HHMI Inclusive Excellence 2018 Meeting
Image by Hadar Goren

**HHMI Inclusive Excellence Grants Awarded 2017 and 2018**

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Arizona State University (ASU) opened its doors to diverse and underserved student populations by increasing the size and flexibility of curricular options, including through online courses and degree programs. Over the past five years, ASU launched more than 50 fully online undergraduate degrees enrolling some 21,000 students. Despite ASU’s growth and success in broadening access, we must improve elements of instruction, particularly for online courses. We will address this challenge by training a cadre of highly motivated faculty members to combine the latest educational technologies and insights from education research to promote inclusive excellence. This community will create modular, interactive online learning experiences to serve multiple curricular and developmental goals for first-year students.

Aspirations and Goals. In five years, a library of 20 Exploration Experiences will reach ~1,700 students per year within STEM-focused ASU 101 sections in the College of Liberal Arts and Sciences. ASU 101 is taken by all of ASU’s first-year students. A cadre of 20 STEM faculty members will know how to advance inclusive excellence online. We aspire to see this model adopted by all ASU 101 sections. Our goal is to produce enduring changes in ASU’s capacity for inclusion by:

- initiating a systemic effort to change faculty culture relative to inclusive teaching;
- engaging ~20 faculty members to create evidence-based pedagogical innovations;
- creating a cohesive pathway for faculty members to transform their teaching methods and attitudes such that inclusive excellence is central to ASU’s culture;
- challenging faculty members to adopt assessment endpoints other than retention or graduation—such as higher order thinking skills, adaptability, and inclusiveness.

Theory of Change (ToC). Our initial step is a survey of student and faculty backgrounds to identify key points where interventions are most likely to improve each first-year student’s sense of inclusion in ASU’s community. These data will guide next steps including creation of Exploration Experiences, faculty development workshops, and assessment of faculty members and students. Inclusion begins by meeting students where they are and we will start our evolving ToC by gaining a better understanding of where they are.

Progress and Institutional Learning. We will measure the impact on faculty members using pre-post experience surveys and post experience semi-structured interviews that probe their perceptions of inclusive teaching practices, online education, and use of technology to create adaptive, personalized learning. We will also probe affordances and barriers encountered. Pre- and post-surveys will assess each student’s sense of belonging, science identity, and self-efficacy. Changing faculty culture is hard at a university as large as ASU. The history of top-down approaches is spotty so, perhaps paradoxically, we will use a bottom-up approach in which faculty members, Exploration Experiences, and lessons learned become exemplars for inclusive excellence mediated by technology. Faculty members involved will want to apply these approaches in their other online offerings, while at the same time these faculty leaders will be championed by senior administrators to become role models for others. In this way lessons learned will disseminate across ASU.
Bates College

Founded in 1855, Bates College was a century ahead of most colleges and universities in building a student body based on the principle that education should be available to students of all races, national origins, religions, and genders. One hundred and sixty-three years later, we remain deeply committed to these values and aspire to offer programs in STEM that will allow all students to thrive at Bates and in scientific careers. Over the past decade, we have implemented a variety of strategies to support an increasingly diverse student body, yet these efforts have only been partially successful in STEM fields. We are determined to change these outcomes through a fundamental transformation in our culture of teaching and learning in STEM.

This grant will catalyze our efforts to develop faculty capacity and institute curricular changes that will remove barriers to success. We will transform faculty behavior and attitudes in order to foster positive connections directly with students and develop readiness for broad-ranging curricular reform. The proposed curricular changes are aimed at early experiences and sustained peer support, in response to our own data and national trends, which indicate that the majority of URM students leaving the sciences do so within the first year.

Program

Specifically, we propose three interrelated strategies:

1. **Develop faculty capacity** on a broad scale to understand the diverse strengths of our students, recognize and mitigate barriers to student success in our actions and in our curriculum, and develop high impact approaches to teaching and mentoring URM students. This work will involve faculty development activities, guided by assessment of faculty attitudes and practices, with a goal of building internal expertise within our faculty ranks.

2. **Introduce authentic research courses** for first year students to engage with faculty in the scientific process early in their college experience. These courses will be designed to ensure successful research experiences, with concomitant increases in science efficacy, science identity, and belonging. Small courses also maximize opportunities for developing relationships with faculty and fellow students. First year research courses will be designed in collaboration with students and serve as catalysts for larger curricular reform.

3. **Transform our Science Fellows program** from a one- to a four-year course-based mentoring program for Bates students so that they are engaged over the course of their college experience, while gaining a sense of belonging, leadership skills, and science efficacy, while receiving academic and career training. Our expansion will bolster both faculty mentoring and peer mentoring of our students and focus on their professional and personal development as scientists. We expect that our science fellows will participate in curricular reform.

Progress and Learning

Our progress towards inclusive excellence will be assessed through faculty and student attitude surveys and interviews. Using assessment tools that focus on scientific content and process and psycho-social characteristics (self-efficacy, confidence, and scientific identity) we will determine the strengths and weaknesses of our approaches. Regular assessment will guide the development of a sustainable practice of revisions and expansion of activities that support inclusive excellence.
Brandeis University recognizes that many students enter college with a strong interest in STEM, but decide not to continue because of academic and other barriers. Rather than focusing our efforts on serving a single population (students of color, first-generation college students, low-income students, ...), our Inclusive Excellence grant seeks to transform the STEM classroom experience for all students, regardless of background. We propose a set of four initiatives designed to enhance retention and success of students in STEM. These programs will address practices and attitudes we have identified in both faculty and students that tend to discourage students from STEM majors. We will encourage the incorporation of the student voice into all of these initiatives to bring about systemic change. Within five years, we hope, as a result of the more inclusive culture we seek to create, to see increased retention and achievement (majors, GPA, involvement in research) in STEM among all students. In short, we hope to change the current sink-or-swim mentality that affects many of our faculty and students to one that recognizes that all students can reach their academic and professional goals.

