Chaminade University of Honolulu
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Chaminade University of Honolulu (CUH), a Federally-designated Native Hawaiian-serving institution, is uniquely positioned to redress educational inequities in Hawai`i, and the Pacific. CUH proposes an Inclusive Excellence program to HHMI. This program is framed by Hawai`i’s indigenous host culture, Chaminade’s recent transformational gains in capacity for STEM education, and a pressing need for the achievement of equity in STEM careers for Native Hawaiians and Pacific Islanders (NHPI). The CUH Inclusive Excellence program is named Hō`imi. In ʻōlelo Hawai`i (the Hawaiian language) this means ‘to look for better and best’. The program’s central vision is that a new generation of Native Hawaiian and Pacific Islander STEM professionals, grounded in science and culture, promote health, sustainability, and equity in Hawai`i and the Pacific.

**Aspirations.** In the Hō`imi program we ‘seek the better and the best’ and this means a comprehensive approach to mitigating financial and academic barriers, acknowledging and addressing cultural barriers and those that arise from the colonizing nature of STEM curricula for indigenous participants, and pragmatically evaluating all ‘best practices’ through the lens of our students’ needs and challenges. These aspirations will be addressed through three strategic **Goals:**

1. **Enculturate the STEM education process at Chaminade through incorporation of NHPI host culture(s).** We will build human capital for inclusion by recruitment of a Cultural Engagement Specialist and a near-peer Academic Navigator. Our STEM curriculum will be revised to incorporate a Hawaiian and Pacific sense-of-place through inclusion of cultural content modules in multiple courses, ʻōlelo Hawai`i, and pedagogy adapted to Hawaiian/Pacific cultural norms. New faculty will perform original social science research exploring avenues for bridging and synthesizing Western and indigenous epistemologies in STEM inquiries. From this, we will define new Hawai`i/Pacific-centric best practices in enculturation of STEM education through the development of novel Native Hawaiian- and Pacific Islander-focused High Impact Educational Practice models.

2. **Support NHPI students through connecting curriculum to community and family.** We will initiate a Family Engagement Program that connects college to family, through resource provision, mediation, and programs of shared STEM outreach activities that engage family members. We will perform original social science research to better understand culturally specific norms and techniques for communicating and demonstrating knowledge to family and community. From this, we will develop new outlets for undergraduate scientific products that parallel ‘Western’ dissemination methods and engage family and community.

3. **Train and develop NHPI scientists.** We will develop a new network of NH research mentors to host undergraduate internships across diverse disciplines that focus on research questions of relevance to Hawai`i and the Pacific. We will support and incentivize Chaminade faculty to embark upon culture-based, community-driven research projects.

**Progress.** Our student attainment targets for Hō`imi are to increase in the mean GPA at graduation for NHPI students in science majors, to exceed institutional averages for 1st to 2nd year retention and 4 and 6 year degree completion for NHPI science students; (3) to achieve high placement levels for NHPI science graduates in graduate schools, health professions schools or the workplace.

**Learning.** At the conclusion of the 5 year Hō`imi program we envision a new institutional capacity to train STEM students in a curriculum that synthesizes Western and indigenous epistemologies into its inquiries and student support framework. We believe that incorporating these diverse ways of knowing into science will result in innovative approaches to these issues – first in a local, place-based manner, and second, more broadly, in the sense that local lessons can be applied to large-scale global concerns. The regional issues to be addressed by our students are themselves part of much larger problems affecting people well beyond the Pacific (e.g., climate change, food insecurity, health and...
social inequalities). We envision a new cadre of NHPI STEM professionals engaged in an intensely regional research (cutting-edge, place-based, culturally enmeshed, community-driven) while also contributing *mana‘o* (wisdom) from scientific and indigenous perspectives to problems at a global scale.
Delaware State University
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At Delaware State University (DSU), most students come from underserved communities and groups traditionally underrepresented in STEM and many of them enter DSU through nontraditional routes. DSU’s undergraduate enrollment is more than 70% minority, about 1/3 are first-generation college students, almost 60% are eligible for Pell grants, and 30% are nontraditional. Students from these groups, especially nontraditional students, face added challenges for degree completion and many of our students have multiple risk factors. Increasing DSU’s capacity for inclusion will therefore require improving our institution’s effectiveness at retaining and graduating STEM students from all backgrounds, and especially nontraditional students. Our DSU-PEAS project will focus on building institutional capacity to: 1) recruit STEM students from nontraditional backgrounds and community colleges; 2) involve incoming and transferring STEM students in bridge programs, and provide effective academic support that will ensure their success; 3) build career awareness and preparation in STEM students; and 4) engage faculty in student-centered teaching and mentoring.

At the end of this project, we expect that the following outcomes will be achieved:

1. Increase the recruitment of nontraditional students into STEM programs by 50%: This project will enhance the ability of DSU to offer nontraditional and underrepresented students a flexible learning environment, especially through online and low residency STEM courses, so that they can learn at their own pace; we will also implement student-centered learning approaches in courses and subjects where students typically struggle.

2. Improve the first year retention rate of nontraditional STEM students from ~65% to 80%: Like our more traditional students, the majority of nontraditional students who are not retained leave in good academic standing, indicating that these students are prepared to succeed academically but other things are getting in their way. By improving the accessibility of STEM courses and programs and academic support, our project will lower barriers, making it possible for more students to be retained.

3. Increase the four-year graduation rate of nontraditional students from 33% to 50%: For nontraditional students especially, time is the enemy. The longer it takes them to complete requirements for their degree, the more likely it is that life will get in their way. Our HHMI project will catalyze an institutional effort to make STEM courses, curricula and student support structures more flexible and efficient to help students finish degree requirements faster and with more success while ensuring more time for high impact learning activities such as participating in undergraduate research.

While primarily targeted to nontraditional students, flexible curricula, more accessible student support structures and teaching that is more student-centered benefits all STEM students. At the end of this DSU-PEAS project, we expect that all STEM students will have access to major courses taught in online or low-residency formats, that courses based around lectures will be relatively rare, and that students will have access to anytime, anywhere tutoring, and career and academic advising responsive to their individual needs. We expect these changes to our STEM academic programs to significantly increase retention and on-time graduation of the full diversity of STEM students.

Success in achieving our goals for increasing retention and graduation will ensure that our programs serve as a national model for the development of hybrid online/residential STEM courses,
curricula and student support structures that would make it easier for nontraditional and underrepresented students to choose STEM majors and be successful in those majors.

This program will be continuously evaluated to monitor both the success of implementation of project elements (formative) and the impact of program interventions (summative). Formative assessment will be instituted during the ongoing development of the program. Quantitative data will be derived from student databases and surveys while qualitative data will come from interviews with program stakeholders. The primary summative indicator of our success at meeting the objectives will be that nontraditional and other STEM students will be retained at DSU and complete STEM bachelor’s degrees. In the shorter term, we expect that students participating in our program will have improved academic indicators, including higher retention and GPAs and more credits earned.
Humboldt State University
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Humboldt State University (HSU) is located in the small town of Arcata on California’s North Coast. One of the 23 campuses of the California State University, HSU is unique in that it is the most geographically isolated campus and is located in a region where the demographic of the local population (75% non-Hispanic White) deviates significantly from the rest of the state. Undergraduate enrollment in STEM disciplines is much higher than throughout the CSU system (36% vs. 23%; data from CSU Analytic Studies 2015). Since 2010, enrollment of underrepresented (URM) students in STEM majors has increased by over 75%, with a 98% increase in Hispanic students. Institutional data show these students have lower scores in foundational science courses (-13%), lower first term GPAs (-10%), and higher rates of academic probation (+17%). Four-year graduation rates are unacceptably low, especially for underrepresented students. The 4-year graduation rate for incoming STEM freshmen is 10% overall, 4% for URM students, and 8% for first-generation students. An 8-9% gap is seen in the second year retention rates of underrepresented (URM) and first generation (first-gen) students compared to all STEM Majors.

The goal of the Humboldt State University’s HHMI Inclusive Excellence proposal is to increase the number of underrepresented and first-generation students attaining Bachelor of Science degrees in the fields of Science, Technology, Engineering, and Math (STEM). Reviews of the published literature and institutional data analyses have identified HSU STEM freshman as the student group most in need of inclusive student success. We hypothesize that the poor performance of these students is due in part to the problem that non-traditional students do not feel adequately welcomed by the HSU campus community. Indeed, there is evidence on our campus that students do not identify with the predominant campus culture and often find course content and/or delivery exclusive or even offensive. Our objective is to foster an increased sense of belonging so students can develop the skills and habits that favor academic success through the expansion and institutionalization of freshman place-based learning communities (PBLCs). Our PBLCs involve faculty, students, staff and off-campus communities in five strategies shown to be effective in increasing diversity in STEM: (1) a summer immersion experience, (2) a major-focused first year seminar, (3) STEM peer mentors, (4) block-scheduled gateway courses and (5) academically themed housing. By designing assignments and activities around scientific, environmental, societal and cultural themes of our location, we hope to foster a sense of community and belonging in first year students that will help them quickly self identify as young scientists in their major and enable them to see how their own life experiences relate to new peoples and landscapes.

