accelerate math mastery.

Individual and group-based instruction will be provided by a teaching assistant who will be selected and trained by the UNM Math Department Math Learning Lab (MaLL). • **Support for STEM Summer Completers:** STCC will partner with the Career Services Office and the Office of the Vice President for Research to help place STEM Summer completers into competitive national and state STEM opportunities during their sophomore, junior and senior years.	
PRIMARY PARTNER: UNM First Year Steering Committee (FYSC). **KEY SECONDARY PARTNERS:** UNM STEM Colleges, Schools and Departments; College of Education; Honors and University Colleges; El Centro de la Raza (Hispanic Student Services); Research Match Office; UNM Office of the Vice President for Research; UNM Student Services departments; UNM Ethnic Centers	

Strategy 1B: STEM Graduate: STEM students struggle to navigate UNM's complex degree

pathways. This challenge disproportionately impacts Hispanic students (Table 17).

Table 17. Achievement Gap in STEM Degree Completion (STEM Gateway Report, 2013)		
Finding	**All Students**	**Hispanic Students**
Percent of STEM-interested first-year students who do not go on to complete a STEM degree	72%	75%
Percent of STEM graduates who took six years or longer to complete STEM degree, or are still enrolled	34%	45%
Percent of STEM graduates who graduated from STEM bachelor's degrees (average credit hours per degree is 130) with 140 credits or more	51%	57%
Percent of STEM graduates who graduated from STEM bachelor's degrees (average credit hours per degree is 130) with 150 credits or more	28%	36%
Percent of STEM graduates who graduated from STEM bachelor's degrees (average credit hours per degree is 130) with 160 credits or more	11%	16%

The STEM Graduate strategy is designed to re-engage UNM students who have dropped out, and

to accelerate UNM students who are lagging behind in their degree program.

To implement the STEM Graduate strategy, STCC will partner with the Office of Student

Academic Success within the Office of the Provost. STCC will hire and supervise a graduate

assistant (GA) who will be trained by Academic Success staff in the following areas: 1) how to

engage students and help them reconnect with their STEM goals, 2) how to access and analyze

student records, 3) how to utilize the various STEM degree pathways, 4) how to help students

access University resources that will ease their transition back to UNM, and 5) how to secure

student data and protect student privacy. This GA will then work with STCC and the Academic

Success staff to implement "STEM Return" in the fall and "STEM Advance" in the spring, and

assist in the development of the "STEM Graduate DataMart Tool" (Table 18).

Table 18. STEM Graduate Implementation Strands and Partners
IMPLEMENTATION STRANDS: The STEM Graduate strategy will include the following: • **STEM Return:** The STCC graduate assistant will work with Academic Success staff to comb through academic records in order to identify STEM-interested students who departed from UNM before completing their bachelor's degrees. The GA will then work with the Alumni Office to collect contact information where possible. The GA will then reach out to students by email/phone/mail and counsel them regarding possibly re-entry into their degree programs. • **STEM Advance:** The GA will work with Academic Success staff to comb through academic records and degree pathways to identify students who are taking too many semesters to complete their degrees (at least 50% longer than anticipated) or are completing more credits than required for their degrees (at least 50% more credits than anticipated). The SSC GA will then work with the appropriate STEM advising office (i.e., Engineering Student Services) to reach out to these students to build quicker and more efficient degree plans.
• **STEM Graduate DataMart Tools:** The STCC GA and Academic Success staff will work with the STCC DataMart Developer to build the following tools: 1) a secure online tool that will allow academic advisors to identify STEM Advance and STEM Return students without manually combing through academic records, and 2) web-based tools that will allow students to chart their own pathways back into UNM STEM, or through their degree more quickly.
PRIMARY PARTNER: UNM Office of Student Academic Success **KEY SECONDARY PARTNERS:** UNM STEM College, School and Department Advising Offices; Office of Institutional Analytics; Provost Office

Strategy 1C: Discover STEM Conference: At UNM, at least 25% of first-time STEM students

are first generation students, and at least 23% are from low-income families. In addition, 45% of

all first-time UNM STEM students graduated from eleven New Mexico public high schools. Of

these high schools, six enroll more than 40% economically disadvantaged students, and all but

three enroll more than 30% economically disadvantaged students (New Mexico Public Education

AYP Reports, 2013; UNM STEM Gateway Report, 2013). Students from low-income families

are less likely to attend college than their peers (*Increasing College Opportunity for Low Income*

Students, 2014), and are less likely to complete STEM degrees at UNM (STEM Gateway Report,

2013). Career planning for freshmen can help change these statistics. Career planning

contributes to college retention (Feldman, 2005) and helps students connect their college

activities to their future careers (Niles & Bowlsbey, 2005).

STCC will partner with Career Services and the various STEM colleges and departments to

offer an annual Discover STEM Conference designed primarily for first- and second-year UNM

students, and open to underrepresented high school students throughout the region. The UNM

Student Union Building will host the Discover STEM Conference, with tours available to labs

and STEM facilities. Presentations & workshops will be conducted by STEM faculty members,

graduate students, STEM professionals from national laboratories & STEM industries, STEM K-

12 educators, and community members conversant with STEM opportunities. STEM career

exploration, pathways planning & emerging technologies will be among those explored.

Table 19. Discover STEM Implementation Strands and Partners
IMPLEMENTATION STRANDS. The DiscoverSTEM conference will include the following: **Career Exploration:** Students will be introduced to STEM career opportunities and job market trends. These activities will align with, but not repeat, those offered more intensively during the STEM Summer Career Capsule program.   **Emerging Technologies:** Students will participate in workshops and presentations designed to introduce important emerging technologies and strengthen their technology literacy. A committee of STEM faculty members and regional STEM industry leaders will identify technologies, and partner with University/industry leaders to introduce them to students.   **STEM Pathways:** Students will be introduced to the various degree pathways necessary to achieve their STEM profession goals, starting with certificate-level vocations (supported by local community colleges) and extending through doctoral level professions (supported by regional and research universities).
PRIMARY PARTNER: UNM Career Services   **KEY SECONDARY PARTNERS:** UNM STEM Colleges, Schools and Departments; National research labs; Graduate Resource Center; UNM Student Services; STEM industry leaders and community advocates; K-12 Educators

Strategy 1D: STEM Leadership Academy: UNM's traditional approach to STEM education

has not been highly effective for traditionally underrepresented, low-income or high-need

students. Hispanic students are only 65% as likely to graduate as their non-Hispanic

counterparts. American Indian students are 150% more likely to drop out as their peers, and

African American students are almost twice as likely to switch majors out of STEM. Low-

income students are 43% more likely to drop out and are only half as likely to graduate in

STEM. Yet, traditionally underrepresented populations are growing at the University, while

white non-Hispanic populations are shrinking. During the past 15 years, the percentage of

undergraduate students who are Hispanic has increased by 14 percentage points (from 29% to

43%). The percentage of freshmen who are Hispanic has increased by 13 points (from 35% to

48%). Meanwhile, the percentage of undergraduate students who are white, non-Hispanic has

decreased by 19 points (from 57% to 38%), and the percentage of freshmen who are white, Non-

Hispanic has decreased by 17 points (from 50% to 33%) (UNM Factbooks, 1997/2013).

To more fully engage these students in STEM during their first and second years, STCC will

partner with the UNM Honors College and El Centro de la Raza (Hispanic Student Services) to

design and develop a fall STEM Leadership Academy. This academy will be available to all

first- and second-year students, but will be designed for and marketed primarily to Hispanic,

low-income and high-need students. Students will be selected based on a competitive

application & nomination process and a committee of STEM faculty, partner organizations and

staff will select participants. The Academy will incorporate high impact practices that increase

college retention (Kuh, 2008) and will utilize empirically proven methods (Table 25 on page 32).

Students will participate in structured learning activities for approximately three hours per

week over the course of twelve weeks. Instruction will be provided by faculty and staff

members from STEM disciplines and partner organizations. Whenever possible, instructors will

be recruited who experienced STEM higher education from the perspective of underrepresented

student populations. Each Academy learning strand will include individual and peer-based

reflection. Students will also participate in structured civic engagement and/or service learning.

The STEM Leadership Academy will begin in Year Two and will build upon the student interest

generated by the Discover STEM Conference and the STEM Summer program.