The first initiative is the Galaxy Program, a cohort-based mentoring program meant to enhance the first-year experience for STEM students. The Galaxy Program has been successfully piloted at Brandeis for the last three years, serving students identified as historically facing academic challenges in STEM. We plan to expand enrollment from 40 students in year 1 to 120 students by year 5 and to open the experience to any first-year science student regardless of background.

A Faculty Learning Community, initially comprised of faculty members who teach the large introductory first and second year science courses, will grapple with literature on inclusive practices. Discussions will include how to best structure classroom lectures, office hours, and other instructional elements to be student-ready for all learners. Faculty will also engage in peer observation to better understand their unconscious biases as they appear in the classroom, learning how to be critical friends in their instructional practices.

A new series of workshops for all introductory science students is aimed at improving the student culture with regard to studying science. Too often, students feel marginalized not only by their faculty but by their peers, and these student-to-student judgments can create a hostile learning environment. Workshops will focus on topics including fixed versus growth mindset, grit as defined by cooperation and appreciation, and the creation of positive self-defined classroom norms. Workshops will initially be facilitated by the grant leadership team.

The fourth initiative is the creation of Science Practicums, twenty-person experiential-based science courses that will be available to undergraduates during their first two years of study. These courses will offer small community environments and engage students in high impact practices with a STEM faculty member.

Formative and summative assessment are critical aspects of this work. Quantitative and qualitative data collected from all stakeholders will be used to assess each of the core activities as well as the overall success of the program.
The change that forms the framework of this project is one where transformed faculty pedagogy, implemented via faculty training and space to reflect on teaching practices (broadly defined), results in transformed learning for students, thereby achieving inclusive excellence. The slogan “Transformed Learners Transform Learners” captures this vision. We acknowledge that teaching faculty are also learners who need to reflect on their pedagogy and use evidence-based best practices to enable all students to realize their full potential. We envision that in five years we will have a community of transformed faculty and students in the sciences who work collaboratively to achieve academic excellence. Cal State LA is already nationally recognized as the #1 institution for the upward mobility of its students. Yet there remains an achievement gap at many levels of achievement, represented partly in demographics: Hispanic and African-American students’ achievement, on average, is significantly lower than that of students of other ethno-cultural identities. Therefore, our overarching goal is to eliminate this achievement gap through transformed pedagogy that reaches all students, particularly Hispanic and African American students.

We propose a multi-faceted implementation plan to transform pedagogy in the sciences by:

1) Instituting an equity-focused professional development program for faculty in collaboration with the Center for Urban Education (CUE) at the University of Southern California. The inquiry-based workshops in this program will a) identify educational inequities experienced by historically underrepresented student groups, b) use CUE’s inquiry strategies and tools to examine critically the ways in which faculty mindsets and educational practices contribute to those inequities, and c) transform those mindsets and practices. We anticipate that these and other high impact practices will lower the achievement gap.

2) Increasing student engagement and fostering the development of students’ college identity by a) building a community of practice and b) promoting and incentivizing science engagement via a program and web portal/App we call “Science Campus Activities for Fostering Engagement” (Sci-CAFÉ).

3) Ensuring sustainable institutional development by working with the Vice Provost for Diversity and Inclusion to incorporate equity-based programing across all administrative units at Cal State LA.

The strategy includes a “train-the-trainer” model to bring together more than 74 faculty and chairs with the leadership and capacity to change pedagogy, curriculum, and programs, and influence academic policy. This faculty training program in inclusive excellence will be institutionalized by the University’s Center for Effective Teaching and Learning. We anticipate that the College and University will sustain the changes by incentivizing all tenure-line and part-time faculty to attend these training programs and inform/transform their pedagogy at the outset. To measure and monitor the changes in Cal State LA’s capacity for inclusive excellence, we plan to use and develop qualitative and quantitative assessment tools to identify what is most effective for our students. We will use institutional research data to monitor our primary target, student achievement gaps; as well as graduation rates, persistence rates, and student engagement.
California State University-San Marcos  
George Vourlitis  

Our recent self-study indicated that rates of graduation and retention of first-time freshmen (FTF) STEM students were disproportionally lower than those for transfer students, especially for underrepresented students such as minority and first-generation students. A previously conducted University-wide survey indicated that many students leave STEM because they feel “disconnected” from their major and/or the student community. Thus, our overall goal is to identify and remove barriers to success for FTF-STEM students and to increase rates of retention for this student population.

We feel that this opportunity gap can be reduced by transforming the early educational experience for FTF from a passive and disconnected learning environment to an active, student-centered environment where students feel welcome and connected both inside and outside the classroom. One critical pre-condition to achieving our goal is to understand specifically why FTF leave our STEM programs, so we first need to assess student perceptions of our institutional and classroom learning environment. We will also conduct a similar analysis of how faculty perceive our institutional and classroom learning environment to assess the potential for student and faculty mismatch. These surveys, in conjunction with other data (retention, time to graduation), will provide the pre-conditions required for developing other approaches that, based on scholarship and previous experience on our campus, show promise for engendering a feeling of student connectedness and increasing student success. For example, our project plans to develop faculty learning communities (FLCs) to train faculty in research-based instructional strategies and cultural sensitivity, which will provide faculty with the information required for transforming the classroom environment to an active, student-centered learning environment where all students feel welcome. This training will provide the pre-condition required for redesigning the introductory Biology and Chemistry courses so that they are active, student-centered, and supportive rather than designed to “weed out” FTF-STEM students. Another key activity of our project is the development of a robust peer-tutor and learning assistant program to help FTF feel more welcome in their STEM major, provide academic support, and assist FLC graduates in their course redesign. Peer-to-peer support will also be linked with a new, intrusive academic and career advising component designed to help FTF navigate the first year of their STEM major and to identify career opportunities once they graduate. Together, these initiatives are designed to help students feel empowered, engaged, and nurtured in their critical first year as a STEM major.