HHMI Inclusive Excellence funding will support activities necessary to build capacity to institutionalize a total of six place-based learning communities in the College of Natural Resources and Sciences (CNRS), ultimately to involve approximately 75% of incoming freshmen in STEM disciplines by the end of the project period. We will work with HSU students to identify barriers to cultural inclusiveness on our campus and provide professional development trainings for faculty to ensure curricular issues are addressed in first year learning community classes and upper division major coursework. Statistical modeling performed by the HSU Office of Institutional Effectiveness (OIE) predicts achieving these goals would substantively advance the cause, yielding an 18-29% increase in the number of students earning degrees that are from traditionally underrepresented groups or are first-generation college students. Regular assessment of defined short and mid-term outcomes will allow the HHMI Core Leadership Team to measure changes for capacity of inclusion.
throughout the duration of the project so that the university can rapidly institutionalize components that lead to inclusive student success.
Over the past 15 years, Kenyon College science faculty have explored and implemented evidenced-based teaching practices, strengthened our student support network, and developed programs to close achievement gaps among students from different backgrounds. Although our aim has been to increase the persistence rate for all students, our particular focus has been on reducing barriers to success for first generation and new majority students. Our efforts have yielded a suite of effective teaching methods and programs. However, we have applied these methods inconsistently, and only small groups of students have benefited.

Our STEM teaching community envisions and aspires toward a transformation of faculty practices and attitudes that reflects our commitment to inclusive excellence, eliminates achievement gaps, and results in high persistence rates (>60%) for all science-interested students. Our primary goals include broad faculty participation in training focused on the unique challenges faced by first generation and new majority students, sustenance and growth of programs that have proven effective in reducing achievement gaps, normalization of evidence-based teaching, advising and mentoring practices, and realization of institutional change that equitably rewards STEM faculty who have invested in these activities. Robust evaluation mechanisms will be in place and lead to continuous improvements as our classroom, laboratory and field practices evolve.

The HHMI Inclusive Excellence grant will catalyze and support a new Intensive Training Program that emphasizes an action research approach to improving pedagogical practice. This program is designed to teach faculty how a continuous cycle of innovation, assessment, and reflection can be used to increase the inclusivity of the courses we teach. The new pool of trained faculty will join our nascent STEM teaching community, will support the growth of programs that are effective in lowering achievement gaps, and will apply evidence-based teaching practices to the benefit of all science students. The Intensive Training Program will be repeated every three years to sustain its impact as new faculty join the division.

Action Groups of faculty stakeholders will study systemic structural barriers and work to reduce their impact. To substantially increase faculty engagement in efforts to increase inclusion and persistence rates, our reward structure must better reflect the value we place on such activities and must recognize and compensate the trade-offs required to devote energy to reducing achievement gaps or to innovating teaching practices. One Action Group will be convened to study and advocate for changes to the current reward structure, while others will address current policies or other challenges that we collectively identify during divisional discussions.

Finally, we will monitor the impact of our programs throughout the transformation, and adapt or adopt strategies that result in perpetual improvement based on achieving consistently high persistence rates from introductory courses through the major, graduation and careers in STEM, especially for those underrepresented in these fields. Beyond affecting our own transformation, we will strive to take a leadership role in defining and sharing best practices for enacting institutional change and making inclusive excellence pervasive throughout the higher education community.
Lawrence Technological University  
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The goal of the project is to revolutionize the teaching paradigm of the college of Arts and Sciences at Lawrence Technological University, transforming it into a college that bases its education on Classroom-based Research Experience (CRE). Courses in multiple disciplines covering all departments and programs in the college will be modified into CRE courses, providing research experiences to all students as part of the curriculum. Novel CRE modules will be designed in a culturally responsive fashion, allowing students to express their culture and identity through research. A professional development community of faculty will collaborate and lead the course development, project budget, outreach, and community activities to support a sustainable cultural shift of the college pedagogy. While undergraduate research is a proven intervention that increases enrollment, retention, graduation, GPA, and graduate school attendance in STEM, involving non-traditional students in research is a primary challenge. Embedding research experiences in the curriculum will provide part-time students, commuter students, and working students with the opportunity to participate in authentic research without the need to spend long hours on campus or commit time for engaging in extra-curricular activities. This approach will provide an alternative to the common Research Experience for Undergraduate (REU) model, with the advantages of inclusion and ability to support a large number of students. The project will be assessed by its ability to increase enrollment and retention of commuter students, part-time students, and working students, as well as improving the self-efficacy and identity of non-traditional students as STEM professionals, leading to perusing STEM research careers. Self-efficacy of the students will be measured by pre and post surveys. The project will also be assessed by the number of faculty members, the number of courses being changed and taught, and faculty perception measured by faculty surveys.
Overview: This initiative drives institutional change at Northeastern University in order to increase interest and success in the natural sciences on the part of nontraditional students, particularly underrepresented minorities and first-generation college students. NU-SCI uses Northeastern’s renowned experiential learning approach as an educational foundation. This project takes advantage of existing university programs that are assertingly creating a positive climate for more effective and inclusive teaching and for increasing access and diversity. Northeastern is a Research 1 university with a history of welcoming and implementing changes that will benefit all students, underpinned by faculty input and active participation.

Goals and Aspirations: Within five years, the College of Science and Northeastern University will lower barriers to inclusion through: 1) Active programs to enhance faculty skills in inclusive teaching and in inclusive mentoring, using workshops and faculty mentoring circles to sustainably increase our cadre of trained diversity champions; 2) Inquiry-based preparatory courses sensitive to the needs of nontraditional students, particularly those who enter Northeastern through our access programs; 3) Innovations in inclusive teaching and mentoring methods and approaches through ongoing research and scholarship by faculty members; 4) Effective, novel strategies for building student self-efficacy in science and enhancement of student identification as scientists. We seek to increase the numbers of nontraditional students engaged in faculty mentored research, in cooperative educational experiences in the natural science fields, and in natural science majors. Additional goals are to increase the year-to-year retention rates and graduation rates for nontraditional students in the natural science majors.

Project: We will create a more inclusive climate in the College of Science and across the entire University, with the following activities: 1) Implement tangible changes in faculty teaching and mentoring practices through workshops led by faculty peer trainers; 2) Offer an inquiry-based course in scientific research, tailored to the needs of nontraditional students; 3) Through faculty research in inclusive pedagogy and mentoring, develop new strategies for more effective instruction and mentoring of nontraditional students; 4) Outreach to students in access programs, beginning with the students in Foundation Year (a college preparatory year for recent high-school graduates from the local area) and then expanding to nontraditional students in other Northeastern programs; and 5) Enhancements in classroom and experiential curricula to strengthen connections between the sciences and the lives of all students, with particular attention to the needs and aspirations of nontraditional students. Synergy with established resources at Northeastern, including the Center for Advancing Teaching and Learning Through Research (CATLR), the Office of Institutional Diversity and Inclusion, and the ADVANCE Office for Faculty Development, will help to insure the success of NU-SCI.

Learning and Measures of Progress: We will measure progress through assessment of faculty attitudes, knowledge, and behavior regarding nontraditional students in the sciences, as well as changes in faculty teaching and mentoring goals and practices. We will also survey students for perceptions of classroom climate, assess academic performances of students, and assess student course evaluations, which include multiple measures of organization and clarity that are correlated with teaching efficacy. Ultimately, the true measures of our success will be the numbers of nontraditional students in authentic research experiences, in natural science majors, as well as
graduation rates in the sciences for underrepresented minorities, first-generation college students, and students entering Northeastern through access programs and two-year colleges.

**Understanding for Future Program Development:** To encourage continuous change and improvement at Northeastern, NU-SCI will serve as a resource to the faculty, to ADVANCE, CATLR, and other change-agents at the university, sharing lessons learned for effective teaching and mentoring of diverse students. Innovations from NU-SCI will drive sustained implementation of inclusion strategies into teaching, outreach, and advising and mentoring of all students. NU-SCI will integrate our successful strategies into curricula and to other institutional programs and innovations emerging from, and essential to, the Academic Plan, systematizing and hence ensuring program continuation. These outcomes will enhance excellence in all of our educational and research programs.
Oberlin College
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Aspirations: Oberlin College graduates an unusually large number of students who go on to earn PhDs in STEM, yet this success is not equally shared by all students. While a large percentage of Oberlin students graduate with STEM majors, persistence in STEM at Oberlin is lower for underrepresented racial and ethnic minority (URM) students and first-generation students than the overall persistence, based on initial interest. Additionally, women are under-represented in several fields. For Oberlin – the first US coeducational college and the first US college to make the education of African American and white students together central to its mission – these gaps represent a galvanizing challenge.

To undertake the institutional transformation necessary to eliminate persistence gaps, Oberlin seeks to change the ways our community is built and our curriculum is delivered. In five years, Oberlin anticipates a substantial increase in knowledge among faculty and staff of practices that support learning by a diverse student body, enhanced institutional capacity for all students to succeed, a more-welcoming STEM learning environment, and a new model of collaboration across academic departments and offices.

Work towards these aspirations will be advanced through three interventions: campus-wide learning communities, Departmental Action and Reflection Teams (DARTs) supported by course releases made possible by visiting faculty and tenure-track bridge positions, and a new post-baccalaureate STEM Fellow position to enhance the STEM climate and link curricular and co-curricular activities. The vision, aspirations, and proposed interventions emerged from a series of listening sessions and NSF-style ideas labs, open to all faculty and staff, that brought together over 100 individuals to visualize an enhanced model of inclusion, with a resulting focus on introductory courses and STEM learning climate.

Goals: The campus-wide learning communities and three Departmental Action and Reflection Teams (DARTs) will study theory, evidence-based pedagogy, empirical evidence, Oberlin-specific data and assessment, and practices to counteract stereotype threat, unconscious bias and other barriers to persistence. DARTS and the learning communities will explore and implement ways to sustain the efforts beyond the grant period through revised introductory courses; expanded coverage of science and society; and new curricular offerings or research experiences during Oberlin’s January term. DARTs will be chosen through a competitive proposal process that fosters bottom-up change. The facets of institutional capacity the project seeks to change are: 1) faculty knowledge and implementation of evidence-based practices and strategies that favor persistence of URM, first-generation college, and women students; 2) procedures for evaluating inclusive practices within departments and teaching and learning within classrooms; 3) student perception of the STEM learning climate in and outside the classroom; and 4) collaboration and coordination among multiple academic and support offices working toward institutional effectiveness in inclusion. A recent STEM graduate, the Fellow will live in a residence hall, organize social and professional development activities to foster community within and across STEM majors, and be mentored by the director of the Center for Learning, Education, and Research in the Sciences.