Table 20. STEM Leadership Academy Implementation Strands and Partners
IMPLEMENTATION STRANDS. STEM Leadership Academy will include the following: • **Civic Engagement and/or Service Learning:** Students will participate in STEM civic engagement (for example, working with area secondary schools to increase STEM interest) and/or participating in service learning focused on STEM fields. • **Information Literacy:** Students will learn basic concepts related to locating, evaluating and using information effectively. Students will also learn basic concepts of correlation and causality. In developing this curriculum, staff will utilize the "Information Literacy Competency Standards for Higher Education" published by the Association of College & Research Libraries (http://www.ala.org/acrl/standards/informationliteracycompetency, 2013). • **Organizational Leadership Skills:** Students will learn to organize and lead peer groups (for instance study groups and student advocacy groups). • **Scientific Presentation Skills:** Students will learn to design/present conference posters, conduct scientific presentations, and summarize research findings.
• **Academy2:** Students who have completed one STEM Leadership Academy will be encouraged to return for a second Academy. During Academy2, students will develop and implement substantial projects that incorporate concepts learned in the Academy. These projects could include individual or group-based research, policy analysis, scientific presentations and/or peer mentoring. Each project will be assigned a faculty or staff mentor to ensure high levels of student practice and reflection. • **Future Modules:** Through UNM formative Title V evaluation processes, future strands will build on data collected from participants and stakeholders showing strong practices, areas that need improvement, and suggestions for new strands.
PRIMARY PARTNER: UNM Honors College and El Centro de la Raza **OTHER PARTNERS:** UNM STEM Colleges, Schools and Departments; Accessibility Resource Center (disability services): ENLACE: Area secondary schools; UNM Community Engagement Center; UNM Libraries

Goal 2: Improve STEM institutional efficiency by creating a University-wide infrastructure designed to reduce duplication of services, monitor and achieve STEM goals, and develop shared collaboration and accountability tools

STCC will implement three strategies designed to meet this goal: 1) Provost Committee on

STEM Success, 2) DataMart Tool Development, and 3) an annual State of STEM Report.

Together, these strategies will improve efficiency while strengthening institutional effectiveness

in educating Hispanic, low-income and high-need STEM students.

Strategy 2A. Provost Committee on STEM Success: The STCC Director will chair a Provost

Committee on STEM Success (PCSS). This committee will be modeled after and aligned with

the current Provost Committee on Academic Success. This committee will meet monthly and

will be composed of faculty members, staff members, students and administrators from across

the University, as well as community and/or regional STEM leaders. The primary objectives of

this committee will be to: 1) increase the number and percentage of students earning STEM

bachelor's degrees and 2) increase the number and percentage of traditionally underrepresented

and high-need students earning STEM bachelor's degrees. To achieve these objectives, PCSS

will work together on a variety of initiatives (Table 21). To facilitate effective implementation

on this large committee, work-teams and/or subcommittees will be formed in the following

areas: DataMart tools, UNM STEM achievement goals (monitoring & reporting), and

collaborative programming. Others initiatives may be added as the PCSS reaches fruition.

Table 21. PCSS Members, Implementation Strands and Partners

IMPLEMENTATION STRANDS. The PCSS will undertake the following tasks:
• Establish a **STEM Dashboard** (website) to monitor and report progress towards institutional STEM goals and performance indicators
• Identify and implement at least **four collaborative initiatives** per year to increase student participation in STEM support activities and/or increase the effectiveness of student support
• Design and build a DataMart Cohort Tracking Tool to **track student participation in the various STEM student programs** at UNM and correlate that participation with STEM student achievement metrics, inclusive of short-term & long-term outcomes (ie, correlate participation in STEM tutoring to course grades in pre-calculus mathematics courses, and to third semester retention).
• These initiatives will allow the PCSS to:
   o Monitor the effectiveness of UNM's STEM support programs.
   o Identify and report to the Provost areas where unnecessary duplication exist
   o Introduce new efficiencies to the Provost as they are recognized
   o Identify and report to the Provost gaps where there are insufficient STEM student support programs (for instance, for low-income or first generation students)
   o Propose innovations to supplement or revise STEM student support programming
   o Identify and report to the Provost high impact practices that warrant scaling up or increased investment.

COMMITTEE MEMBERS • Faculty representatives from the following STEM colleges/units: College of Arts and

Sciences, School of Engineering, College of Education, Honors College, University College, Health Sciences Center
- Staff representatives who specialize in serving underrepresented and high-need students, including: El Centro de la Raza (Hispanic Student Services), College Enrichment and Outreach Programs (services for first-generation students), Women's Resource Center, Accessibility Resource Center (disability services), American Indian Student Services, African American Student Services and the Veteran's Resource Center.
- Staff representatives who specialize in providing academic student support, including: Center for Academic Program Support (tutoring services), Office of Academic Student Success, Engineering Student Services, Arts & Sciences Advising Center, & University Advisement.
- At least two community representatives from among the following areas: K-12 public schools, community members with specialized skills in addressing underrepresented students, national or regional research laboratories, and/or the Albuquerque Hispanic Chamber of Commerce
- At least one student representative from each of the following areas: El Centro de la Raza, College Enrichment and Outreach Programs, Arts & Sciences degree programs, Engineering degree programs, Education degree program and Health Science Center degree programs.

Strategy 2B: DataMart Tools: Over the past two years, UNM has invested in the creation of a DataMart infrastructure to facilitate the widespread and efficient collection, analysis and reporting of student achievement data. Prior to implementing the DataMart model, most faculty and staff requests for student achievement data were processed on a case-by-case basis by researchers in the Office of Institutional Analytics (OIA). For example, when the Dean of Arts & Science wanted to see success rates for all students enrolled in MATH 121, this request was processed manually within OIA and then sent to the Dean for his review. As the number of such requests has ballooned, this model has put tremendous stress on an understaffed infrastructure designed for compliance reporting rather than information analytics. In addition, this results in frequent overlaps & long delays. For example, the math department requests MATH 121student success rates, while the biology department requests the same information for BIOL 201. Under the previous OIA model, requests were processed individually. The new DataMart model provides a quicker, more efficient approach. For data requests that are frequent and somewhat standardized, OIA is creating a series of general customizable online queries, reports and tools flexible enough to serve the needs of many constituents, while still being simple enough to

require little user training. The STCC strategy will build upon this DataMart model to create

customizable online tools specific to the needs of STCC, the Provost Committee on STEM

Success (PCSS), and to other UNM STEM educators. Each of these tools will be integral to the

success of the Title V project, including a Cohort Tracking tool to monitor student participation

in STCC activities, an Annual Performance Tool to quickly report and analyze APR data, and a

STEM Report tool to assist the STEM Report Team in analyzing student achievement data.

Under STCC guidance, a DataMart programmer will be hired to design, test and roll out the

tools. Once the following tools are completed, the STCC Director will work with PCSSA to

identify subsequent tools for development.

Table 22. DataMart Strategy Implementation Strands and Partners
IMPLEMENTATION STRANDS. DataMart will develop these tools, among others: • **Cohort Tracking and Assessment Tool**: Online tool for STEM support programs to track student participation and correlate to academic achievement outcomes. This tool will be utilized by STCC STEM Summer, Discover STEM and STEM Leadership Academy, as well as by programs who participate on the PCSS. • **STCC Annual Performance Report Tool**: Online tool to collect, analyze and report the Measurable Objectives and Activity Objectives presented in this proposal. This tool will allow for on-demand tracking and reporting of UNM's progress towards objectives. • **State of the STEM Report**: Tool to frequently collect data for the STEM Report Team. • **STEM Return Tool:** Online tool for UNM staff and faculty to quickly identify students who have left UNM degree programs prior to degree completion, prioritized by variables such as credits completed, semesters away and student subpopulation. This tool will be used for the STEM Graduate strategy. • **STEM Return Student Website:** Website to provide students who have left UNM an individualized preliminary pathway back into their degree program. • **STEM Advance Tools**: Online tool for UNM staff and faculty to quickly identify enrolled students who are taking longer than anticipated to complete their STEM degree. This tool will be used for the STEM Graduate strategy. • **STEM Advance Website**: Website that individually analyzes student curricular pathways towards degree completion, and provides preliminary recommendations for faster progress. • **UNM STEM Goals and Key Performance Indicator Tool**: Highly customizable tool that allows UNM to monitor short-term progress towards long-term student achievement goals. • **UNM STEM Performance Indicator Dashboard**: Publicly available website that monitors and reports UNM progress towards UNM STEM student achievement goals, aggregated by ethnicity and SES. This tool will be designed by the PCSS and the STEM Report team. • **High Impact Practice Analysis Tool:** Tool for UNM STEM staff & faculty to correlate student participation in high impact practices (Kuh, 2008) to student achievement outcomes.