We plan to assess the effectiveness of these initiatives for increasing institutional inclusiveness by annually assessing changes in student perceptions of our institutional and classroom learning environment and how their perceptions change according to our current baseline. We will conduct similar analyses of faculty to assess whether faculty perceptions change as well. These qualitative data will be used in conjunction with quantitative data on student retention rates to assess the efficacy of our project initiatives for achieving inclusive excellence within the CSUSM College of Science and Mathematics.
Chaminade University of Honolulu

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 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.
Fostering Inclusivity and Respect in Science Together (FIRST) at Davidson College builds on strong undergraduate STEM programs, thoroughly committed leadership, dedicated faculty and staff, and a climate keenly tuned to enhancing diversity, inclusivity, and equity in all dimensions. Over the coming five years FIRST will work to expand faculty understandings of inclusivity (Aim #1) and reduce institutional barriers to success in STEM (Aim #2). We recognize that widespread engagement and actions at multiple levels are necessary as well as that effective change will likely be challenging and diverse in its implementation on our campus. Ultimately we aspire to eliminate grade differentials, increase representation in STEM graduates, diversify our STEM faculty, and learn from institutions with similar aspirations to foster student success.

**Aim #1. Expand and transform STEM faculty understanding of critical factors that foster STEM success for all students.** We learned that lack of time, lack of support, limited insight into student experiences, and fear of failure are key barriers to our STEM faculty members adopting more inclusive pedagogies and stances. Thus, FIRST RATE (Resources and Time for Exploration) will provide release time for all of our permanent STEM faculty members to reflect, learn, implement, and assess evidence-based strategies within their existing STEM courses. Simultaneously, FIRST will enable learning communities and workshops to support faculty and staff members engaged in the important, ongoing, and multifaceted work of improving relationships, assessing teaching strategies, revising courses, and reimagining curricula to become more inclusive and foster student success. Specifically, FIRST will redesign introductory physics as well as catalyze new STEM Justice, Equality, Community (JEC) courses and Group Investigation (GI) research experiences. Moreover, FIRST’s STEM Education Fellow will support assessment, collaboration, and creating new pathways to student experiences that our faculty eagerly seek to understand. Progress will be assessed quantitatively and qualitatively through continued self-study, participation metrics, climate surveys, annual faculty activity reports, and student feedback.

**Aim #2. Reduce institutional barriers to STEM success by concretely addressing campus policies, practices, and structures that limit inclusivity.** FIRST will target five specific functional barriers that influence new majority success in STEM (e.g., course credit, pass/fail, tenure expectations, etc.) through resourced Action Teams of students, faculty, and staff. Our ability to reduce institutional barriers will be measured qualitatively and quantitatively by the number, degree, and types of policies and procedures revised to enhance inclusivity, as well as by synergy with emerging academic strategic planning priorities, new majority STEM majors, grades/GPAs, and student feedback on navigating STEM courses, major decisions, and student stress. Our ultimate aspiration is to identify and remove institutional structures, policies, and practices that hinder inclusion and success yet are beyond the reach of any individual instructor or department.

FIRST’s strategy to foster reflection, feedback, and continual enhancement of inclusive practices at all levels will help these actions to become customary within our culture. Ultimately, Davidson College seeks to become an environment wherein all students can succeed in STEM—and inclusive excellence is a shared responsibility and lived reality rather than an aspiration.
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.
DePauw University  

Jacqueline Roberts  

At historically white institutions like DePauw University, faculty and staff must acknowledge the role they play in perpetuating educational disparities among student populations, and must work to transform the educational environment so that it is welcoming for all students. Our goals are ambitious and, if accomplished, will produce true institutional change, evident in:

1) all STEM faculty teaching with inclusive pedagogies and creating welcoming learning environments,
2) greater persistence and success of underserved minority and first-generation students in STEM majors (and women, in those majors where they are currently underrepresented),
3) diverse students and faculty feel welcome in the STEM community,
4) increased numbers of successful, diverse, engaged DePauw alumni in STEM fields, and
5) a model for inclusive teaching and student support implemented in other disciplines.

Our project has two prongs. The first strategy, anchored in a new university structure for granting tenure-line positions, requires STEM departments to conduct audits to determine their specific problem areas. Our own student focus groups will help us identify local barriers to student achievement and sense of belonging in STEM. Each department, with the support of the HHMI Team and an individual departmental STEM liaison, will develop a plan to address the identified issues. Course development funds and external consultants will assist departments and their liaisons with the process of curricular transformation. A centerpiece of this 21st century curriculum effort is a semester-long Inclusive Excellence course for STEM faculty and staff. This ongoing course will provide cohorts of our colleagues with the tools, training, and community necessary to create more inclusive courses and curricula, and sustain new methods of teaching.