Progress: Oberlin will assess all aspects of the project. Progress towards goals will be assessed through pre- and post-project data gathered with validated instruments (e.g., PULSE certification rubrics, observation protocols, teaching practices inventories, concept inventories), student and alumni surveys and focus groups, and collection of institutional data (grades, majors, persistence) and
data on student use of resources provided by such offices as the Career Center, Undergraduate Research, and Alumni Affairs.

**Understanding:** The learning communities and DARTs will establish a habit of organizational learning, in which goals, policies, and tacit assumptions and norms are continually examined. This will enable the College to expand the impact of the project beyond the grant period. Funding from HHMI will catalyze Oberlin’s ability to take on the hard work of institutional change. Liberal arts colleges play an outsized role in producing future faculty, and since the 1920s Oberlin has ranked among the national leaders in STEM. Improving the climate and curriculum at Oberlin can seed change for a wider range of institutions.
Radford University
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Radford University is a microcosm of national STEM education; too many freshmen and transfer students in our natural sciences programs leave within their first year. This attrition is not a reflection of our incoming students, but instead a reflection of what greets them - uninspiring entry-level courses and a cold social environment. The REALising Inclusive Science Excellence (REALISE) program will benefit all Radford University Biology, Chemistry and Physics majors by reforming entry-level courses around exciting, personally relevant problems and creating a welcoming student-ready culture where faculty communicate their belief that all students can succeed.

Around the country, a making culture has been emerging that fosters independent thinkers, creators, and designers who solve real world problems via creation of physical or digital artifacts. This emergence is evidenced by public libraries and for-profit companies building makerspaces, making-themed magazines and TV shows, and a growing cottage industry of material suppliers catering to makers; ordinary people are paying for access to the tools and expertise they need to make the things they imagine. The principles of making share a great deal with the practice of science, including a willingness to experiment and invent, an investigative mindset, and the need for collaboration. Makers are self-efficacious, willing to try and willing to fail, and embrace continual learning - all characteristics we hope to cultivate in our STEM students.

We intend to capitalize on the national and on-campus emergence of making culture to address our first-year student retention challenge. We will center the REALISE program around a making-themed, problem-based entry-level curriculum. Tangibly, this means biology students might build electronic physiological sensors to measure their own test anxiety, or physics students might build gyroscopic stabilizers for a camera used at campus sporting events - instead of listening to lectures and answering multiple choice exams. Embedding these experiences in entry-level courses will reach all students, avoiding the frequently inequitable access to gold-standard high impact practices like faculty-mentored research.

However, dramatic changes in instruction will require significant faculty time and effort. Thus, faculty learning communities will be established to support faculty as they design innovative making-themed courses. Additional faculty development will focus on inclusive instruction and effective student-centered pedagogy more generally. Postdoctoral teaching faculty will be hired to provide permanent faculty involved in curriculum redesign meaningful incentives, in the form of reduced teaching loads. Benefits to the postdocs (and the institutions they move on to) include mentorship from permanent faculty, participation in the faculty development, deep teaching experience, and opportunities to contribute to the innovative making-themed curriculum and educational research publications on its effectiveness. A peer role-modeling program will support students academically and socially as they successfully transition into our natural sciences programs. The components of the REALISE program will catalyze a transformative change in culture within the natural sciences programs and establish a community of faculty and student learners.

We will partner with the National Institute for STEM Evaluation and Research to collect program efficacy data. To identify program strengths and weaknesses, as well as barriers to student success across campus, formative evaluation data from focus groups, surveys, vetted campus inclusivity instruments, and institutional sources will be reviewed by the REALISE core team and an external advisory board of faculty with relevant expertise. Similar approaches will be used to query faculty perceptions of the campus environment and project components that are contributing to a more
inclusive campus culture, and instructional practices will be evaluated for inclusivity by analyzing course syllabi. Our administrative core team members will leverage data to implement institution-wide changes and build coalitions across campus **to remove institutional barriers to student success**; REALISE will directly connect Radford’s existing student success efforts and diversity/equity initiatives, enhancing the efficacy of each.

REALISE will transform the natural science programs, sustain itself beyond a five-year granting period, and serve as a model to catalyze institution-wide change in policies and practices limiting student success at Radford University.
Rochester Institute of Technology
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RIT proposes a three-pronged approach to expanding inclusivity of deaf/hard-of-hearing (DHH), female and African-American, Latino/a-American and Native American (AALANA) students in the Schools of Physics and Astronomy, Life Sciences, and Chemistry and Materials Science. Our program 1) develops faculty to proactively recruit and mentor targeted students in undergraduate research; 2) creates new course materials to improve reflective and metacognitive strategies proven to enhance student success; and 3) develops a college-wide welcoming faculty/student and student/student community to foster an inclusive environment. **We envision a college, and Institute, that recognizes the importance of inclusivity, nurtures the unique abilities of a diverse student population, and forms a rich community with numerous opportunities for formal and informal mentoring.** To achieve this, we will change the culture in three key College environments --- the research lab, the classroom, and the social community --- developing in each a consistent message of inclusion, support and recognition of potential.

**Objective #1** is to develop faculty to better identify, recruit and mentor a diverse student population in the research lab. Faculty workshops will discuss both general mentoring strategies (e.g. setting goals) as well as topics specific to our target populations (e.g. DHH communication strategies or mentoring across gender and racial divides). Of all the active research faculty in the Schools of Physics and Astronomy, Life Sciences, and Chemistry and Materials Science, **60% will participate in workshops** and supervise at least one student in research, creating a critical mass of faculty and students. Close collaboration with existing institute programs that serve underrepresented students will increase recruitment and participation of targeted students that are currently underrepresented in research labs.

**Objective #2** is to create new classroom materials that promote student metacognition and sense of identity, as these have been shown to address many negative cultural messages students receive about their place in science. Examples include short reflections on individual strengths (affirmation exercises) or how different disciplines connected (e.g. how math concepts arise in physics). Activities will be short, so faculty can incorporate 1-2/week without significantly impacting content. **70% of faculty have agreed to consider using at least one activity per week**, creating a consistent message across the college.

**Objective #3** is to foster a welcoming and inclusive community. A series of “Playback Theater” workshops in which actors recreate participant narratives around issues of identity, inclusivity and challenges will create strong bonds between faculty and students. We will work with existing (and create new) student and faculty/student groups across the college to identify common challenges in the culture. **70% of faculty have expressed interest in participating**, and we aim to involve a majority of all students in at least one program activity.

Throughout the project, we will measure our progress by quantitative participation and representation benchmarks, qualitative interviews to provide formative feedback, annual analyses of target student performance and retention, and quantitative and network analysis of the college culture. These include “pre-intervention” baseline surveys to accurately capture the RIT climate as it currently exists and annual follow-up surveys to assess impact. Network analysis will be used to describe the communication “fabric” of the College; increasing the number of discussions across students, faculty and staff is a key goal of our community building activities. We also look to increase significantly representation of DHH, AALANA and female students in the Schools of Physics, Chemistry and Biology, and raise 2-year and 4-year retention rates of these students to that
of their peers. Research-based surveys of identity and perception will be used to measure student views of their department and College; preliminary work indicates a significant drop in feelings of inclusion over the first year that we seek to reverse. Network analysis will characterize the extent of the College community, providing quantitative measures by which to measure bonds between students and faculty.

Throughout the project, our progress, successes and challenges will be presented and discussed openly at an annual Community Symposium hosted by the President. In addition to an annual celebration of our efforts, the Symposium will bring together all program participants, enabling faculty and students engaged in one program strand to learn about and engage with another. The Symposium will also disseminate our findings and practices across the entire Institute, which will follow our model for increasing inclusivity. Ultimately, our goal is to change an entire College culture, creating a consistently welcoming and inclusive experience for all students and faculty that spreads across the Institute.
Over the last three years, the San Francisco State University (SFSU) Science Education Partnership and Assessment Laboratory (SEPAL) has partnered in strong collaboration with the SFSU Department of Biology to initiate systematic transformation of the undergraduate biology course experience for all students. Through an HHMI Undergraduate Science Education Award (2012-16), over 85% of biology faculty have engaged in >40 hours of professional development in scientific teaching, using their scientific habits of mind to collect classroom evidence and make teaching decisions that increase active learning, equity and diversity, and assessment. The majority of biology faculty have gone further, engaging in >100 hours of collaborative faculty learning community programs such as Teaching Squares, Classroom Evidence Collection Partnerships, and the Changing Minds and Talk Matters Evidence Collection Projects. Through these collaborations, faculty have visited one another’s classrooms, systematically measured student learning, reflected on classroom videos of their practice, and analyzed direct measures of their use of classroom active learning. Direct and indirect measures have evidenced that faculty are indeed innovating in their teaching. Systematic investigations of student perceptions corroborate faculty descriptions of change, with high student enthusiasm and minimal resistance.

However, continued transformations in biology courses are clearly needed. Institutional data show that only ~35% of first-time freshman biology majors persist and graduate with a biology degree in six years, with disproportionately high attrition for Latino and African American students.