• **STEM Program Accountability Tool:** Created with assistance from the Provost Office, tool to document the impact of STEM programs and academic departments on eventual STEM graduates. For instance, regardless of whether a STEM student earns degrees in Mathematics, he or she was impacted by UNM's math courses. This tool will allow administrators to measure this impact of academic and support programs.
PRIMARY PARTNER: Office of Institutional Analytics   **KEY SECONDARY PARTNERS:** Faculty representatives from STEM Colleges, Schools and Departments; Student and Academic Services departments; Provost Office; PCSS

Strategy 2C: Annual State of STEM Report: The Annual State of STEM Report is designed to maximize the impact of the previous strategies in this application. Strategy 1 establishes a model for collaboration and focuses resources for STEM students who are most likely to leave UNM or their majors. Strategy 2A (PCSS) brings the University together to create and achieve institutional STEM student achievement goals. Strategy 2B (DataMart Strategy) provides PCSS and other UNM personnel the tools they need to collect data and analyze collective impact. An Annual State of STEM Report will leverage each of these to influence policy decisions and resource allocation at the University level. Each year STCC will work with a STEM Report Team to draft and publish a UNM State of STEM Report. This report will be presented to the Provost and the President, and will be made publicly available on the STCC website. The State of STEM Report will include the sections described in Table 23.

Throughout the course of the fall and spring semesters, the STEM Report Team will 1) request and collect data from OIA & DataMart tools, 2) meet individually and in focus groups with students, STEM faculty members, academic/student support staff members, and other stakeholders, and 3) visit each of the STEM support programs on campus. During the summers, the team will write and finalize their reports, and then will publish them each September.

Table 23. STEM Report Strategy Implementation Strands and Partners
IMPLEMENTATION STRANDS. The State of STEM Report to the Provost and President will include at least the following sections: • **GOALS:** Data demonstrating UNM's status/progress towards institutional STEM student achievement goals

- **PROGRAMS**: A list and description of the various academic and student support programs available to STEM students at UNM, and correlation of student participation in individual programs to STEM student achievement goals
- **RECOMMENDATIONS:** The STEM Report Team will submit recommendations to the PCSS, the Provost and President regarding the following:
  - Methods to reduce unnecessary duplication of services between STEM support programs
  - Successful high impact practices that warrant scaling up or extension
  - Strategies to improve the number and percentage of Hispanic, high-need and underrepresented students earning STEM bachelor's degrees
  - Strategies for improving the University's performance in the P-20 pipeline
  - PCSS will draft a tactical plan for implementing the recommendations proposed in the State of STEM report, and will submit it to the Provost during the spring semester following each report publication

STEM REPORT TEAM MEMBERS:

- Four faculty representatives appointed by the Provost (Two from STEM disciplines, one STEM educator from the College of Education, and one efficiency or process expert from the disciplines of Organizational Leadership or Business Management)
- One student representative from a STEM discipline
- One community representative from a national research laboratory
- One representative from NM's public school system
- Three staff members, including representatives from El Centro de la Raza (Hispanic student services), College Enrichment and Outreach Opportunities (first-generation student services) and the Accessibility Resources Center (disability services)

a) The rationale for the implementation strategy for each activity, clearly described and supported by the results of relevant studies or projects

Through data collected from the National Survey of Student Engagement, George Kuh identified high impact practices that demonstrate substantial educational benefits to students and that underline correlate to college persistence, especially among underrepresented students (2008). These practices are listed and incorporated into individual strategies in Table 24.

Table 24. High Impact Practices that Correlate with Student Persistence (Kuh, 2008)	
HIGH IMPACT PRACTICES	**ALIGNED STRATEGIES**
First-year seminars and experiences that bring students together with faculty and staff, and that place a strong emphasis on critical inquiry, frequent writing, information literacy, collaborative learning and other skills that develop students' intellectual and practical competencies. These experiences can also involve students with cutting-edge questions with faculty members' own research.	STEM Summer, STEM Leadership Academy, Provost Committee on STEM Success (PCSS)

Common intellectual experiences that require students to learn together, and combine broad themes (i.e., technology and society) with a variety of curricular and co-curricular options for students.	STEM Summer, STEM Leadership Academy, Discover STEM, PCSS
Collaborative learning assignments and projects that require students to work and solve problems in the company of others, and that sharpen one's own understanding by listening seriously to the insights of others.	STEM Summer, STEM Leadership Academy, PCSS
Undergraduate research that involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions.	STEM Summer, PCSS
Diversity/global learning experiences that help students explore cultures, life experiences and world views different from their own. These are frequently augmented by community-based learning.	STEM Summer, STEM Leadership Academy, PCSS
Service learning and community-based learning that give students direct experience with issues they are studying and with ongoing efforts to analyze and solve problems.	STEM Leadership Academy, PCSS
Internships that provide students with direct experience in a work setting, usually related to their career interests.	STEM Summer, PCSS

In addition, each strategy is designed to incorporate empirically proven methods (Table 25).

Table 25. Rationale for Implementation	
AREA OF IMPACT	**EVIDENCE OF IMPACT**
Career Planning Aligned strategies: STEM Summer, Discover STEM, STEM Leadership Academy	Prior knowledge of the STEM profession & the opportunity to talk to professionals differentiates students who remain in the major & those who switch (Good et al, 2002; Tsui, 2007). The factor that most influences the consideration of a major is student interest (Beggs et al, 2009). If a student has not been exposed to STEM, they cannot develop an interest (Hall et al, 2011). Career-planning courses reduce career decision-making difficulties & increase career self-efficacy (Fouad, 2011). Professional development activities allow underrepresented students to engage in networking & participate in conferences to develop & socialize within a discipline & profession (National Academies, 2011). Model program: UC-Berkeley, Center for STEM Innovation, Leadership and Diversity.
Leadership Development Aligned strategy: STEM Leadership Academy	Students who participate in leadership programs demonstrate significant growth in leadership-related measures including civic responsibility, multicultural awareness, understanding of leadership theory & societal values (Cress, 2001). For underrepresented students, success may also hinge on the extent to which they participate in activities promoting social integration (National Academies, 2011).
Service Learning and Civic Engagement Aligned strategy: STEM Summer, STEM	Participation in community service opportunities favorably influences academic development, civic responsibility, & life skills (Astin, 1998). Experiential education that takes students into the community helps students connect classroom study to the world, and transform inert

Leadership Academy	knowledge into knowledge-in-use (Eyler, 2009). Students who participate in service learning engage in greater interactions with faculty and staff (Keup, 2005), are more active socially, more connected to their peers (Wolff & Tinney, 2006), & more likely to persist in college (Hatcher et al 2002; Vogelgesang et al 2002).
Undergraduate Research and Internships Aligned strategy: STEM Summer	Students who participate in undergraduate research are more likely to graduate (Jones et al, 2010), have higher GPAs than their peers, graduate sooner, obtain employment within discipline sooner (Kinkel, 2006) & indicate they are more likely to pursue a career in research (Owerbach et al, 2013). Underrepresented students who participate in undergraduate research programs are more likely to remain in their STEM major (Chang et al, 2014), are twice as likely to graduate, & five times more likely to go to grad school than control group students (Summers, 2006). Internship opportunities increase multicultural skills & reduced negative racial attitudes (Simons et al, 2012). Undergraduate research further develops interest & competence for underrepresented students (National Academies, 2011).
Summer Programming Aligned strategy: STEM Summer	Summer programs that target underrepresented students stimulate interest in STEM fields (National Academies, 2011). Model programs include: UW-Eau Claire, Summer STEM research program; Salisbury University, Bridges for Success STEM Summer Research Experience.
Collaborative Programming Aligned strategy: PCSS	Coordination and integration of efforts make the aggregate of individual programs stronger than the sum of their parts (National Academies, 2011).

b) Realistic and likely to be attained timetable(s) for each activity

Table 26. Activity Implementation Timetable		
Task	**Responsible Individual**	**Timeline (month/year)**
1. Assemble strategy-related teams and committees		
Convene the Provost Committee on STEM Success (PCSS) and PCSS Subcommittees	Project Director	10/14 Monthly thereafter
STCC Oversight Council co-chairs finalize council membership and articulate Council charge	STCC Co-Chairs	10/14
Convene the STCC Oversight Council.	STCC Co-Chairs	11/14 Monthly thereafter
Convene the Title V faculty and student advisory councils to collect feedback regarding project effectiveness	Project Director	1/15 Meeting Twice Per Semester
2. Implement the STEM Summer strategy		
Convene a STEM Summer committee, including representation from each of the identified partners. Identify additional partners as needed.	Program Manager	10/14 Meeting at least monthly