The second prong entails community-building for students, staff, and faculty. We will establish a coordinated mentoring, advising, and tutoring program for STEM courses that bridges the gap between faculty and Student Academic Life, and trains diverse cohorts of upper-level students to serve as STEM Guides for their peers. STEM Guides will work with faculty in their core courses and help foster peer learning. Our community-building effort will also include a semester-long STEM-specific SEED (Seeking Educational Equity and Diversity) seminar for faculty and staff. The SEED format uses personal testimony and experiential learning to examine and raise awareness of systems of oppression, and to develop empathy and confidence in their diversity and inclusion work. These efforts build on and seek to enhance already established relationships between faculty and staff, honoring the work of both groups by offering access to additional professional development funds.

Our multifaceted assessment efforts entail internal data collection from student focus groups and student success and persistence data from our STEM courses and majors. We will also determine faculty participation in our activities and revised, more inclusive curricula. Our external assessment firm will conduct interviews and surveys, and classroom observations. These data should demonstrate an improved campus climate and sense of belonging for diverse STEM students, faculty, and staff, ultimately evident in our STEM alumni more closely reflecting the demographics of our student body and the greater US population.
The College of STEM at Framingham State University (FSU) will be welcoming and inclusive of all students, particularly those from underrepresented groups. Faculty will routinely implement an experimentalist model of teaching infused with high impact practices and culturally responsive pedagogies; faculty will be comfortable assessing and revising their practices. The University will have shifted to embrace a culture that demands and rewards inclusivity and excellence within the classroom and across campus, and will create policies to support and sustain this goal.

The faculty is central to enacting the mission of any academic institution. Our Theory of Change is based on the premise that in order to effect lasting, meaningful change, a university must change the mindset of its faculty. Faculty at FSU and Mass Bay Community College (MBCC), FSU’s largest feeder community college, will be engaged in a project of intensive faculty development. STEM faculty leaders will be identified and charged with the task of working with staff and administrators to create and implement intensive summer faculty development institutes that will improve faculty self-efficacy with diversity and inclusion, high-impact practices, and culturally responsive pedagogy. Faculty participants will be recruited broadly from both the full-time and part-time STEM faculty, and all participants will be supported and charged with working to infuse the principles of Inclusive Excellence throughout their work at FSU and MBCC. Tenured and tenure-track faculty are often in positions of power on our campus, whether on Governance Committees or as peer evaluators in the reappointment, tenure and promotion process; educating these influential members of the University on the painful effects of racism and exclusion within the academy will help to drive progress forward using more permanent avenues.

We will measure progress towards increasing FSU’s capacity for Inclusive Excellence through assessment of faculty self-efficacy with accomplishing an inclusive classroom in terms of pedagogy, classroom culture, and content. We will also use focus groups to capture the Student Voice along with traditional success metrics.
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 program 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.
James Madison University is committed to establishing a diverse and inclusive learning community in which each student regardless of background has an equitable opportunity for success. Over the next five years, the JMU Biology Department will shepherd assessable activities designed to define, develop, and secure an enduring inclusive culture. This culture will manifest inside and outside the classroom by encouraging and celebrating inclusive behavior in our faculty and students. We ascribe to a theory of change that implements a reflective and iterative process that has been intentionally designed with interconnected activities to establish and scaffold sequential preconditions necessary for success.

Our faculty development initiative will begin with the assessment of our current state of inclusive awareness. From there we will establish a shared definition of and common language for inclusive practice, develop inclusive pedagogy, explore implicit bias and the threat of false assumptions, and implement inclusive practice throughout the myriad experiences we provide our students. These activities help move us to our goal of establishing inclusivity as an enduring core value for our faculty.

Using the inclusive capacity gained through our faculty development and our previous experience developing an effective freshman CRE, we will design, assess, and iterate a transfer student CRE that provides the same high impact practices experienced by our freshman majors while folding in activities and resources hypothesized to remove barriers and provide access for our transfer students. This CRE will also provide transfer students an experiential touchpoint with our freshmen that will further strengthen our community. Additionally, the framework of this course could be adopted by other departments, colleges and universities.

An additional community building and strengthening initiative is the formation of our BioCommons. This initiative will create a physical space intentionally designed to foster a diverse and inclusive Biology community, while providing resources and services intended to benefit all by ensuring the success of our first-generation and community college transfer students. For this space to be useful to the entire community, we will cultivate a deeper understanding of our students by using their input (which also reveals their needs, desires, and concerns) for the BioCommons, reinforce faculty commitment through a venue that allows them to learn, practice, and assess successful inclusive behavior, and synergize our efforts by programming our transfer student CRE activities in the BioCommons. We aspire to create a space that promotes diversity and inclusion as the optimal learning environment, thereby establishing a community valuable for every student regardless of background.

Valid assessment of our initiatives is essential, and will employ a mixed method approach; quantitative data will show patterns of change while qualitative data will help us understand what the numbers mean. This combined approach will facilitate our strategic decision-making as we move through the course of the project. We are determined to make JMU’s commitment to inclusivity enduring and irreversible by demonstrating that inclusive behavior provides best practice for all of our students and is therefore a nonnegotiable aspect of our campus culture.
Kalamazoo College

Kalamazoo College aspires to transform from a diverse institution to one that is fully inclusive. In five years we expect that all STEM faculty and staff will have developed cultural competency and the motivation, knowledge, and skills necessary to create inclusive learning environments. Students from all backgrounds will experience welcoming learning and study spaces in which their life experiences are understood and valued, their strengths appreciated and nurtured, and their innate curiosity fueled. Our students will encounter engaging, socially relevant introductory STEM courses based on cross-cutting foundational concepts and effective evidence-based pedagogies. Class visits by diverse alumni and local professionals working in STEM fields will help students see the relevance of the basic science they are learning to their career goals and social interests, thereby encouraging their persistence. STEM academic support centers will serve as spaces of belonging and growth in which students learn how to learn. These transformed classroom and learning spaces will close opportunity and achievement gaps between underrepresented minority (URM), first-generation (FG), and majority students.