Intriguingly, while other universities struggle with high fail rates in introductory courses, over 80% of our students successfully complete introductory biology and chemistry. Taken together, these data suggest that inclusive interventions in upper division biology courses may be key to connecting culturally diverse students with advanced biology content, retaining them in the major, and facilitating their graduation. However, our predominantly majority culture faculty do not necessarily understand the cultural perspectives of our diverse students, nor do they have the capacity alone for developing and integrating culturally-relevant curricular materials aligned with course content. To address these challenges, we propose to engage and partner with our talented, upper division biology majors of color – African American, Black, Latino/a, Native American, Filipino/a, and Pacific Islander students, many of whom are first-generation college-going and/or transfer students – in continued transformation of the undergraduate biology experience, as peer learning assistant role models in biology classrooms and as co-developers of curricular materials to highlight the importance of diversity in science. To increase inclusive teaching efforts, we propose to:

- **Aim 1**: Embed biology majors of color as classroom learning assistants and expand faculty capacity for inclusive teaching through the PALS – Peer Assistants for Learning Science – Partnership Program
- **Aim 2**: Engage biology majors of color as co-developers of culturally inclusive curriculum through LEADS – Learners Advocating for Diversity in Science – Partnership Program
- **Aim 3**: Empower PALS and LEADS student leaders through a newly developed and regularly offered Biology FEST service-learning course, an elective towards all biology majors and graduation
- **Aim 4**: Engage PALS and LEADS faculty-student partnership teams in classroom research in collaboration with the SEPAL Postdoctoral Scholars to gauge impact of their efforts

Over 5 years, we will engage ≥50% of biology faculty and ~240 advanced biology major students of color in ~14,000 hours of inclusive teaching professional development and implementation,
integrating peer learning assistants and diversity interventions into upper division biology courses. A new biology service-learning course will institutionalize the developed programs, and postdoctoral scholars will enable us to continue our record of evaluating and disseminating outcomes.
**Stony Brook University**
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**Aspirations:** Stony Brook University is poised to begin a period of coordinated innovation and evaluation in order to achieve sustained success in a more expansive array of students. We aspire to: foster a more inclusive campus community that embraces current research on successful science engagement practices; purge psychosocial barriers to inclusion from course designs and faculty behaviors; construct a broad array of novel learning pathways aligned with student needs and characterized by supportive classroom climates and faculty mindsets; provide more effective experiences for underprepared students to succeed through coordinated feedback between instructional actions and co-curricular student support services; and build a more coordinated network of action through Faculty Learning Communities, Summer Institutes, and external change agents. University efforts will be united in a data-driven predictive analytics model that provides timely, actionable, and meaningful information about student success and inclusion to faculty, student support services, and administrative units.

**Goals:** We propose to: (1) embed psychosocial interventions throughout math, chemistry, and biology courses to improve student self-efficacy, foster growth mindsets, reduce stereotype threat, and enhance students’ sense of belonging; (2) expand FLCs and Summer Institutes in order catalyze cultural changes in faculty mindsets, bridge isolated pockets of reform, and foster a data-driven culture that focuses faculty attention on pernicious barriers to inclusion; (3) diversify STEM course pathways in math, biology, and chemistry to tailor instruction to the diversity of student needs; (4) implement instructionally sensitive diagnostic assessments across science and mathematics courses to inform instructional design, precisely target student needs, and longitudinally measure competency attainment; (5) integrate co-curricular instructional supports, tutoring, and coaching within and alongside new course pathways; and (6) iteratively model, predict, modify, and study impact using data mining and longitudinal trajectory analysis.

**Progress and Learning:** An interdisciplinary research team from Institutional Research, Applied Math and Statistics, and the Institute for STEM Education will continue to conduct large-scale measurement, analysis, and statistical prediction of undergraduate science learning dynamics. Published work has employed supervised machine learning, trajectory analytics, and data mining to better understand student pathways and build predictive risk models. More campus units, and a broader array of instruments, variables, and methods, will be used to measure within-course longitudinal student mastery patterns, DFW rates in gateway courses, STEM attrition, degree attainment, and social-psychological change in URM, transfer, and first-generation students. Measures of faculty instructional behaviors, mindsets, and resulting classroom climates will also be measured and integrated into our predictive risk models. Purposive sampling and qualitative studies of first-generation, transfer, and URM students will be used to study progress in faculty, student, and institutional transformation. These approaches will help us establish a data-driven, "bird's-eye view" of the STEM watershed feeding and flowing through the University.
We are implementing TU-REP (Towson University-Research Enhancement Program) to bring authentic research experiences to a large, diverse group of students early in their undergraduate science career. TU-REP is built upon studies that undergraduates engaged in authentic research are more likely to persist in science and math classes, complete their degree, and pursue STEM fields in their careers and post-graduate education. The TU-REP program will recruit students, specifically transfer and members of under-represented minorities (URM), who are interested in science; create a curriculum and support system that allows these students to participate in multiple authentic research projects; and provide assistance in continuing research at TU and beyond. We will collaborate with several existing initiatives at TU focused on promoting success of students from underserved groups. Students will complete a series of new research-focused classes, including an Introduction to Research Methods course and a number of CREs (Course-based Research Experience) to master content and skills and develop their own science identity and self-efficacy. Based on prior experience with an existing CRE, all new classes will include Undergraduate Learning Assistants (ULAs) from our transfer and URM populations, students who have successfully completed the course and serve as peer mentors in the classroom. ULAs seem more accessible to students than faculty, particularly so if they share race, ethnicity, gender, or transfer status with students in the course. TU-REP will begin by increasing CRE offerings in Biology and then expand into other areas, particularly Chemistry and Geology, eventually affecting curricular change across all science departments at TU.

One major goal of TU-REP is to dramatically increase the number of undergraduates successfully engaged in research by ensuring that our teaching is inclusive, with particular focus on transfer students and URM. To reach this goal, we have defined three major intended outcomes: 1) development of a set of CREs to provide research experience to large numbers of diverse students, 2) increased participation of non-traditional undergraduates in CREs and independent research, and 3) effective faculty professional development to promote inclusive teaching and CRE pedagogy. Our student body is diverse, with ~50% of our students transferring in from other schools and up to 40% of particular STEM majors comprised of students from URM. We anticipate that 200-250 students will participate in TU-REP over the five years of the award, and an additional 400-600 students will enroll in at least one new CRE. TU-REP will thus dramatically increase the number of science majors engaging in authentic research relative to our current system, which relies primarily on mentored research in individual faculty laboratories.

We will measure the changes in our capacity for inclusion using several quantitative and qualitative mechanisms, such as monitoring retention and graduation rates; conducting student, faculty, and course assessments; and tracking post-graduation careers/education. These assessment data will be used to improve student recruitment and support and course development over the duration of the grant via our Professional Learning Community, part of our professional development plan. We will assess progress annually, revamping the program as needed each year to promote student and faculty success. As a result of TU-REP and our other student-focused initiatives, we envision a college in which inclusive teaching is universal and authentic research is the typical experience for any science major, regardless of educational or social background, not the exception.
Goals and Aspirations: We aim to increase inclusion through the development and implementation of ExCEL (Experience x Confidence Equals Leadership), a holistic science program. A training program for faculty and staff called Instructor-ExCEL (I-ExCEL) will increase Trinity’s capacity to identify and overcome barriers limiting student success in science. Instructors will be equipped to effectively design and implement a mentoring program and a more flexible curriculum. We will develop a holistic program to support students called Undergraduate-ExCEL (U-ExCEL) aimed to overcome barriers and increase the retention of women of color, women from low income areas and first generation students entering science majors at Trinity by improving student confidence, sense of belonging, self-efficacy and well-being. Additionally, all science students will participate in mentored experiential learning opportunities.

Project: We will implement a training program, I-ExCEL, for faculty, staff and external mentors to develop expertise for: effective mentoring practices, cultural competency, approaches to foster student social and emotional learning, and student learning strategies. With this expertise, we will redesign the science curriculum to create a holistic program for students (U-ExCEL) to address students’ academic and social needs. The new curriculum will provide more flexible pathways to degrees in the natural sciences, accommodating students’ varied needs and life challenges. U-ExCEL will increase experiential learning, and mentored support by integrating 3 components: Mentor Circle courses which will provide peer and faculty mentorship, skills development, strategies for social belonging, community building and the development of self-awareness; Course-based Research Communities which will provide students the opportunity to engage in authentic scientific research within the curriculum; and external experiential internships obtained and completed by students with support and mentorship through Mentor Circle courses and internship networks. Our capacity to include all students in research opportunities will also increase by purchasing scientific supplies and equipment to conduct authentic research within the curriculum, and by expanding our network for external research opportunities. Finally, we will increase institutional knowledge through assessment as we develop, implement, and refine the ExCEL program, which will serve as a catalyst for institutional inclusive excellence in science.

Progress and Learning: Our goal to address low retention in the science program, varying student skill and confidence levels and to foster student success is based on the premise that a holistic approach incorporating mentorship, mindset, skill development, and research experiences will promote changes. Developing U-ExCEL as a catalyst for change is based on principles from the social transformation theory of change described by Maton (2008) rooted in creating empowering and affirmative environments to increase retention and achievement.

Assessment of faculty and staff will be used to shape training programs and will be compared to post-training outcomes. Progress will also be measured by quantifying courses into which faculty add elements learned through I-ExCEL training. Assessment of students’ feelings of self-efficacy and belonging in the sciences will be measured with surveys and interviews before, during and after participating in U-ExCEL. Retention rates for students completing a science major and the number of students matriculating into graduate programs or science-related careers will also be compared. Additionally, we will compare the numbers of students participating in mentored high impact authentic research and use surveys and interviews to determine if such opportunities are effective to increase students’ sense of belonging.
We will analyze student survey responses and pass rates in introductory courses to identify barriers limiting success and inform changes to the program to increase its effectiveness at promoting self-efficacy and belonging. Additionally, we will learn from student interviews to determine effective components of our mentorship program and external student internship network and improve the experiences accordingly. By understanding the impact of elements integrated into the ExCEL program, we will revise our program to more effectively promote inclusiveness in our science program.