Develop Learning Outcomes for each STEM Summer module	STEM Summer Committee	1/15
Finalize design for the modular format of STEM Summer. Select start/end dates, days of the week, and start/end times for each module.	STEM Summer Committee	1/15
Develop process for student application, nomination and selection	STEM Summer Committee	2/15
Convene work-teams to design curriculum, schedules and logistics for each of the STEM Summer modules	STEM Summer Committee	1/15 Meeting as needed
Develop & implement a student recruitment plan to attract Hispanic, low-income & high-need students	STEM Summer Committee	1/15
Implement STEM Summer programming	STCC Staff and STEM Summer Committee	5/15 each summer
Collect participant feedback and improve program	Program Manager	Ongoing
3. Implement the STEM Graduate strategy		
Develop procedures for identifying and prioritizing students in need of STEM Graduate interventions	Program Manager and Acad. Succ. Staff	12/14
Train Graduate Assistant	Acad. Succ. Staff	1/15
Identify and contact students who have left UNM and provide them with return pathways	Graduate Assistant	Each spring semester
Identify UNM students who are lagging behind on their STEM degree, and work with STEM advising centers to accelerate their curricular pathways	Graduate Assistant	Each fall semester
Collect participant feedback and improve program	Project Director	Ongoing
4. Implement the Discover STEM Conference strategy		
Convene a Discover STEM committee, including representation from each of the identified partners. Identify additional partners as needed.	Program Director and Career Services Director	10/14 Meeting at least monthly
Develop Learning Outcomes for the Discover STEM Conference	Discover STEM Committee	11/14
Finalize design for Discover STEM conference	Discover STEM Committee	12/14
Select two key-note presenters, one for STEM career exploration & one for emerging technologies	Discover STEM Committee	Each February
Invite industry and community leaders to present and/or showcase technologies at the conference	Discover STEM Committee	Each February
Leverage partnership with Innovate ABQ to showcase regionally developed emerging technologies	Project Director	Each February
Develop & implement a student recruitment plan to attract Hispanic, low-income & high-need students	Program Manager and Discover STEM Committee	12/14
Implement STEM Summer programming	Program Manager and Discover STEM Committee	Each March

Collect participant feedback and improve program	Program Manager	Ongoing
5. Implement STEM Leadership Academy		
Convene a STEM Leadership Academy (SLA) Committee, including representation from each of the identified partners.	Program Manager	02/15 Meeting at least monthly
Develop Learning Outcomes for the STEM Leadership Academy	SLA Committee	04/15
Finalize design for SLA, including civic engagement and/or service learning	SLA Committee	05/15
Develop & implement a student recruitment plan to attract Hispanic, low-income & high-need students	SLA Committee	08/15
Develop process for student application, nomination and selection	SLA Committee	06/15
Implement STEM Summer programming	SLA Committee and Program Manager	Each January, starting 01/16
Collect participant feedback and improve program	Program Manager	Ongoing
6. Implement Provost Committee on STEM Success (PCSS)		
Develop a publicly available dashboard (through the DataMart strategy) that demonstrates institutional progress towards STEM goals and performance indicators	Project Director, PCSS and DataMart Programmer	06/16
Develop collaborative programming that is designed to increase student participation or program effectiveness	PCSS and Project Director	Each Year Recurring
7. Implement DataMart Strategy		
Train DataMart programmer to develop online tools	Director of Office of Inst. Analytics	1/15
Develop the tools in Table 22, prioritized in order of completion.	DataMart Programmer	Starting 10/14 Ending 10/17
Identify and develop additional online tools	Project Director and DataMart Programmer	Starting 10/17
Collect user feedback and improve program	Project Director	Ongoing
8. Implement State of STEM Report		
Finalize format and sections of the UNM State of STEM Report	Project Director and Provost	11/14
Develop process for collecting data needed by the STEM Report team	Project Director and Dir. Of Inst. Anal.	11/14
Nominate and select team members	PCSS and Provost	12/14
Convene the team and select team chair	STEM Report team	01/15
Create a catalog of similar institutional reports to share with authorship team	Administrative Assistant	1/15
Draft and publish report	STEM Report Team	Each September

IV.   KEY PERSONNEL

Tim Schroeder will serve as the Project Director and Activity Director for this Title V project and will devote 100% of his time to HSI Title V grant and STCC functions. Schroeder is currently the Director of the UNM STEM Gateway Program. In this role, he has developed academic support programming designed to improve Hispanic and low-income student success in STEM gateway courses (i.e., general chemistry and college algebra), and has explored the variables that correlate with STEM student success at UNM (Table 2 on p. 7). Schroeder has 25 years' experience in college academic and student services, specializing in serving traditionally underrepresented students. Prior to joining UNM, he served as Senior Director of Student Academic Success at San Juan College (developing support programs for Native American students and overseeing the SJC branch of the Hispanic-serving ENLACE program), and Coordinator of Student Services at the University of Alaska (developing support programs for Native Alaskan students). Schroeder currently chairs the FYSC Data Subcommittee, and oversees the University's efforts to identify & strengthen first-year student high impact practices.

Tim Schroeder has authored and/or supervised ten large grant-funded programs (over $15M), including six Department of Education Title III and HSI projects. Three of these projects were designed specifically to improve STEM academic achievement for underrepresented students. Schroeder received his Bachelor of Arts degree in Political Science from Southwestern College, and his Masters of Science in Education from Newman University. He is currently completing his Educational Doctorate degree in Educational Leadership, and his dissertation research explores University administrator perceptions towards STEM challenges.

Schroeder's responsibilities as Project Director include: ensuring compliance with all U.S. Department of Education (DOE) and University policies and procedures; hiring, training and

supervising all STCC staff; overseeing the design, development and implementation of STCC

programming; overseeing all aspects of budgeting and expenditures; building and maintaining

the partnerships necessary for effective programming; collecting and reporting formative and

summative data to UNM administrators, stakeholders and DOE; and overseeing the

institutionalization of STCC strategies.

Table 27. Program Managers, to Be Hired (2 positions at 100% project time each)	
Major Responsibilities	Qualifications
• Participate in the hiring and training of GAs • Develop strong working relationships with partner organizations • Oversee the development & implementation of assigned project strategies • Participate in formative and summative evaluation of project strategies & outcomes • Participate in the monitoring of budgets	• Master's Degree or higher (preferred qualification degree in a STEM field) • Strong interpersonal & communication skills • Proven experience working with faculty and staff in higher education setting • Proven experience serving under-represented students • Proven experience leading teams

V.   PROJECT MANAGEMENT PLAN

Dr. Chaouki Abdallah, the University of New Mexico Provost and Executive Vice President

for Academic Affairs, will have ultimate responsibility and supervision of this program,

regularly monitoring project implementation and institutionalizing grant strategies at the end of

the funding period. Abdallah will delegate authority for project coordination to Tim Schroeder,

who will serve as the HSI Title V Project Director and the Director of the STEM Collaboration

Center (STCC). Schroeder will have full authority to administer the day-to-day operation of the

project, and in matters pertaining to this project and STCC, will have direct access to the

Provost. Schroeder will regularly inform the Provost of progress.

The efforts of Schroeder and STCC will be administered by a high level STCC Oversight

Council. This council will be co-chaired by Greg Heileman, Tim Gutierrez and Carlos Romero.

Table 28. Responsibilities and Qualifications of STCC Oversight Council Co-Chairs	
Dr. Greg Heileman, Associate Provost for Curriculum	
Key Responsibilities: Encourage participation by STEM disciplines and academic deans; build partnerships with academic support units; ensure alignment of STCC learning outcomes to those of STEM courses.	**Qualifications:** Professor in the Department of Electrical and Computer Engineering; degrees in computer engineering, biomedical engineering, mathematics, and biology; Oversight of Academic Support programs.
Dr. Tim Gutierrez, Associate Vice President for Student Affairs	
Key Responsibilities: Encourage participation by Student Affairs programs; Ensure grant compliance regulations are met.	**Qualifications:** 30 yrs experience as a University administrator/educator; 15 yrs experience with diverse U.S. Dept. of Education development & retention programs
Carlos Romero, Associate Vice President for Research	
Key Responsibilities: Connect STCC activities to UNM faculty-led research projects, to national and state policy makers and to STEM industry leaders	**Qualifications:** 13 yrs experience in public policy and sponsored research, including oversight of UNM governmental relations, research grant development/compliance, and community relations for research initiatives

Table 29. Additional Members of the STCC Oversight Council	
MEMBER NAME	**TITLE**
Rosa Isela Cervantes	Director of El Centro de la Raza (Hispanic student services)
Michael Dougher	Vice Provost Research & Economic Develop.; Prof. of Psychology
Charles Fledderman	Associate Dean of the School of Engineering
Vi Florez	Interim Dean of the College of Education: Prof. of Education
Kate Krause	Dean of Honors and Undergraduate Colleges; Prof. of Economics
Kevin Malloy	Associate Dean of the College of Arts & Sciences; Professor of Electrical and Computer Engineering
Diane Marshall	Associate Dean of the College of Arts & Sciences: Prof. of Biology
Sonia Maria Gipson Rankin	Associate Dean of University College; Lecturer in Africana Studies
Valorie Laggot Romero	VP of Diversity at the Health Science Center
Eliseo Torres	Vice President for Student Affairs

Each of these persons participated in the design of this application, and all have agreed to serve on the Oversight Council. In addition to supervising operations, the Oversight Council will be responsible for approving STCC policies and for working with the Provost and partner departments to institutionalize successful projects after the funding period. Dr. Gutierrez will supervise Mr. Schroeder and monitor STCC compliance with UNM and Dept. of Ed. policies & procedures.