GOALS:

A caring, culturally competent climate. We will create and implement a comprehensive professional development program through which faculty and staff learn about historical, social, and psychological dynamics that perpetuate exclusion. All STEM faculty and staff will attend a 2.5-day training on understanding and analyzing systemic racism led by a community-based organization. To build on that training, we will create a series of workshops focused on: 1) racial identity development and whiteness, 2) implicit bias and stereotype threat, 3) microaggressions, 4) stress and resilience, and 5) pedagogy of care. These trainings and workshops will be sustained beyond the grant. More aware, caring, and culturally skilled faculty and staff will be able to connect with the varied cultural backgrounds and value systems of our students, allowing them to thrive and succeed.

Integrated, evidence-based introductory STEM curriculum. We will revise our introductory STEM curriculum to integrate career capital; emphasize shared concepts among disciplines; fully embrace evidence-based pedagogies that have been shown to close achievement gaps; and interface with enhanced academic support centers. At the end of five years, our introductory STEM curriculum will be significantly transformed, and ongoing curricular innovation will be encouraged through sustained institutional support and a revised reward structure. The new position of STEM learning specialist initiated in year 2 of the grant will be sustained beyond the grant term by the College.

Supportive institutional reward system. We will work through the faculty governance system to revise our hiring, retention, tenure, and promotion policies to reward cultural competency and inclusive, evidence-based pedagogy. Once new policies are in place they will help create a positive feedback loop that attracts and rewards faculty who prioritize inclusive teaching practices.
Kennesaw State University's Inclusive Excellence program will catalyze a sustainable focus on expanding success for traditionally underserved students in the natural sciences. Students enter Kennesaw State University (KSU) from many starting points. Regardless of where and when students enter the University, our goal is for them to find faculty and staff committed to inclusion, courses that use evidence-based instructional pedagogies that engage students in science, a welcoming community of peers supported with peer learning assistants to enhance active learning environments, and a culture that is focused on the success of every student. The degree curricula will be transformed to include active learning and research experiences throughout and use course assessments as a formative student experience.

Students will be taught metacognitive learning strategies that are integrated across key points in the curriculum, which will help them quickly adjust to a college environment, allow them to develop their personal strategies for success, and allow them to more easily integrate their learning goals with their life commitments. The curriculum will have a cohort structure to establish supportive learning communities as students transition into the university. We will lower barriers for faculty to engage in challenging conversations about race, equity, and educational attainment so that faculty are confident and motivated to invest in inclusion. This will be accomplished through professional development workshops that support faculty as they change their instructional practices. These faculty learning communities will include facilitated conversations about equity and inclusion, and how classroom culture impacts student learning outcomes. Conversations will continue in department- and college-wide faculty retreats. Students will be collaborators in the transformation process throughout. These systems provide a mechanism for continued program development well after the HHMI program concludes.

Throughout the program we will monitor traditional student success metrics (course success rates, retention, progression, graduation), but will also use student and faculty focus groups to provide qualitative data regarding campus and classroom climate and the impact that different elements of the program are having on campus culture. The results will be broadly shared with the KSU and Inclusive Excellence communities. This program will ensure that KSU becomes a model for inclusive excellence in Georgia and across the southeastern United States.
Kenyon College

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

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 independent 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.
Lawrence University  

We propose to address structural barriers to success faced by underserved students at Lawrence, particularly first-generation and global majority students in the natural sciences. We seek a natural science community that unreservedly welcomes, fully embraces, thoughtfully engages, and effectively teaches all students of all identities from their very first class through graduation. Our natural sciences division, with broad commitment from our faculty, will place inclusive excellence at the root of our curricula, our mindsets, and our shared mission.

As a result of our work over this grant period, Lawrence faculty and staff in the natural sciences will be better oriented, trained, and equipped to teach and mentor our underserved students. The introductory courses in our biology, chemistry, and physics programs will employ modern, active learning pedagogies, which have been shown to be more effective than traditional lecture-based courses, particularly with respect to underserved students. Our new introductory courses – redesigned to center on inclusion, restructured to engage every student, and supported with peer-led learning groups – will lead to better outcomes for our underserved students, both in these courses and beyond. The success of these new introductory courses will lead to the adoption of inclusive, active pedagogy throughout our natural science curricula. New assessment strategies for these classes will help us evolve and improve our policies and practices continuously up to and beyond the end of the grant period.

Our plan to achieve these goals involves significant professional and curricular development. Divisional retreats and workshops for our faculty and staff will help nurture a community of practice dedicated to the pursuit of inclusive excellence. These retreats and workshops, coupled with site visits to exceptional peer institutions, will help our faculty learn and develop more inclusive pedagogies and practices. Three two-year STEM Pedagogy Fellows, recent PhDs in discipline-based education research, will provide further training and guidance in inclusive, active pedagogy for Lawrence faculty. In parallel with the active involvement and contributions of the STEM Pedagogy Fellows, Lawrence faculty will have the time and opportunity to engage in new course development and implementation. In addition, we will build on a successful program in our introductory biology curriculum by developing and implementing peer-led learning groups for the introductory courses in chemistry and physics to help students connect with each other as they develop study skills.