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Goals and Aspirations: Inclusive excellence in the natural sciences means conveying to students from all backgrounds that they are welcome participants in the practice of science, whose ideas are valued and taken seriously. At Tufts, first-generation students and students from underrepresented minorities (URM) currently leave science at a higher rate than majority students, and many URM students do not yet feel fully accepted on campus. The Listening Project seeks to improve the experience and persistence of URM and first-generation students in introductory science classes by refocusing instructors to elicit, interpret, and respond meaningfully to all students’ participation, with sensitivity to their background and prior preparation. By the conclusion of the project we expect to observe measurable changes in instructional practice, student attitudes towards science, and retention of underrepresented students in science.

Project: The Listening Project is designed by scientists for scientists to effect sustainable change in instructional culture across the natural sciences, increasing instructors’ awareness of implicit and unconscious bias and supporting their efforts to elicit and cultivate the productive beginnings of scientific thought in all students. Experts in science education and diversity in education will lead intensive working groups where instructors will study examples of students’ thinking and learn to recognize and appreciate the diverse and productive beginnings of science shown by students from all backgrounds. That experience will: 1) Help instructors recognize the scientific merits of what all students have to say — its basis in the knowledge and evidence available to them; 2) Cultivate persistent efforts to understand all student thinking; 3) Teach proactive interaction so instructors actively solicit engagement from students of all backgrounds; 4) Explore instructors’ tacit beliefs surrounding race, socioeconomic status and gender, and how these affect instruction and can inadvertently silence underrepresented populations.

By involving science instructors at all levels – faculty, graduate student teaching assistants, and undergraduate peer tutors and study group leaders – we will ensure a unified approach and support faculty as they establish a new set of expectations about what it means to be a student of science. Shifting the emphasis, from students’ retaining and repeating memorized information to their explaining ideas and supporting them with evidence, will build students’ analytical skills and make science majors and science careers more accessible to students from diverse educational and cultural backgrounds. Through this multi-level community of practice, the Project aims to universalize the shift in classroom culture and to support faculty with an instructional team that is ready to work within the new paradigm.

The Project will develop tested methods and materials, including curated examples of student reasoning and faculty responses, that will be incorporated into existing and future programs of instructional development. Those programs will include faculty orientation programs, discipline-based courses for teaching assistants, and training for peer tutors. In this way the lessons learned will become part of an ongoing, sustainable instructional culture centered on eliciting and responding meaningfully to all students’ thinking.

Progress and Learning: The Project aims to affect instructional practice, student attitudes towards science, and retention of URM and first-generation students in science. We will assess changes in practice by instructor participation in the working groups and their self-assessment, as well as by direct observation of student participation in classroom dialogue. Student surveys and focus groups will provide evidence for changes in student attitudes, and academic and demographic data will
track changes in attrition rates from introductory courses and in the number of natural science majors.
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Our growing investments to support students from non-traditional pathways affirm UC Davis’ commitment to serving the breadth of our state’s diverse community. Through the development of unique digital analytics tools and expertise, we have gained significant insight into the growing gaps in performance between traditional and non-traditional students, and can identify courses with significant opportunity for targeted improvement. Addressing student inclusion and academic outcomes represent not only moral, social and economic imperatives for the university, but are also tremendous opportunities for institutional growth. We have identified three key institutional barriers to progress for the instructional team (faculty, instructional staff, and teaching assistants) that we propose to address with this project: (1) insufficient direct instructor access to data, analytics tools, and knowledge of the psycho-social factors affecting student inclusion, (2) limited sharing of experience and expertise that promote faculty engagement in effective and inclusive, data-driven instructional practices and (3) a lack of faculty development resources that help link data-driven awareness to the adoption of new pedagogical practices.

Aspiration - In the next five years, we aspire to increase faculty participation in modes of instruction that promote inclusive excellence in the natural science and engineering disciplines. Possible outcomes include: increased use of data-driven reflective analysis; increased sharing and communication of data and instructional methods; increased consistency in course content and instructional practice across instructors; greater synergy between instructors and instructional support units; expanded curricular connections between departments; increased feeling of inclusion among non-traditional students and, above all, a reversal of trends in the performance gaps between traditional and non-traditional students on our campus.

Goals - To foster sustainable, inclusive instructional excellence, we will implement the Multidimensional Instructional Development for Achievement and Success (MIDAS) approach.

Several key goals of the MIDAS approach include:

• Inspiring sustainable data-driven experimentation focused on eliminating performance gaps.

• Providing instructors with a “snapshot” of key characteristics of their students that have the potential for influencing course outcomes (e.g. preparation and prior-course performance, non-traditional background, subject interest, alignment with long-term student objectives, etc.) and connecting with professional development opportunities and local faculty and staff expertise.

• Creating an instructional support network where the most effective, practical, and inclusive instructional practices are identified, implemented, evaluated and broadly disseminated.

• Capturing new data-types at the course level and connecting them to campus-wide instruments that measure elements of inclusivity (i.e. self-efficacy, belonging, student affect and other psycho-social factors) to inform the instructional support network and faculty development efforts.

• Enabling faculty to create a voluntary instructional portfolio that captures and communicates reflective practices that promote continuous improvement efforts in their teaching while providing added value in the merit and promotion process.

Progress - We will measure changes in our capacity for inclusion by:
• Tracking the use patterns of new data analysis tools and evaluating how these resources lower the barrier for faculty participation.

• Measuring faculty implementation of a voluntary instructional portfolio approach to document teaching efforts and outcomes.

• Measuring the evolution of faculty and professional staff interactions/networks focused on instructional improvement aimed at inclusive excellence.

• Measuring changes in student feeling of inclusion and performance in targeted courses and beyond.

• Interviewing active participants to assess the impact MIDAS has on the instructional conversations and decisions made in departments.

**Understanding** - We aim to gain significant insight into the most effective methods for introducing faculty to the use of data-driven analysis tools, interventions, and teaching approaches that allow UC Davis to promote inclusive excellence and maximize the success of all students. We will also gain significant insight into what teaching practices are most successful for targeted courses and the impact longitudinally tracking instructional data will have on faculty reflective teaching practices.
The UCLA Transfer Success Program focuses on strengthening the transition from community college to the University of California, Los Angeles. Transfer students make up 36% of the student pool and contribute significantly to the diversity of UCLA undergraduates. About 34% of UCLA transfer students come from underrepresented minority (URM) groups; over 40% of the transfer students are first generation college students; and 50% are or have been federal Pell grant recipients, among the highest in the nation among elite institutions.

While UCLA has a history of innovative programs that promote inclusive excellence for STEM students, these have largely focused on direct entry students. In five years, we will ensure that transfer students have equal access to a high quality STEM education that supports their persistence in STEM majors and increases their entrée into a range of STEM careers. All of these activities will be enhanced through coordinated data collection and dissemination among campus stakeholders to build institutional capacity, which will benefit all students. The Program will achieve this goal by taking the following approaches:

(I) Building capacity for enhanced data collection and sharing

Our team, led by the UCLA Center for Educational Assessment (CEA), will develop a dashboard (i.e. integrated assessment data repository) that will be used to evaluate and compare our student and program outcomes using input data from numerous sources (e.g. registrar data, learning artifacts from courses, and senior surveys). By fostering transparency and reducing campus data silos, the dashboard will facilitate rapid sharing of data, and provide a more granular, detailed perspective of transfer student pathways and potential barriers to transfer student academic success. This analytical tool will be disseminated to improve data management for all UCLA student programs. In this way, this HHMI-funded project will allow us to build capacity for better data sharing and provide a mechanism by which to identify the intersections, synergies, and gaps in the existing infrastructure supporting STEM student success across campus.

(II) Curricular reform and pedagogical transformation

(A) The Life Sciences Core (LS Core) curriculum was recently restructured to remove barriers transfer students face in accessing Life Science major coursework, course-based research experiences, and apprenticeship-based research opportunities. To leverage this restructuring, partnerships with community colleges will be formalized to ensure that the curricular changes meet the needs of transfer students. New LS Core course material will be developed in collaboration with community college partners. (B) UCLA’s Center for Education Innovation & Learning in the Sciences (CEILS), working directly with the Deans of Life and Physical sciences, will coordinate workshops focused on pedagogy. These teaching development activities will help faculty not only increase their awareness of classroom climate issues that disproportionately affect the success and persistence of diverse students in STEM, including transfer students, but also empower faculty to engage in instructional practices that support inclusive learning environments for all students.

(III) Interventions that level the academic playing field for transfer students

(A) To support transfer students from day 1, we will establish the Academic Excellence Boot Camp for Bruins in STEM that will familiarize students with UCLA and foster development of student
learning communities. (B) Based upon experiences with several highly successful curricular programs targeting direct entry students, we will provide analogous opportunities for transfer students in their first year at UCLA. A new course, *Biosciences Research Methods & Careers: Orientation for Life Science Transfer Students* (RMC), will provide skills in time management, knowledge about academic culture, lab tours, research talks (by other transfer students and faculty), structured learning and advising activities designed to raise awareness of research opportunities on campus and as a career option, and broader exploration of STEM careers. (C) Several existing high impact research engagement programs, which have been highlighted in *Vision and Change* (e.g., Research Deconstruction, Biomedical Research Minor, course-based research experiences), will be expanded so that they are accessible to transfer students.