Schroeder will be assisted in the implementation of STCC strategies by members of the

Provost Committee on STEM Success (PCSS). This team will meet at least once monthly, with

subcommittees meeting more frequently as needed.

Figure 1. Organizational Chart
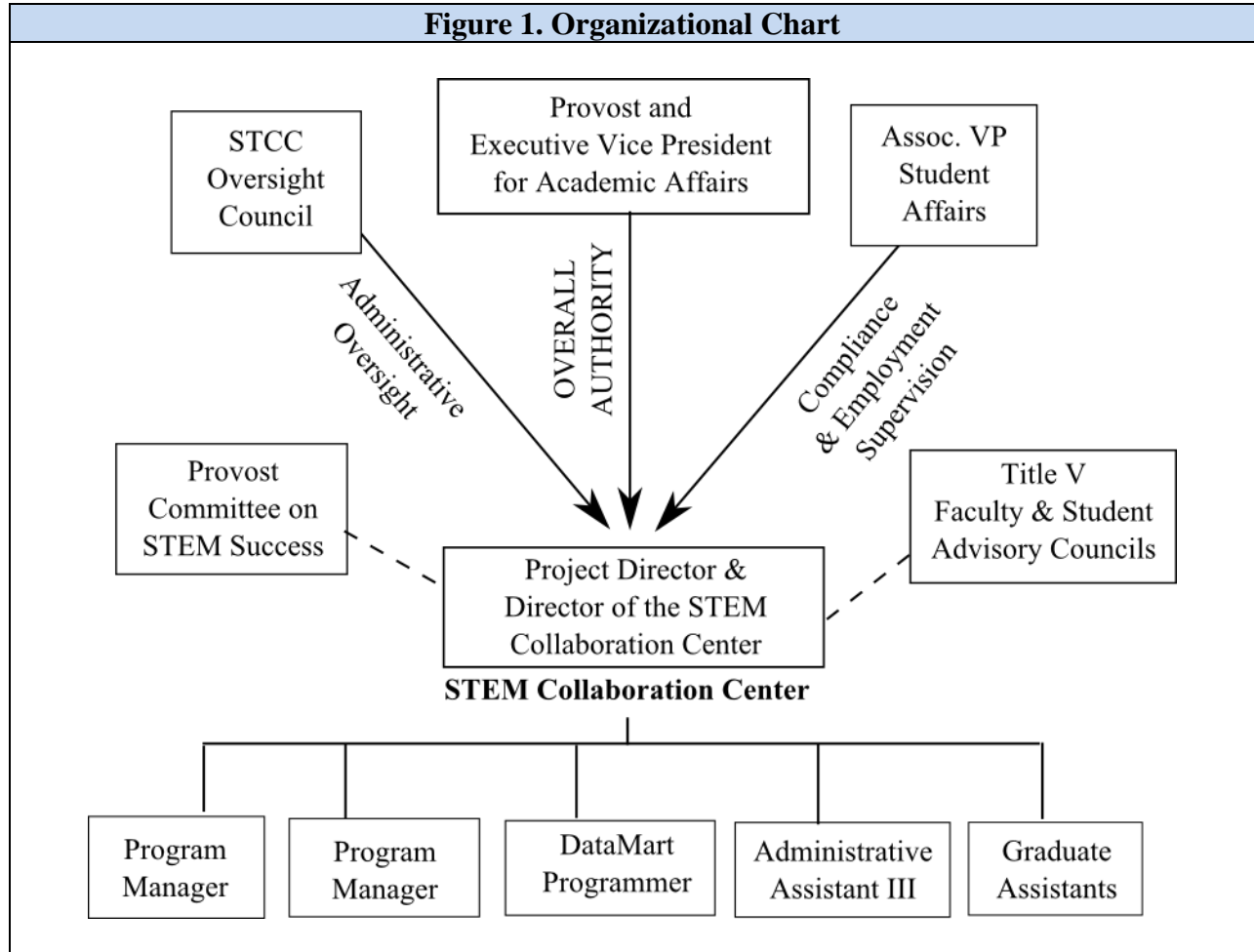
Procedures: UNM will employ policies and procedures that adhere to HSI regulations and that

promote effective and efficient program administration. Procedures for project administration

will reflect attention to the eventual full integration of the strategies into regular institutional

operations. Policies and procedures will be refined as needed during the grant period. Inherent

in the policies and procedures is an internal monitoring and reporting system to ensure sound

fiscal management, efficient project operation leading to achievement of objectives, and

avoidance of any supplanting of institutional funds with federal funds.

Grant Personnel: UNM makes every effort to hire qualified personnel, which includes being members of target populations for which service is sought. In this case qualified personnel will be sought from members of underrepresented groups, particularly individuals who are Hispanic, or are from low-income or high-need backgrounds. STCC will employ two program managers, one administrative assistant, one DataMart programmer, and six graduate assistants. STCC staff will work as a team to implement all of the strategies described in this application. GAs will receive additional support from the UNM Graduate Resource Center.

Table 30. Project Management Implementation Timetable		
Task	**Responsible Individual**	**Timeline (month/year)**
1. Recruit and hire program staff		
Advertise, recruit for, interview and hire professional and support staff positions	Project Director	By 12/14
Advertise, recruit for, interview and hire graduate assistants for the following areas: STEM Graduate, STEM Summer	Project Director and Directors of Partner Programs	By 12/14 ongoing thereafter
Train professional staff, support staff and graduate assistants in the following areas (among others): institutional procedures and policies, grant compliance policies and regulations, securing student data, protecting student privacy, collaboration methods, and promoting diversity	Project Director and Directors of Partner Programs	By 1/15
2. Develop student participation tracking system and grant compliance infrastructure		
Assemble Title V compliance notebooks	Project Director	11/14
Complete Contract for External Evaluator	Project Director	11/14
Prior to the completion of the DataMart Cohort Tracking Tool and the DataMart STCC APR Tool, collaborate with the Office of Institutional Analytics to collect and report on Measurable and Activity Outcomes. This data will be pulled from student participation logs, rosters and STCC files, and from UNM student information systems (i.e., Banner and LoboAchieve)	Project Director and the Director of the Office of Institutional Analytics	03/15

Develop a DataMart Cohort Tracking tool to collect, monitor and report student participation data	PCSS DataMart Subcommittee and the DataMart Programmer	02/15
Develop a DataMart Annual Performance Report Tool to annually collect and report Measurable and Activity Outcomes	Project Director and DataMart Programmer	06/15
Utilize DataMart tools to collect and report on Measurable and Activity Outcomes.	Project Director	9/15 And each 6 months
Host External Evaluator visit to campus and share findings with Provost and STCC Oversight Council	Project Director and External Evaluator	July of each year
3. Assemble strategy-related teams and committees		
Convene the Provost Committee on STEM Success (PCSS) and PCSS Subcommittees	Project Director	10/14 Monthly thereafter
STCC Oversight Council co-chairs finalize the council membership, articulate the Council charge, and set agenda for the first meeting	STCC Co-Chairs	10/14
Convene the STCC Oversight Council.	STCC Co-Chairs	11/14 Monthly thereafter
Convene the Title V faculty and student advisory councils to collect feedback regarding effectiveness	Project Director	2/15 Meeting twice per year
4. Implement Activities (see Table 26)		
5. Collect feedback on program performance and develop improvement strategies		
Collect feedback from the External Evaluator	Project Director	September of each year
Collect feedback from the Faculty and Student Advisory Councils	Project Director and Program Managers	2/15 Meeting Twice Per Semester
Collect feedback from the STCC Oversight Council	Project Director & Oversight Co-Chairs	Ongoing, starting 10/14
Collect feedback from the PCSS	Project Director	Ongoing, starting 10/14
Provide interim progress & feedback reports to the Provost, PCSS & STCC Oversight Council	Project Director	Ongoing, starting 10/14
Review feedback and formulate improvement plans during an annual STCC Planning Meeting that includes participation from STCC staff and representatives from each of the primary partner organizations. Submit annual improvement plan to the Provost	Project Director, STCC staff, STCC Oversight Council Co-Chairs, Partner organizations	9/14 Annually thereafter
Submit improvement plans to the Provost	Project Director	10/14 Annually thereafter

Submit Annual Performance Review to the U.S. Department of Education	Project Director	3/15 and each six months thereafter

VI.   PROJECT EVALUATION PLAN

Evaluation will be both formative and summative and will begin at project outset and last for the duration of the project. This will allow for early, ongoing, and consistent feedback on UNM Title V project implementation and effectiveness on its progress toward meeting program goals, objectives, and specific performance indicators as indicated by the Secretary. Data collection strategies for the formative portion of the evaluation will consist of official data (e.g. demographics, grades, enrollment, and persistence) and qualitative data (e.g. surveys and/or interviews, stakeholder feedback, strategy evaluations, observations, and committee minutes).