Assisted by a dedicated evaluation analyst and coordinator, we will measure our progress by tracking disaggregated academic data as well as student survey data that assess the effect of our courses on students’ understanding of, and attitudes toward, science. In addition to collecting qualitative survey data, we will monitor whether our activities reduce the achievement gaps faced by our underserved students, particularly in grades in introductory courses and GPA at graduation. An evaluation team will guide our efforts, creating critical evaluation feedback loops to iteratively improve our programs and pedagogies. Ongoing qualitative and quantitative assessment of our activities will allow our natural science division to iteratively improve our practices and policies, and to continue to strive for inclusive excellence at Lawrence.
Mercy College

Mercy College, a proud and diverse Hispanic-Serving Institution aspires to change the culture of the entire institution to be more inclusive by being intentional and dynamic in the way it treats all of its students, faculty, and staff. To start, we will focus on how these changes will increase the representation, persistence, and graduation of underrepresented students majoring in Biology.

The Program and Goals. Mercy’s President has charged the College community with increasing efforts to help all students overcome social, emotional, and administrative hurdles to secure the full benefits of higher education. In alignment with this charge, the project will develop: (1) an Adjunct Academy for science instructors--the first of its kind in our region, to develop engaged and interculturally-competent instructors who are reflective and cognizant of student needs, and use inclusive pedagogies (including the use of High-Impact Practices) across our biology curriculum. More importantly, the program will cultivate instructors who feel included and valued as members of the College community, and understand students’ needs; (2) Predictive Analytics and Data-driven Personalized Pathways to strategically expand our investment in and use of data, with a focus on analytics that incorporate non-cognitive and psychosocial factors to better understand and address factors that impact our students’ success.

Progress and Learning. The project will: (1) characterize what it means to be inclusive at Mercy College while measuring the changes based on this collaborative definition; and, (2) evaluate synergetic effects of changes in institutional capacity for inclusive excellence on student and faculty outcomes. Participants in our Adjunct Academy will complete the Intercultural Development Inventory, receive training in inclusive pedagogical strategies, reflect on learning and application of these strategies, and receive one-on-one mentoring. Our task force of faculty, IR/IT specialists, and staff will conduct a comprehensive landscape analysis representing demographics among Biology students to create a data baseline. Statistical analysis of these data, along with early phase predictive modeling ongoing at Mercy, will determine variables most highly associated with risk of attrition and academic performance. As part of the landscape analysis, we will develop a non-cognitive assessment plan with the assistance of a retention consultant. Through analysis of the predictive model, we will provide instructors and students with appropriate personalized data and pathways. Inclusive excellence of instructors will be measured through sustained student satisfaction in end-of-course surveys, student and adjunct focus groups, results from formal observations and improvements in student grades, and retention in Biology. Statistical comparisons to baseline, in part, will determine if these new initiatives are effectively propelling the success of students in Biology. Every other year, we will convene students, full-time and adjunct faculty, administrators, student advisors and staff to discuss project implementation and make appropriate modifications to our program. The College’s administration is committed to sustaining the successful elements of this project. This will include (but is not limited to) retaining highly qualified Academy graduates for a minimum of two to three years, implementing distribution of data and analytics that show promise at improving student and faculty success.
Mount Mary University

The HHMI Inclusive Excellence Program positions Mount Mary University to become educationally excellent by addressing the disparity in educational outcomes and making equity a priority. The Mount Mary University project is a campus-wide, intentional, and evidence-based effort toward inclusive excellence.

The project will engage all faculty, staff, and administration in professional development around unlearning racism and trauma-informed practice. Faculty specifically will receive training in decreasing math anxiety and stereotype threat and develop their skills in unlearning racism to create inclusive classroom environments and curricula. A STEM curriculum specialist will be hired to help faculty in STEM and other disciplines to move what they learn in their workshops into their classes. The specialist will help to facilitate lasting change that will be seen in all classes across the University. Through community engaged activities, including poster sessions and service learning experiences, students will develop their identities as scientists.

These interventions will enable a change in culture at the institution that will echo through every office, every classroom, every hallway, and every interaction a student, staff, faculty or administration has with each other. With both greater awareness of systemic racism and tools to unlearn it the University will be better equipped to support all of our diverse student body to success. With high impact practices we will also improve our students’ sense of themselves as a scientist. This will improve their retention in the sciences and help to encourage them to go further with their education.

Multiple surveys and instruments will be used to measure everything from campus climate, to implicit bias, and to math anxiety. We will also employ interviews to get a deeper sense of the students’ experiences before and after the interventions. As we learn what works and what doesn’t, we will adapt our project to better achieve our intended outcomes.
Norfolk State University

Norfolk State University is a historically black college/university (HBCU) with a strong STEM tradition. As such, we are uniquely positioned to promote the inclusion of members of the global majority who are typically underrepresented in STEM fields. Our primary approach to achieving this is through the use of a novel research program called a SEC3URE: Spartans Engaged in C3UREs integrated across our four-year curriculum. The novel, hypothesis-driven projects are specifically selected for their ability to impact the local environment or local/minority populations. They will bring STEM faculty and all students enrolled in core biology courses together on one overarching research project. This approach will lead to institutional change by enabling our faculty to explicitly demonstrate to students: 1) how courses in related disciplines interconnect, 2) how to develop a strong sense of project ownership and commitment, 3) the relevance of scientific research to students, for themselves, and their community, and 4) how to build collaborations between STEM and non-STEM departments and the community. These activities constitute the primary framework of our theory of change. The goal is to shift the mindset of faculty towards not just telling how research is done but engaging in it with the students, other NSU colleagues, and community organizations. This will enable us to better prepare future cohorts of students to become successful members of the STEM work force, as they will already view themselves as a part of the STEM community because of the research they have done at NSU.