(IV) Evaluation and Dissemination

Our assessment team will employ a comprehensive, mixed-methods approach to collect data and provide ongoing feedback and a summative evaluation of the proposed curricular changes, programmatic interventions, and faculty teaching development strategies. Achievement of project milestones will serve as evidence for change in UCLA’s capacity for inclusion. The iterative data collection and reporting processes will feed development of the dashboard described in part I.

In addition to publications related to this specific project, we will develop and share a multimedia, online presentation called “UCLA Strategies for Inclusive Excellence.” This digital product will tell the story of how the various strategies undertaken at UCLA (including past activities that were initiated with HHMI support) fit together to enhance Inclusive Excellence.
The University of Colorado Denver (CU Denver) aims to be a welcoming and nurturing campus where culturally-competent faculty, staff, and peer mentors support all students who seek a transformative education for meaningful careers in the sciences. CU Denver is the only public urban research university in the State, and has the most demographically diverse student body of any campus in the CU system. Over 40% of CU Denver undergraduate students in the College of Liberal Arts and Sciences (CLAS) major in Biology or a field that requires General Biology for degree completion or career goals. Biology majors reflect the broader diversity of the campus with 27% being underrepresented minority (URM) students. Unfortunately, 39% of the students who have enrolled in General Biology 1 over the past six years earned grades of D, F, or W. When disaggregated by race/ethnicity, the DFW rate was 50% for URM students, who were also underrepresented in General Biology 2 and less likely to persist in the major. It is our aspiration that in five years, General Biology 1 will serve as the course that welcomes students into our science majors, rather than one that stands as an inequitable barrier to inclusion.

With the support of the Howard Hughes Medical Institute (HHMI), CU Denver will improve the inclusiveness of its Biology instruction and curriculum with research-informed revisions to the first-year General Biology sequence and sophomore-level biology courses, closing the gap between the success rate of underrepresented and other students. This includes incorporating more active learning opportunities, student learning communities, and early research experiences into the curriculum to support motivation and confidence as students learn science and develop science identities. This curricular effort is aided by 1) an institutional focus on identifying and removing the barriers that students face, 2) faculty professional development around inclusive teaching practices, 3) a proactive and data-informed approach to Biology student advising, and, in general, 4) a commitment to culturally competent and identity-conscious communication with, and support for, our students. Our goals for change in our capacity for inclusive excellence reside in four pillars supporting student success:

1) **Institutional Focus**: Implement a sustainable new model for effecting institutional change by creating an *Equity and Excellence in Science Alliance*, an action-oriented, inter-office collaborative that is publicly accountable for identifying and removing barriers to success for science majors.

2) **Cultural Awareness**: Increase faculty cultural competence, implementation and assessment of inclusive pedagogies, and participation in inclusive excellence scholarship and community through faculty participation in a new *Inclusive Pedagogy Academy*.

3) **Inclusive Curricula**: Reform General Biology 1 and 2 as the foundation of a *Biology Persistence Curriculum*, designed to increase student engagement with active learning, learning communities, and early research experiences; and increase student confidence, belonging, and science identity.

4) **Success-Centered Support**: Implement a *data-informed proactive approach* to orientation, advising, and new student registration that ensures students have access to the right courses, at the right time, with the right academic and personal support to meet their needs.

The *Alliance* is charged with implementing the project and measuring progress toward these goals. Evidence of change in our capacity for inclusion will include decreases in the overall rate of and inequity in DFWs in General Biology 1; increases in persistence of URM students in General Biology 2 and the major; and increases in student sense of confidence, motivation, belonging, knowledge, and
identity as scientists. We will begin by focusing on incoming freshmen who indicate an intention to major in Biology (54% DFW rate for URM students), giving us a manageable cohort for applying and evaluating our initiatives. We will apply our new understanding from those experiences to create models, processes, and infrastructure that the institution will be able to extend, first to all students in General Biology, then to other STEM fields, and ultimately across our campus to all fields experiencing challenges of equity and inclusion.
By engaging a critical mass of STEM faculty and administrators in understanding students’ experiences and perceptions of the conditions for intrinsic motivation, the project will dramatically shift UNC’s institutional culture towards one of inclusive excellence in STEM. We will expand UNC’s capacity for inclusion to engage all students by leveraging students’ experiences in STEM classrooms. In particular, through surveys of all students and focus groups with underserved students, we will help STEM faculty surface and make visible students’ experiences in STEM coursework with respect to classroom conditions for supporting intrinsic motivation. Our efforts focus on providing professional development to STEM faculty to help them engage in cycles of action research where faculty (1) gather data on students’ experience of the intrinsic motivational conditions in their classroom; (2) plan and implement a change in their instructional practice to improve the conditions; (3) gather data to analyze the impact of the change; and (4) undergo a transformational learning experience and fundamentally change how they see their role in underserved student success. In addition, we provide professional development to STEM administrators to help them understand and support the work faculty are undertaking and engage them in developing strategies for moving their units towards an institutional stance of inclusive excellence. Shifts in faculty practice will impact all students positively, but in particular will impact the experiences of the students entering STEM majors via nontraditional pathways (students of color, first generation students, students from low income backgrounds, transfer students, veterans and members of the LGBTQ community) whose experiences are rarely visible.

Project goals include: (1) enable STEM faculty to create classroom environments that positively impact student intrinsic motivation within the context of equity and inclusive excellence; (2) increase intrinsic motivation, persistence and graduation rates in STEM programs for students from nontraditional pathways; (3) provide administrators with the knowledge to support faculty in engaging in practices to provide an inclusive classroom; and (4) advance our understanding as a result of the successes and challenges of project implementation, resulting in a model for adaption and replication. Qualitative and quantitative data will be used to assess the current climate for inclusive excellence in STEM at UNC, the project’s progress, and whether intended outcomes are achieved.

The deliverables for our project result in increased capacity for STEM inclusive excellence. These deliverables include: (1) 40 STEM faculty (out of 71) with the knowledge, awareness and tools to create classroom cultures that support intrinsic motivation for all students, but particularly those who are underserved; (2) 3-6 STEM faculty who are trained to implement this professional development model with faculty and administrators increasing UNC’s capacity for institutional change; (3) 10 STEM administrators who understand the value of this work, actively encourage faculty to understand students’ experiences and adapt their instructional practices appropriately, and recognize the importance of such work when evaluating faculty; (4) a documented, tested strategy with robust professional development materials that will be used to continue to build faculty and administrator capacity to engage in creating STEM classrooms; and (5) a new Center of Inclusive Excellence in STEM, that will provide infrastructure and leadership to continue STEM faculty development and expand this professional development to additional STEM faculty, STEM graduate teaching assistants, faculty and teaching assistants in the Allied Health Sciences and across the campus, and to broader communities. Collectively these deliverables will shift UNC’s culture to one where STEM inclusive excellence is expected and actively supported and where conversations about understanding students’ experiences and instructional practices for improving conditions for intrinsic student motivation and success are commonplace.
Goals and Aspirations: The University of South Dakota’s (USD) HHMI-IE program, South Dakota Needs Scientists!, aspires to become a regional leader in providing high-quality training in the sciences to undergraduates from non-traditional background. Specifically, our program focuses on students from under-represented minorities (URM) and those who are the first in their families to attend college with an emphasis placed on American Indian students who represent the largest ethnic minority in South Dakota. The program’s philosophy is that students from under-represented groups already have to make many changes to adapt to their academic institution and it is time for the institution to adapt to the needs of these students. Our programmatic goals are to enhance mentorship training, create an environment that stimulates an interest in the sciences in a broad range of students, provide the tools for the students themselves to cultivate a science identity that meshes with their cultural identity, and to understand in greater detail the motivational processes that promote student success in the sciences. Ultimately, this program aspires to increase the number of students from under-represented backgrounds enrolled as science majors at USD to levels that are consistent with the demographics in our region.

Our Project: To achieve these goals USD will do the following.

- Develop mentorship training practices of the faculty and staff that emphasize culturally sensitive, asset-based approaches to guide students enrolled in science majors. USD will create a highly trained cohort of faculty/staff using the National Research Mentoring Network’s “Train the Trainers” course and these faculty will go on to teach best mentorship practices to the faculty and staff mentors at USD, thereby raising the quality of academic guidance throughout the institution.
- Increase interest in the sciences by URM students and provide a path for entering science majors at various levels in a student’s academic career. This will be accomplished, in part, through the development of courses that have culturally relevant themes to the students of South Dakota. Another component will be to provide support to student organizations promoting the sciences among the URM students at USD (e.g. the USD chapter of the American Indian Science & Engineering Society), so that these students may engage in self-directed activities to develop a scientific identity that complements their cultural identity.
- Utilize lecture capture technology to (1) enhance the capacity of students to maintain contact with courses even when cultural and family obligations draw them away from school and (2) to utilize this technology to promote more active learning pedagogies, e.g. flipped classrooms.
- Conduct an education research study to develop a detailed understanding of the motivational processes that impact URM vs. non-URM students’ success as science majors.