The proposed DataMart strategy will be used to automate the collection of key data points, and the STCC website will be used to provide ongoing progress updates to the UNM community and elicit feedback to ensure continuous program improvement. Summative evaluation focuses on achievement of goals and objectives, student progress and Title V performance indicators. Summative evaluation conducted at the midpoint and end of each grant year will focus on accomplishments toward the specific objectives for that time. Final summative evaluation at project's end will focus on total accomplishments relevant to project objectives and related UNM strategic goals. Both quantitative and qualitative evaluation methods will be used. Formative and summative evaluation will help shape the project development and measure progress. Formative and summative data provide the basis for data-driven decision making and continuous program improvement based on evaluative feedback. In so doing, it will help increase the capacity of UNM to serve Hispanic, low-income, and high need students.

Overall evaluation of the proposed activities will be supervised by the Project Director with support from the Office of Institutional Analytics. Starting in Year One, an external evaluator

will be hired to conduct an objective analysis of the program. Deborah Baness King, Ph.D., is

the contracted independent evaluator for the project. Dr. King brings to this project more than 15

years in education, including 10 years working with federal, state and local grant-funded

programs. She has written and received funding for programs through the US Dept. of

Education TRiO Programs, Office of Migrant Education Programs, Title V, and the US Dept. of

Labor. She served as federal grant application panel reader and a consultant for proposal review

workshops, and has held leadership positions with the Council for Opportunity in Education,

Southwest Assoc. of Student Assistance Programs, College Reading and Learning Assoc.,

National Association of Student Personnel Administrators, and the Mid-America Association of

Educational Opportunity Program Personnel.

Dr. King will meet with program staff, PCSS, the STCC Oversight Council, the advisory

councils, STEM student focus groups and other stakeholders once per year, and will provide a

comprehensive report regarding program effectiveness and grant compliance within two months

after the visit. The report will be presented to the STCC Director & Oversight Council co-chairs.

Dr. King will provide project staff with additional on-demand consultation regarding grant

compliance & effectiveness throughout the five years of the project.

Evaluation Objectives: UNM has established the following objectives for the evaluation

process in order to take developmental advantage of the project: 1) measure progress toward

attainment of goals and objectives and provide quantifiable data regarding accomplishments,

2) inform institutional decision-making with quantifiable data about project achievements, and

3) achieve integration of data-proven strategies into regular institutional operations.

General Outcomes of the Evaluation Process: By the end of the grant period, it is anticipated

that the following will have been accomplished as a result of the University's evaluation process:

UNM will have objective and quantifiable data about each strategy as a result of internal reports and Title V Performance reports, and the successful strategies will have been institutionalized into ongoing University structures, expectations and assessment.

Process and Personnel for Analyzing Formative and Summative Data: The STCC Oversight Council will review all data and progress reports prior to submission to the Provost. In addition to other scheduled Council meetings, the STCC Oversight Council will be convened at least once per semester specifically for the purpose of formative evaluation. The Project Director will convene a STEM Student Advisory Council and a STEM Faculty Advisory council to provide objective feedback regarding project implementation. These councils will meet twice per year with the Project Director and STCC Oversight Council Co-Chairs to hear progress reports and offer suggestions for improvement, expansion and institutionalization.

The University Grants Compliance Officers, the Project Director, the Associate VP of Student Affairs and the External Evaluator will ensure that UNM complies with EDGAR regulations regarding systematic monitoring of the project.

During regular staff meetings, STCC personnel will utilize the The BEST Evaluation Criteria for Assessing Education Programs/Practices to help monitor and discuss strategy effectiveness (Table 31).

Table 31. BEST Evaluation Criteria for Assessing Education Programs/Practices
(Building Engineering and Science Talent, A Bridge For All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering and Mathematic, 2004)
Selected Questions/Criteria: 1. Were expected outcomes defined before strategy launch? 2. Are outcome data attributable to the strategy intervention? 3. Does strategy demonstrate excellence, which requires equity? Does the strategy increase the diversity of the target population? 4. What was the value-added of the experience to the target population? 5. Is there evidence of effectiveness with a population different from that originally targeted? 6. Were there unexpected consequences?

Table 32. Evaluation Plan Linked to Project Objectives	
Data Analysis: Formative evaluation data will be analyzed by the Project Director and grant program staff on an ongoing basis. Formative evaluation data will be used to prepare the summative evaluation.	
Data Reporting: For each objective, the Project Director submits monthly reports (where possible) to the Oversight Council and Provost, and submits annual reports to the Provost, Oversight Council and Provost Committee on STEM Success. Formal performance reports are made publicly available on STEM Collaboration Center website as they are completed.	
MO1. Compared to 2013-14 historic data, **increase the *number* of Hispanic, low-income and high-need first-year students who go on to earn STEM bachelor's degrees within four years.**	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014, and 3) who earn a bachelor's degree in STEM[5] within four years of their first semester. Compare to baseline cohort from 2013-14.	Data will be collected from participation logs and STCC files, and from student information systems. This data will be collected in collaboration with the Office of Institutional Analytics. Once the DataMart APR Tool and Cohort Tracking Tools (Table 22) are completed, data will be collected through these systems. Progress towards objectives will be measured monthly, and reported to the Provost and the STCC Council every six months.
MO2. Compared to 2013-14 historic data, increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who go on to earn STEM bachelor's degrees within four years**	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014. Count the number of these students who earn a STEM degree[5] within four years of their first semester. Compare to baseline cohort from 2013-14.	Same as MO1.
MO3. Compared to 2013-14 historic data, increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who return to UNM for their second year**	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014. Count the number of these students who remain enrolled for their third semester. Compare to baseline cohort from 2013-14.	Same as MO1.
MO4. Compared to 2013-14 historic data, **increase the *proportion* of Hispanic, low-income and high-need STEM-interested first-year students who return to UNM for their third year**	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014. Count the number of these	Same as MO1.

students who remain enrolled for their fifth semester. Compare to baseline cohort from 2013-14.	
MO5. Compared to 2013-14 historic data, d**ecrease the *proportion* of Hispanic, low-income and high-need first-year students who go on to switch out of STEM degrees within two years**	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014. Count the number of these students who have remained at UNM but have changed majors away from STEM[5] within their first four semesters. Compare to baseline cohort from 2013-14.	Same as MO1.
MO6. Compared to 2013-14 historic data, i**ncrease the *number* of Hispanic, low-income and high-need STEM-interested undergraduate students who are enrolled at UNM**	
Data Elements	**Data Collection**
Count the number of undergraduate students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicate a STEM interest[5]. Compare to baseline cohort from 2013-14.	Same as MO1.

AO1. During the first grant year, 40 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in STEM Summer. During each subsequent grant year, 60 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in STEM Summer.	
Data Elements	**Data Collection**
Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, and 3) who complete any module of STEM Summer during this APR year.	Data collected from STEM Summer participation rosters/logs. This data will be stored initially in STCC files, and will later be stored in the Cohort Tracking Tool once completed (Table 22).
AO2. During the first grant year, 10 students will re-enter their STEM degree program or accelerate their STEM degree progress with assistance from STEM Graduate strategy. During each subsequent year, 30 students will re-enter their STEM degree program or accelerate their STEM degree progress with assistance from STEM Graduate strategy.	
Data Elements	**Data Collection**
Count the number of undergraduate students who indicated a STEM interest, and who were successfully assisted by STEM Graduate during this APR year.	Data collected from STEM Graduation participation rosters/logs. This data will be stored initially in STCC files, and will later be stored in the Cohort Tracking Tool once completed (Table 22).
AO3. During the first year of the grant, 250 STEM-interested students will participate in the Discover STEM Conference. During each subsequent year, 400 STEM-interested students will participate in the Discover STEM Conference.	
Data Elements	**Data Collection**
Count the number of undergraduate STEM-interested students who participated in the Discover STEM Conference during this APR year.	Data collected from STEM Conference sign-in rosters. This data will be stored first in STCC files, and will later be stored in the Cohort Tracking Tool once completed (Table 22).

AO4. During the second grant year, 30 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in the STEM Leadership Academy. During each subsequent grant year, 40 STEM-interested first-year and second-year Hispanic, low-income and high-need students will participate in the STEM Leadership Academy.	
Data Elements	**Data Collection**
Count the number of first-year[1] or second-year students who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) have participated in the STEM Leadership Academy this year.	Data collected from Leadership Academy logs. This data will be stored initially in STCC files, and will later be stored in the Cohort Tracking Tool once completed (Table 22).