Hand-in-hand with the SEC3URE is a concerted assessment effort designed to measure both faculty and student attitudes, feelings, and decisions. We seek to better understand how faculty view students and their abilities, and how faculty view their own ability to impact student outcomes. We will survey the barriers that faculty perceive, and then tackle as a group whether those barriers are real, imagined, malleable, movable, or removable. This will be accomplished through discussions initially amongst the leadership team, then expanding to the departments involved, then to the College and the University as a whole. We will also use surveys to assess student attitudes about science as they enter the college, and as they progress through the curriculum. We will also survey students to know when and why students leave STEM majors, and for those who finish a STEM degree, to know where they go and why. This will allow us to more directly address barriers to their inclusion in STEM careers. We will share these data with the faculty and administration in the form of annual reports to encourage our entire institution to tackle the identified issues head-on. Within the participating departments (biology, chemistry, math), we will use these data to set new departmental goals and to direct specific changes to be implemented by our curriculum and retention committees. Together we believe these approaches will result in measurably improved inclusion in STEM for the population of global majority students at Norfolk State University.
**North Carolina State University**  

Vicki Martin  

1. **IE Scholars:** Our goal is to create a community of faculty aware of barriers to student success and committed to transforming their teaching and mentoring through inclusive excellence. IE-NC will train 80 faculty as IE Scholars, drawn from nine life science degree programs in the College of Agriculture & Life Sciences and College of Sciences. After five years, we expect the Office of Faculty Development and the Office of Institutional Equity and Diversity to continue to offer IE Scholar training across all science disciplines.

2. **IE Courses:** Our goal is to infuse inclusive pedagogical practices throughout existing courses and support the development of new IE courses, including IE-informed course-based authentic research experiences. IE Scholars will develop or revise some 110 courses, including at least 20 new course-based undergraduate research experiences (IE CUREs). Some of these courses will be built into a first-term curriculum. As a result, all new transfer and freshmen students will take at least one IE-transformed course in their first term, and all new transfer students will also take an IE CURE during their first term. Other students will also have access to these courses. We expect to directly impact 10,000 students over five years through IE-transformed courses. By creating courses and building them into our curricula, and by continuing to train more IE Scholars, we will ensure the transformation of how we teach science at NC State.

3. **IE Community:** Our goal is to cultivate an enhanced sense of belonging and self-efficacy in science among all of our students and to increase student persistence and student success. All IE-NC programming will contribute to this goal, including proactive advisors, peer mentors, outreach to community college students, small section sizes and IE-inspired courses in the first-term curriculum taught by IE Scholars, collaborative research experiences, and administrative changes to create reasonable and accessible paths-to-degree that are integrated across NC Community Colleges and NC State curricula in a program-specific manner. These efforts will encourage interactions (with peers, advisors, faculty) and facilitate the development of a sense of belonging at NC State, and will directly impact an estimated 300 NC Community College students before they even apply to NC State as well as some 3000 freshmen and 600 transfer students. After five years, we will be expanding our outreach efforts to more prospective students and continuing to grow our capacity for advising, mentoring, and building community among all of our life science students.

4. **IE NC State:** Our goal is to transform NC State into an institution of inclusive excellence by focusing on faculty transformation, partnerships with key stakeholders, course and curricular reform, and assessment-based program decisions. IE-NC programs will be designed, implemented, and assessed with the goal not only of making them permanent NC State programs, but also having them serve as models to inspire other programming at NC State.

Assessments will focus on faculty growth, course offerings and course quality, curricular changes, students’ sense of belonging and self-efficacy, and a range of measures of student success.
Northeastern University

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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 assertively 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 under-represented 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 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.
Oregon State University

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Inclusive Excellence@Oregon State builds on Oregon State University’s recent progress enhancing equity, inclusion, and integration of evidence-based instructional practices by strengthening STEM instructors’ capacity for cultural responsiveness. The goal for infusing inclusive and culturally responsive pedagogies into evidence-based teaching practices in STEM is to allow all students to learn as their authentic selves in the absence of marginalizing language, and to increase belongingness and classroom community for all. The program is a collaboration of OSU’s Center for Research on Lifelong STEM Learning, the College of Science, and the Division of Undergraduate Education.

Faculty teaching foundational STEM courses at OSU and nearby community colleges play a critical role in shaping students’ early college experiences and success. Productively addressing issues of equity, diversity, and inclusion in everyday STEM learning experiences will expand current efforts to transform OSU into a welcoming and nurturing environment for all students to learn and grow.

The program will establish a sustainable model for faculty development that will empower instructors to strengthen STEM instructional practices at OSU and those nearby community colleges that serve students who transfer to OSU. Five groups of 20 “Inclusive Excellence Fellows” will participate in a one-week intensive training (modeled after OSU ADVANCE) to learn about power, difference, discrimination, cultural humility, and weaving culturally responsive practices together with evidence-based instructional practices. Each fellow will generate an action plan for transforming their own practice over the following year.

Undergraduate learning assistants and graduate teaching assistants, each with pedagogical training and experience facilitating active and cooperative learning in the classroom, will provide direct support to fellows as they execute their action plans. The fellows will work in peer learning groups to assess their progress toward changing practice and collaboratively overcome the challenges of transforming STEM courses. OSU’s ongoing community of practice, Enhancing STEM Education at OSU, or ESTEME@OSU, will expand its focus toward Inclusive Excellence and provide quarterly opportunities for instructional faculty working to improve practice to interact across colleges and disciplines.