Progress and Learning: Progress will be measured using a combination of formative and summative assessment tools as well as through the educational research study that focuses on factors influencing student motivation. The assessment plan will analyze institutional data in terms of numbers of URM students enrolled in science majors, their retention and their graduation rates. The assessment plan will also utilize surveys to determine the number of URM students involved in research, travel to professional conferences, involvement in student science organizations, the number of students who have been able to take advantage of lecture capture technology, and the number of faculty/staff involved who have participated in mentoring training. Progress will also be measured in terms of changes in student motivation to choose and persist in science majors as evaluated by the education research component of our study. Another indication of progress will be the successful institutionalization of the principles and values of inclusive excellence among the
faculty, student and staff engaged in the science curriculum at USD. That students of all backgrounds have assets to bring to the scientific enterprise and that the scientific enterprise best serves all of society when all of society participates in science. Finally, and most important, we hope that the program will help faculty and staff to learn what types of interventions (note the plural) have the greatest impact in improving student motivations from all backgrounds to enter and complete an academic major in the sciences.
The University of Texas Rio Grande Valley (UTRGV), one of the nation’s Top 3 providers of Hispanic college graduates, seeks to significantly increase the number of Hispanic, Spanish-speaking healthcare professionals in one of the nation’s poorest – yet fastest growing – regions through an evidence-driven, scalable, replicable, competency-based, financially-sustainable B.S. in Biomedical Sciences pathway. Currently, students in the biomedical sciences degree pathway struggle with course and program completion, especially in the mathematics and basic science disciplines. This is a missed opportunity, as the region is approximately 90 percent Hispanic, and therefore has the unique capacity to provide strong opportunities for students who are currently underrepresented in the medical sciences, as well as increase diversity in these fields.

We envision that the College of Sciences, the College of Health Affairs, and UTRGV will soon comprise the preeminent incubator for bilingual STEM and medically-focused Hispanic students pursuing advanced science and medical degrees locally, nationally, or globally. The biomedical science students mirror the region’s demographics: to a large extent they come from underrepresented groups, economically disadvantaged backgrounds, and/or are first generation students. Providing UTRGV biomedical science students with wrap-around student support and a better opportunity to master content will automatically change the institution’s capacity for inclusion. We will accomplish these goals by enabling the students to understand the relevance of essential mathematics and science course work in biomedicine, and thus not only succeed in their courses but also complete the program. Over the five years of the grant, the goal is to translate the enhanced success of biomedical students into increased numbers of students recruited, served, supported, retained, and graduated.

Our BMED-STEM project redesigns the courses and supportive pedagogies, technologies, and services in both the biomedical sciences and basic sciences. The Howard Hughes Medical Institute will provide funding support for the following key aspects of this initiative: instructional facilitators, peer and near-peer mentors, and a student success manager. These personnel will support students through tutoring, providing supplemental instruction, leading study groups, assisting with study skills training, and providing academic and non-academic support. The instructional facilitators may be degreed professionals, or UTRGV graduate or senior undergraduate students who act as academic coaches; the peer and near-peer mentors are advanced students responsible for providing academic support to less advanced students. The student success manager will offer individualized academic and non-academic support to students by addressing any impediments to success, coordinating student needs with relevant support services and collecting student data and feedback. Other facets of the project are supported through grants from the University of Texas System and the university itself.

This reengineering of the academic experience will be accomplished in a holistic way. We will begin by redesigning essential mathematics and sciences courses to be more synergistic with the biomedical sciences and more activity driven. We are transitioning our re-engineered courses to web-based delivery to increase the program’s accessibility and affordability. We will collect data about student engagement, persistence, and mastery to target; evaluate the effectiveness of interventions; and continuously improve the learning experience. A key component of our holistic approach is to provide a community of care to fully support students in their academic pursuits while assisting them in balancing their work life, family life, and community engagements. The student success manager, instructional facilitators and peer mentors will provide one-on-one and
group support and assistance when students reach out for help, or when the data monitoring indicates a need.

In order to achieve our student goals, we plan to continue offering a coherent, integrated, synergistic curriculum focusing on student engagement; flexible scheduling to help students balance their studies with work and family responsibilities; bilingual content to promote student understanding and parental involvement for students with international backgrounds; and frequent formative assessments to diagnose and remediate learning problems. Additionally, our pilot program has revealed that students enjoy interactive learning in a flipped classroom model, especially if faculty can incorporate the latest technology in facilitated learning. The BMED undergraduate program offers an accelerated three-year pace versus the regular four-year pace, which students find attractive based on individual needs. The Biomedical Freshmen Research Initiative (BFRI) is a clear favorite with students, since it helps them develop critical thinking/problem solving and professional skills while they are being mentored by faculty. The integration of BMED courses and curriculum with non-BMED science and humanities courses such as Chemistry, Physics, Math, Psychology, and Literature shows students the relevance and importance of all disciplines to the pursuit of a Biomedical career.

We will measure the impact of the program in two key ways: quantitatively through statistics on student retention, performance, pace, persistence and academic success; and qualitatively, through student and faculty surveys and focus groups. Additional measures of impact would include the success in placement of BMED students in professional and graduate schools as well as an external evaluation. These data will be linked to student background data (e.g. high school attended, high school GPA, standardized exam scores, place of residence) collected through surveys, which will allow us to measure our progress in achieving true inclusiveness. By showing that students from diverse academic and social backgrounds can succeed in higher education when the right educational approach is utilized, we can highlight the need for institutions to refocus their attention toward adjusting current curricula in order to ensure the success of students of all backgrounds.
The Utah Pathways to STEM (UPSTEM) Initiative is a collaboration between the University of Utah (U) and Salt Lake Community College (SLCC) to increase the capacity of both institutions to support transfer students in the sciences. More than a third of the U’s students are transfer students and 44% of these students come from SLCC. Thus, this project provides a unique opportunity to make systemic improvements across both institutions that will positively impact a significant portion of the student population.

Our aspirations are for the University of Utah to become a model for how a research-intensive institution and a community college can partner to provide an exceptionally supportive, cohesive, and rich experience for students from all backgrounds. We want our faculty to have the knowledge and skills to teach effectively and inclusively. We want our institutional policies to remove barriers to success and build support structures for transfer students and students from diverse backgrounds. These aspirations will be manifest in a 2% increase per year in the number of transfer students from SLCC that declare a STEM major and an 85% third-year retention rate of students who participate in the UPSTEM curriculum.

Five outcomes will result from the UPSTEM Initiative that will help both institutions achieve the goal of increased capacity for inclusion in the sciences;

• **Outcome 1:** Fully articulated, clear academic degree pathways for STEM transfer students. The UPSTEM Initiative will catalyze a cross-institutional collaboration to design fully articulated degree pathways that transfer directly to College of Science programs at the U.

• **Outcome 2:** Increased capacity to make data-driven decisions regarding STEM transfer students. The UPSTEM Initiative will create a new cross-institutional STEM Data Team that will establish common definitions of data elements, proper controls, and data sharing agreements that enable effective collaboration. With these mechanisms in place, we will be able to guide policy development, implement practices and services that support inclusivity goals, and, perhaps most importantly, assess student-level outcomes in the sciences in ways that are not currently possible, particularly for transfer students.

• **Outcome 3:** A model curriculum for transition and inclusivity. With funding from HHMI, we have a unique opportunity to create a model curriculum that helps transition transfer students to the U while also employing best practices in inclusive pedagogy. This work will be a central component of the innovative curriculum that the College of Science is developing for the new Crocker Science Center research and education facility, and will provide a focal point for faculty professional development on inclusive teaching practices.

• **Outcome 4:** A vibrant Faculty Learning Community (FLC) that is committed to inclusive excellence. Equipped with data from the STEM Data Team, a clear purpose, and resources to implement and assess ideas, the UPSTEM FLC will be a powerful mechanism for institutional change.

• **Outcome 5:** A culture that supports STEM transfer students academically, socially, and financially. UPSTEM will conduct a longitudinal assessment of the culture of the COS to identify specific needs for institutional change and student support.

Progress toward the goals of the UPSTEM Initiative will be measured through clearly defined indicators such as completed degree pathways, a live STEM data dashboard populated by the STEM Data Team, and increased transfer student enrollment in the College of Science. A longitudinal assessment of College of Science “climate” will also inform our progress toward institutional change. From this information we hope to learn about current challenges for our
students and our institutions, effective practices for supporting students and implementing institutional change, and how to improve our institutional capacity for inclusion on a large scale.
With respect to inclusion in undergraduate science programs, Virginia Tech (VT) aspires to a deeper level of structured and adaptive self-evaluation and institutional transformation. Its goals for students from underrepresented regions of Virginia and all students in the sciences are that they:

1. encounter threshold learning environments (Parks Daloz et al., 1996) that foster inclusion and success through the instantiation of inclusive pedagogy as a strategy to address implicit biases and issues of climate that persist in STEM classrooms (Malcolm & Feder, 2016). Cohorts of science faculty from VT’s three science colleges will learn the ways in which implicit bias and stereotype threat hinder the success of students from nontraditional paths. They will adopt inclusive pedagogy to build threshold learning environments that promote a growth mindset for students. These Inclusive Excellence (IE) Faculty Scholars will serve as champions and mentors to faculty peers. Progress will be measured by the number of faculty and departments who participate, their reflections, student perceptions related to inclusivity, and academic performance of students in the classes of IE faculty. (Target: 36-72 faculty members)

2. experience flexible curricular path embedded with high impact practices (HIPs) through departmental work in designing inclusive curricula. IE Departments will commit to building inclusive curricula. Curricular structures that prove to be barriers for some populations of students to complete their degrees in a timely manner will be identified and solutions beta-tested with seed funding. Inclusive curricula will also ensure that all students participate in HIPs such as undergraduate research, internships, and/or experienced-based capstone courses. As recommended by Malcolm & Feder (2016), departments will be supported in obtaining data to help identify curricular barriers for some students and measure participation in HIPs. Campus-wide, metrics to define inclusive curricula will be established. Progress will be measured by increased retention and decreased time-to-degree, student learning and perception of inclusion, and participation in HIPs. (Target: 12 science departments)

In the past, VT has benchmarked its progress in achieving inclusion through a rather one-dimensional lens of measuring academic success of student populations traditionally underrepresented or “at-risk” in STEM (e.g. women, minorities, transfer students). As a university rich in expertise in data sciences and the social sciences of identity and inequality, VT is positioned to develop a more sophisticated framework for inclusion built on the concept of intersectionality (Kelly & Smith, 2014), recognizing the multiple, complex and changing identities an individual brings to a situation. Our focus population of students will align with VT’s recruitment of students from regions of Virginia with low college attendance rates (both rural and urban, racially diverse, lower income, many first-generation and transfer students), and will adopt a data driven approach to examine the effects of our IE program on the success of these students.