AO5: Compared to 2013-14 historic data, the *number* and *proportion* of Hispanic, low-income and high-need first-year students who participate in STEM Summer, STEM Graduate, Discover STEM or STEM Leadership Academy and then who go on to earn STEM bachelor's degrees by September 2019 will increase by 20%	
Data Elements	**Data Collection**
Starting with 2014-2015, Count the number of first-year students[1] who are: 1) Hispanic, low-income[2] or high-need[3] students, and 2) who indicated a STEM interest during their first year[4] at UNM, starting with Fall 2014, and 3) who participated in any STEM Summer, STEM Graduate, Discover STEM or STEM Leadership Academy, and 3) who earn a bachelor's degree in STEM[5] within four years by September 2019. Compare to baseline first-semester STEM-interested cohort from 2013-14 who graduated STEM by September 2018.	Data will be collected from participation logs and STCC files, and from student information systems. This data will be collected in collaboration with the Office of Institutional Analytics. Progress towards this objectives will be measured at the conclusion of each semester, and will be reported to the Provost and the STCC Council every six months.

AO6. During each grant year, at least 4 collaborative STEM activities will be sponsored by or facilitated by the PCSS.	
Data Elements	**Data Collection**
Count the number of collaborative activities	Data collected from PCSS Minutes

AO7. During each grant year, at least 4 DataMart tools will be created by STCC.	
Data Elements	**Data Collection**
Count the number of online tools	Data collected from STCC files.

AO8. During each grant year, one State of STEM report will published and submitted to the PCSS, Provost and President	
Data Elements	**Data Collection**
Count the number of reports	Data collected through STCC logs

NOTES: [1]Defined as students in their first or second semester at UNM, and who have transferred in fewer than 12 college credits (this definition allows for students to have completed dual credit courses while in high school). [2]Low-income is defined as Pell-grant eligible. [3]High-need students are those who meet the definition provided in the RFP for this grant. [4]As indicated by the student selecting a STEM major on their application, or indicating a STEM interest to their academic advisor during the first two semesters. [5]STEM disciplines are listed on page 18.

AO9. By September 2019, the PCSS Collaborative Initiatives, DataMart Tools and State of STEM Report will save UNM $89,000 in expenditures and 6,500 personnel hours.	
Data Elements	**Data Collection**
Project Director will work with UNM Staff to estimate unit savings in dollars and personnel hours for DataMart tools and collaborative initiatives; This will be multiplied by the number of times queries are run and collaborative programs are implemented. The Director will monitor STEM Report recommendations implemented and work with the Provost Office to assess savings.	DataMart report logs; estimate worksheets developed and completed by STCC and staff from Office of Institutional Analytics and Provost Office: finance and HR reports from Banner information system.

VII.   BUDGET

Personnel: Each position outlined in this line item has specific job duties and responsibilities.

Compensation per UNM Salary Schedule. Annual 2% salary increase added for each position.

As per Title V guidelines Years are defined as October 1 – September 30 for each project year.

	Position	#, %, Mo.	YR1 2014-15	YR2 2015-16	YR3 2016-17	YR4 2017-18	YR5 2018-19	Total 2014-19
PERSONNEL COSTS								
Project Staff								
	Project Director	1 @ 100% x 12mos.	75,000	76,500	78,030	79,591	81,182	390,303
	Program Manager	2@100% x 12 mos.	50,000/1 100,000	51,000/1 102,000	52,020/1 104,040	53,060/1 106,120	54,122/1 108,244	520,404
	DataMart Programmer	1@100% x 12mos.	60,000	61,200	62,424	63,672	64,946	312,242
	Adm. Assistant	1@100% x 12 mos.	30,000	30,600	31,212	31,836	32,473	156,121
TOTAL	**Project Staff**		265,000	270,300	275,706	281,219	286,845	1,379,070
Project Graduate Student Assistants (GA's)								
TOTAL: Project Graduate Assistant			69,000	70,380	71,788	73,221	74,686	359,075
TOTAL Personnel Costs: Staff +GA			**334,000**	**340,680**	**347,494**	**354,440**	**361,531**	**1,738,145**

Fringe Benefits: As per UNM Office of Vice President for Research & Economic Development

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Staff Total FB	96,725	100,822	104,493	107,988	110,148	520,176
GA Total FB	8,769	9,190	9,628	10,086	10,101	47,774
TOTAL FB	**105,494**	**110,012**	**114,121**	**118,074**	**120,249**	**567,950**

Travel: Aligned with federal guidelines for travel. Travel for professional development and to

present at conferences state and nationwide.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Travel	**12,000**	**7,000**	**6,000**	**6,000**	**3,000**	**34,000**

Supplies: General STCC office supplies, Resource and Educational materials; Program supplies.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Supplies	**30,000**	**19,000**	**9,000**	**6,000**	**0**	**64,000**

Contractual: Funds to contract UNM STEM faculty for work on UNM State of STEM Annual

Report. This is beyond faculty's regular course of duties. Funds for Title V Outside Evaluator.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total	**15,000**	**15,000**	**15,000**	**15,000**	**15,000**	**75,000**

Indirect: $0 No Indirect Cost will be applied as per federal regulations 606.30C.

Other: Expenses for STEM Summer STEM Leadership Academy, DiscoverSTEM Conference.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
STEM Summer	13,000	9,000	9,000	8,000	8,000	47,000
Leadership Academy	0	8,000	8,000	4,000	4,000	24,000
DiscoverSTEM Conference	15,000	16,000	16,000	13,000	13,000	73,000

Total UNM Direct Cost Request

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Annual Request	524,494	524,692	524,615	524,514	524,780	2,623,095

VIII. COMPETITIVE PRIORITIES

Competitive Priority 1: "Projects that are designed to increase the number and proportion of high-need students who persist in and complete college or other postsecondary education and training."

The strategies, measurable objectives and Goal One activity objectives of this proposal align directly with Competitive Priority One. Each of these strategies is designed to increase the number & proportion of high-need students who persist and earn STEM degrees. Table 33 lists the high-need students served & the project methods utilized to improve their achievement rates.

Table 33. High-Need Students Served by the STEM Collaboration Center	
HIGH-NEED POPULATION	**METHODS AND ALIGNED STRATEGIES UTILIZED TO SERVETHIS POPULATION**
Students who have left college before finishing a degree	The **STEM Graduate** (STEM Return) program will reach out to these students and assist them in developing return pathways
Students who are at risk of not graduating with a degree on time	The **STEM Graduate** (STEM Advance) program will reach out to these students and help them build and follow accelerated pathways to degree completion
Students who are not on track to become career-ready by graduation	The **Discover STEM** Conference and **STEM Summer** will assist students develop an accurate set of career strategies around which to build work-place skills. The **STEM Leadership Academy** will prepare students to assume leadership roles in the workforce.
Students who have disabilities	The Accessibility Resource Center (ARC) will partner with STCC in developing each of the following strategies: **STEM Summer, STEM Graduate, Discover STEM Conference, and the STEM Leadership Academy**. ARC will also participate on the Provost Committee for STEM Success.
Students who are living in poverty	STCC strategies are designed to provide career planning activities for low-income and first-generation students who have had limited exposure to high-tech and research careers. The **Summer Leadership Academy** is designed to empower low-income students to develop strong leadership skills, leading to high-level STEM positions. The **STEM Summer** program is designed to allow students to work part-time while participating.
Students who are immigrants and/or are migrant	The **STEM Summer program** was designed to complement, align with and build upon the successes of the UNM CAMP program for students from migrant families. CAMP participants will be given priority to participate in the STEM Leadership Academy.

George Kuh identified high impact practices that demonstrate substantial educational benefits to students and that <u>correlate to college persistence</u>, especially among underrepresented students (2008). These practices are listed and incorporated into individual strategies in Table 34.

Table 34. High Impact Practices that Correlate with Student Persistence (Kuh, 2008)	
HIGH IMPACT PRACTICES	**ALIGNED STRATEGIES**
First-year seminars and experiences that bring students together with faculty and staff, and that place a strong emphasis on critical inquiry, information literacy, and collaborative learning and other skills that develop students' intellectual and practical competencies.	STEM Summer, STEM Leadership Academy, Provost Committee on STEM Success (PCSS)
Common intellectual experiences that require students to learn together, and combine broad themes (i.e., technology and society) with a variety of curricular and co-curricular options for students.	STEM Summer, STEM Leadership Academy, Discover STEM, PCSS
Collaborative learning assignments and projects that require students to work and solve problems together, and that sharpen one's own understanding by listening seriously to the insights of others.	STEM Summer, STEM Leadership Academy, PCSS
Undergraduate research that involve students with contested questions, empirical observation, & cutting-edge technologies.	STEM Summer, PCSS
Diversity/global learning experiences that help students explore cultures, life experiences and world views different from their own.	STEM Summer, STEM Leadership Academy
Service learning and community-based learning that give students direct experience with issues they are studying	STEM Leadership Academy, PCSS
Internships that provide students with direct experience in a work setting, usually related to their career interests.	STEM Summer, PCSS

In addition, each strategy incorporates empirically proven methods (Table 35).

Table 35. Rationale for Implementation	
AREA OF IMPACT	**EVIDENCE OF IMPACT**
Career Planning Aligned strategies: STEM Summer, Discover STEM, STEM Leadership Academy	Professional development activities allow underrepresented students to engage in networking & participate in conferences to develop & socialize within a discipline & profession (National Academies, 2011). Prior knowledge of the STEM profession & the opportunity to talk to professionals differentiates students who remain in the major & those who switch (Good et al, 2002; Tsui, 2007). Career-planning courses reduce career decision-making difficulties & increase career self-efficacy (Fouad, 2011).
Leadership Development Aligned strategy: STEM Leadership Academy	For underrepresented students, success may also hinge on the extent to which they participate in activities that promote social integration (National Academies, 2011). Students who participate in leadership programs demonstrate significant growth in leadership-related measures including civic responsibility, multicultural awareness, understanding of leadership theory & societal values (Cress, 2001).

Service Learning and Civic Engagement Aligned strategy: STEM Summer, STEM Leadership Academy	Students who participate in service learning engage in greater interactions with faculty and staff (Keup, 2005), are more active socially, more connected to their peers (Wolff & Tinney, 2006), & more likely to persist in college (Hatcher et al 2002; Vogelgesang et al 2002). Participation in community service favorably influences academic development, civic responsibility, & life skills (Astin, 1998).
Undergraduate Research and Internships Aligned strategy: STEM Summer	Students who participate in undergraduate research are more likely to graduate (Jones et al, 2010), have higher GPAs than their peers, graduate sooner, obtain employment within discipline sooner (Kinkel, 2006) and indicate they are more likely to pursue a career in research (Owerbach et al, 2013). Underrepresented students who participate in undergraduate research programs are more likely to remain in their STEM major (Chang et al, 2014), are twice as likely to graduate, & five times more likely to go to grad school than control group students (Summers, 2006)
Summer Programming Aligned strategy: STEM Summer	Summer programs that target underrepresented students stimulate interest in STEM fields (National Academies, 2011).
Collaborative Programming Aligned strategy: PCSS	Coordination and integration of efforts make the aggregate of individual programs stronger than the sum of their parts (National Academies, 2011).

To measure the impact of methods described in Tables 34-36, STCC staff will collect names of each high-need student who participates in STCC programming. At the end of each semester for all five years, the STCC & OIA Directors will correlate participation among high-need students to Measurable Outcomes, Activity Outcomes, and these additional outcomes selected specifically for competitive priorities: semester GPA, core course GPA, STEM GPA, first-semester course withdraws, and number/proportion of students who retain their state Lottery Scholarship.

Competitive Priority 2: "Projects that are designed to significantly increase efficiency in the use of time, staff, money or other resources while improving student learning or other educational outcomes."

The strategies, measurable objectives and Goal Two activity objectives of this proposal align directly with Competitive Priority Two. These strategies are designed to improve efficient use of *time* and *money* (see conservative estimates in Table 36). Tables 37-39 explain these efficiencies and demonstrate the methods that will be utilized to measure and document them.

Table 36. Conservative Efficiency Estimates	
ESTIMATED SAVINGS FOR THE INSTITUTION	
1,284 Personnel Hours/year	Annual hours saved by the use of the DataMart tools by September 2019; Inclusive of staff hours in OIA, Student Academic Success & STEM Depts.
384 Personnel Hours/year	Annual hours saved by collaboratively planning STEM initiatives by September 2019; Inclusive of staff hours in multiple STEM departments.
$14,000 Per Year	Supplies, materials and programming costs saved by collaboratively planning STEM initiatives by September 2019.
$236,000 Per Year	Tuition Revenue increased by improving retention through to graduation among STEM-interested first-year students by 15%
$25,000 Per Year	Anticipated financial savings stemming from State of STEM recommendations by September 2019
ESTIMATED SAVINGS FOR THE STUDENT	
$455,000 Per Year	Total increase in annual earnings for STEM graduates who would have dropped out if not for this project, based on 10% increase in graduation rate and $17,500 added earning power of bachelor's degree (Yen, 2014)

Table 37. Strategy 2A Improvements in Efficiency	
DESCRIPTION: The Provost Committee on STEM Success will encourage programs to collaborate on STEM student support. This proposal sets clear goals & timelines for collaboration (see OA5). This collaboration will: reduce staff time spent on planning & implementing duplicative services; reduce costs to individual programs by allowing them to pool resources; improve student achievement by bringing together staff & faculty specializations	
CURRENT PRACTICE: Departments plan STEM support activities and services in silos, with strong divisions existing between STEM academic units and student affairs departments.	**PROPOSED PRACTICE:** Through the PCSS, STEM support activities and services will be developed collaboratively, with strong connections between academic units and student affairs departments. Anticipated annual savings by September 2019: 384 personnel hours and $14,000 in reduced supplies, materials and programming costs.
METHOD FOR ASSESSING COSTS: Each collaborative PCSS initiative will be developed by a work-team that includes representation from academics and student affairs. These work-teams will document the person-hours spent by all team members on the initiative, and the STCC Director will estimate costs based on the hourly wage/salary of each work-team member.	
OUTCOMES TO BE MEASURED: 1) Time saved by developing initiatives collaboratively, 2) money saved by developing initiatives collaboratively, and 3) impact on student achievement resulting from collaborative initiatives	
METHOD FOR ASSESSING OUTCOMES: 1) Each work-team will estimate the person-hours the initiative would have taken without collaboration, and the STCC Director will compare this to the actual person-hours spent; 2) Each work-team will estimate the money (i.e., supplies, facilities, materials) saved by developing the initiative collaboratively; 3) Each work-team will record the UNM identification numbers for each student who participates in the initiative. The STCC Director and the Office of Institutional Analytics will correlate student participation in the initiative to the following achievement outcomes: 3rd semester retention, 5th semester retention, semester GPA, core course GPA, and time to graduation. The CohortTracking Tool will be utilized on this initiative once it is completed. Correlation will be conducted for five years.	

Table 38. Strategy 2B Improvements in Efficiency	
DESCRIPTION: The DataMart strategy will: 1) reduce the time spent by Office of Institutional Analytics (OIA) staff on pulling duplicate or overlapping reports, 2) reduce the time spent by STEM faculty and staff on pulling manual data (for instance, reviewing individual transcripts).	
CURRENT PRACTICE: Departments individually request data reports and analyses from the Office of Institutional Analytics, and/or collect data manually by reviewing individual student transcripts.	**PROPOSED PRACTICE:** The DataMart programmer will build tools that allow departments to pull customizable reports directly online. Anticipated annual savings by September 2019: 1,284 personnel hours.
METHOD FOR ASSESSING COSTS: STCC and OIA Directors will catalog and report all costs, including the salary and benefits of the DataMart Programmer, and any related software.	
OUTCOMES TO BE MEASURED: 1) Time saved by OIA staff members in pulling individual department reports, and 2) Time saved by STEM faculty and staff on pulling data	
METHOD FOR ASSESSING OUTCOMES: 1) For each DataMart tool, OIA staff will estimate the equivalent person-hours the same data would take to pull using the current process. Each DataMart tool will include a tracking mechanism to count the number of times it is used. STCC and OIA Directors will calculate the total time saved by multiplying person hours saved on each tool by the number of times each tool is utilized; 2) The PCSS DataMart Subcommittee will estimate the person-hours spent by STEM faculty and staff to manually collect the equivalent data for each DataMart tool. The STCC Director will calculate the total STEM faculty/staff time saved by multiplying this number by the number of times each tools is utilized.	

Table 39. Strategy 2C Improvements in Efficiency	
DESCRIPTION: The Annual State of the STEM report will provide specific annual recommendations for improving effectiveness while simultaneously reducing unneeded duplication.	
CURRENT PRACTICE: No such comprehensive review and recommendation process exists	**PROPOSED PRACTICE:** The STEM Report Team will review current practices, and will recommend efficiency and effectiveness improvements. Anticipated annual savings through the removal of duplicated services, attributable to the STEM report by September 2019: $25,000.
METHOD FOR ASSESSING COSTS: The STEM Report Team will track and report the person-hours spent on this strategy to the STCC Director.	
OUTCOMES TO BE MEASURED: Improved efficiencies in time, money and/or staffing	
METHOD FOR ASSESSING OUTCOMES: For each efficiency recommendation enacted, the STCC Director will work with technicians from the Provost Office and appropriate administrative departments to calculate the efficiencies in the targeted area (for instance, if a recommendation is designed to reduce staffing, then the STCC Director will work the Human Resource Office to calculate the actual staff savings).	