Participation in the IE project has the potential to catalyze a pervasive cultural shift in Virginia Tech’s approach to inclusion in the sciences. As we bring more diverse populations of students to campus, the work we have proposed in our IE grant is needed more than ever. The university must address systemic barriers to the academic success of our students and full participation in the types of experiential learning that prepare them to be citizen-leaders and for careers. These needs are most acute in STEM, where the majority of our students major and where there are disparities for students of intersecting identities (first-generation, low income, underrepresented minorities).
In five years, VT should gain a better understanding of the ways in which the institution itself has created barriers to participation and success of students who come from non-traditional paths and then to act upon that understanding. Participating faculty should value the diversity these students bring and empathize with the unique challenges they face in navigating a large research university. Specific practices that improve student success and attributes of an inclusive faculty member that should be sought after and rewarded will be identified. Modifications to degree structures should produce truly create inclusive curricula that enable a diverse population of students to complete degrees in science in a timely manner while fully participating in the types of experiential learning that define the best undergraduate science educations.
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The overarching goal of this project is to create an inclusive learning environment where all students feel welcome and have an equal opportunity to be successful in STEM disciplines at Washington University in St. Louis (WUSTL), and that all students will reach their potential. This student-supportive, inclusive, and positive learning environment will foster a smooth transition from high school to the university for our first-year students, especially those from groups traditionally underrepresented in STEM. In addition, we hypothesize that these interventions will give students from underrepresented groups knowledge of these barriers and the skills to address them once they graduate from WUSTL and continue in careers in STEM. Our primary goal is to ensure that our environment will promote the success and persistence of all students in STEM, and we will have no disparities in outcome for students in groups traditionally underrepresented in STEM.

By the end of the grant, key stakeholder groups (i.e., all faculty and departmental staff connected with STEM courses; four-year advisors and other student-affair professionals who interact with first and second-year students; and peer leaders, mentors, and teaching assistants) will be knowledgeable about psychosocial barriers to the success of at-risk groups and adept in applying strategies to address these barriers in their interactions with students. In addition, new institutional structures (e.g., on-going professional-development programs for the three key groups, faculty-learning communities, and integrated standing committees) will foster information sharing about introductory STEM courses and non-academic support programs and collaboration among these stakeholder groups in supporting student success. These structures will ensure a consistent positive narrative about student success in our STEM courses and majors is conveyed by all stakeholders. This collaborative environment will help disseminate best practices for inclusion in interactions with students in class, peer-learning groups, and academic-advisor meetings. These psychosocial and metacognitive interventions are designed to eliminate the barriers to success in STEM, and we hypothesize that these interventions will promote student integration into, build their confidence in their ability to succeed in, and foster a sense of belonging to and feeling welcome in STEM disciplines. We also hypothesize that students who are more integrated into the STEM disciplines will be more successful and satisfied with their university STEM experience.

To accomplish our goals, we will develop, implement, and evaluate psychosocial and metacognitive training programs and interventions to increase inclusion in introductory STEM courses and during the first two years of college by targeting three key groups: faculty in these STEM courses, advisors/student-affairs professionals who interact closely with first-year students, and undergraduate peer leaders/teaching assistants (TAs)/peer mentors. These multi-workshop, on-going training programs will educate these stakeholders about the barriers to success for traditionally underrepresented groups and strategies to remove those barriers. Additional working sessions will facilitate development of implementation plans for interventions, and provide opportunities of sharing best practices. Importantly, these key stakeholders will be supported in their implementations by faculty developers or experts in peer leading.

A two-year workshop/strategy-development program will engage STEM faculty in learning about barriers to inclusion, social belonging, and psychosocial strategies to promote inclusion. Faculty will work in groups to develop interventions to use in courses and student interactions. The faculty will be supported by The Teaching Center and the HHMI Education Specialist during
implementation. In addition, the Center for Integration of Research on Cognition, Learning and Education (CIRCLE), a university center that performs evaluative studies on education innovations, will work closely with the faculty and the HHMI project team to evaluate their implementations and provide feedback for refinement. To support the transformation of our STEM environment, we will develop a STEM Teaching Academy, a faculty-learning community that will promote a culture of continuous improvement and use of evidence-based strategies.

A similar program structure will be developed for the four-year advisors and other student-affairs professionals who interact with first-year students to ensure student meetings are inclusive and convey a common narrative of student success in STEM courses and majors. The HHMI project team and CIRCLE will work closely with the College of Arts & Sciences, Office of Student Affairs, and Engineering Student Services to develop, implement, and support this program. Working with these key centers will ensure institutionalization of this program by the end of this grant.

The training for the undergraduate peer leaders will be integrated in their current semester-long training courses. Peer leaders start their training with a one-time course for new leaders. Ongoing participation in a ‘maintenance’ course is required for every semester the student is a peer leader. Similar to the faculty and advisor training, these peer mentors will learn about barriers to inclusion and social belonging, and learn to implement psychosocial strategies to promote inclusion. The training of the graduate students and postdoctoral fellows will be incorporated into the required Teaching Center training workshops and into the current Teaching Center professional-development programs for future faculty. These structures ensure continual re-training and an institutionalization of the training by the end of the grant.

Evaluation is integrated into our proposal as part of a feedback loop of continuous improvement and to determine if our interventions change the culture and improve student outcomes. CIRCLE will work closely with the HHMI project leadership team, project manager and education specialist to design and implement evaluation studies as we develop the activities and programs. In addition, the project manager and education specialist will housed in CIRCLE to ensure the development of a close and supportive working relationship. This synergistic relationship will foster formative use of the evaluation results to refine the programs. The evaluation will include psychosocial and metacognitive surveys, as well as exam-performance outcomes, including course performance and completion in introductory STEM courses, persistence and performance in upper-level STEM courses and STEM GPAs. In addition, surveys will be administered to measure knowledge of inclusion issues and strategies, as well as perceptions of implementation of such strategies, in the three key stakeholder groups. Observations will provide independent documentation of implementation of the strategies in student meetings and classes. Reflective evaluation of the strategies used and modes of implementation will provide feedback to the key stakeholders to improve implementation. In addition, select interviews of students and key stakeholders will be performed to provide deeper insights into the effect of the interventions on students and the knowledge and beliefs of the key stakeholders. To measure integration of students into the culture of the university, we will collaborate with a university social science center in the Brown School of Social Work to study changes in the social networks of students in STEM over the course of the grant. The university Institutional Research Office will continue to monitor the number of students in different subgroups who graduate with a STEM degree, and to examine the students’ opinions of STEM majors, courses, and departments through the COHFE senior survey. At the end of the grant period, we expect that disparities in outcomes will be erased and knowledge and use of strategies that foster inclusion and social belonging will dominate our students’ experiences in STEM in the first two years at Washington University.
Western Washington University (WWU) presents a comprehensive enterprise to achieve the long-term goals of the HHMI Inclusive Excellence Initiative. This project will enhance recruitment, retention, and success in the Natural Sciences for first-generation, underrepresented racial and ethnic minority, female, and transfer students at WWU. Four goals guide this project: 1) increase the representation of students from these groups who graduate with Natural Science degrees and/or enter careers related to the Natural Sciences, 2) improve the success of historically underrepresented students in our Natural Science programs by changing classroom and advising practices and in doing so, 3) create a sustainable model for long-lasting change at WWU that 4) could be adapted for implementation at other institutions.

We will enact systemic change to affect the individual, the classroom, and the institution, in part by leveraging existing resources so that new activities will become the norm, and therefore sustainable, at WWU. Specifically, our plan consists of four major efforts to reach our goals. First, we will identify and transform policies and practices that disadvantage underrepresented groups. Second, we will establish cohorts of students interested in the Natural Sciences who will undertake coursework designed to provide a strong foundation in STEM coursework and successful navigation through college. We will recruit first-year and transfer students from historically underrepresented backgrounds to enter a new program of linked courses called Natural Science Interest Groups (NSIGs). NSIG courses will include two new seminar classes that address navigating college, understanding and using scientific practices, and building quantitative reasoning skills specific to the natural sciences. NSIG cohorts will also enroll in a new Math class geared to the Natural Sciences and be invited to enroll in a revised English 101 section that includes STEM-related reading and writing skills. Third, we will provide professional development to faculty and teaching assistants on equitable, inclusive, student-centered teaching and learning. This initiative will draw on existing frameworks that are already initiating changes in faculty’s teaching philosophies and practices. Fourth, we will create a mentoring program to support students throughout their time at Western by strengthening support networks and opening the door to early research opportunities. Together, these initiatives will encourage students with diverse backgrounds, experiences, and perspectives to build and strengthen their STEM identities. We anticipate that the number of faculty members engaged in actions to build and support a diverse student body will at least double with HHMI funding. Ultimately, our project will result in enhanced faculty awareness, understanding, and ownership of issues of equity and inclusion that will be assessed through baseline and annual follow-up surveys of students and faculty. We expect that by providing supportive learning environments, along with targeted mentoring, WWU will increase retention and promote the success of women, first-generation students, and underrepresented racial and ethnic minorities in the Natural Sciences. This will be assessed through student surveys and analysis of retention and graduation rates of participating students. These efforts will lead us to achieve institutional change that will be both sustainable at WWU and serve as a model for other institutions.