The OSU evaluation team will monitor changes in teaching practices and document student success in transformed courses relative to other courses. Even more important will be understanding how OSU with its specific institutional context, legacies, and student body is transforming through Inclusive Excellence so we can sustain successes and expand progress over time. To capture the story of transformation, we will employ an approach inspired by design-based implementation research and developmental evaluation methods. These practices emphasize learning and adapting activities in iterative cycles and are particularly suited to initiatives that seek to transform systems. They prioritize embedded and continuous evaluative and reflective practices that emphasize substantial qualitative data to help make meaning and tell the story of OSU’s Inclusive Excellence journey.
Radford University

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.
Roosevelt University

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Goals and Aspirations: Inclusive excellence at Roosevelt University (RU) will be defined by a successful student experience for all with a focus on underrepresented minority/global majority and first generation students. RU, founded on the principles of social justice and inclusion, successfully recruits women (75%), underrepresented minorities/global majority (40%) and first generation students (50%) into its science programs. However, these students leave science at a higher rate than majority students and even those students that persist to graduation may not have had a positive student experience where they felt welcomed and valued. To provide a successful inclusive excellence student experience in the sciences, we will help students find their fit through support, mentorship, and skill building opportunities. We will increase cultural responsiveness, reflected in our pedagogy and interactions with students, among science faculty and staff. By the conclusion of the project, we expect our work to be the foundation for institutional policy changes enhancing student experiences. We will observe formalized changes in institutional practices, as well as, measurable increases in retention and graduation of underrepresented minority/global majority and first generation students in the sciences.

Program: Experts in diversity and inclusion will lead intensive trainings for faculty and staff in the sciences to help recognize implicit biases and understand the connection between cultural responsiveness and inclusive excellence. As the faculty increase their understanding of these issues, they will implement changes to their pedagogy and behavior with students and other members of the university community. In addition to changing what is happening in the classroom, we will help to guide students in navigating their pathway of academic success and to find their personal fit among the science curriculum and various career options. A sequence of intentional and carefully monitored mentoring scaffolding, including peer and faculty mentors, will work to increase student engagement in student success support activities and experiential learning opportunities. Our progress, as well as challenges, will be disseminated to the greater university community through the Center of Teaching and Learning workshops, presentations at the annual Provost’s faculty conference, and meetings with RU administration. This will allow RU to develop a strategic plan for inclusive excellence beyond the sciences and implement institutional policy changes to benefit all student experiences.

Progress and Learning: Progress will be measured using a combination of formative and summative assessment tools. For some initiatives, the assessment may involve determining outcomes based on institutional data. Demographic and usage information will be used to evaluate who is using services, how often, and why. Data from student records will include GPA, retention and graduation rates, dropped courses, repeated courses, and changes in majors. In addition, data from faculty, staff and student interviews, student focus groups (prospective, current, and former), classroom and university climate surveys, and self-report surveys will be collected. Data from these assessments will be used to modify the dynamic system of support and inclusion that we have designed. In addition to assessing each initiative individually, the system as a whole will be evaluated for efficacy, efficiency and sustainability.
San Francisco State University

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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/a 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.
Syracuse University

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The goal of the CHANcE Project is to create an inclusive environment for students from groups underrepresented in STEM, including “minorities” (URM) and first-generation students in courses in STEM departments (biology and chemistry) thereby providing a supportive campus culture at Syracuse University that will ensure that every student is respected and valued, a campus that is student-ready.

In five years, we anticipate that the Biology and Chemistry Departments will have implemented structures, policies, and practices with inclusive decision making and inclusive forms of power sharing on all levels of their department’s work. As a result of these changes, we anticipate the elimination of the disparity between underrepresented and white students in matriculation, persistence, and completion of biology and chemistry majors; and in pursuing advanced degrees in STEM or pursuing a STEM career.

Our theory of change is to implement strategies that move the Biology and Chemistry Departments toward a commitment to intentionally identify as culturally inclusive departments, and to engage in activities that foster cultural responsiveness and inclusion. To achieve our goal, biology and chemistry faculty will implement culturally responsive practices in their courses and redesign courses to incorporate active learning and authentic research experiences. Biology and chemistry faculty who teach the first-year introductory courses will adopt the Peer-Led Team Learning model.

To improve cultural awareness and develop deep knowledge of specific high-impact practices for active learning pedagogy, biology and chemistry faculty will participate in the following activities. They will attend one 2-day workshop off-campus each semester organized and facilitated by individuals with expertise in inclusive excellence, theory of change, and active learning pedagogy. In addition, biology and chemistry faculty will meet biweekly with a “group of four” (GOF) fellow faculty members, facilitated by a Discipline-Based Education Researcher (DBER), and attend one other special event or activity to share ideas across GOFs, which will be organized and facilitated by the DBER fellow. These activities will also support DBER graduate students in their development as future faculty.

We will measure our progress and learning by monitoring changes in the number of URM students who matriculate, persist, and graduate in STEM majors and who pursue advanced STEM degrees or STEM career. We will also monitor the level of understanding of inclusive and active learning pedagogy by faculty in biology and chemistry and the level to which they implement active learning practices in their classrooms. We will also determine whether URM students develop positive perceptions of “sense of inclusion” in STEM and have increased research self-efficacy. We will monitor whether students are engaged in active learning in their biology and chemistry courses and have more authentic research experiences and have positive perceptions of gateway courses’ inclusiveness.

In summary, the CHANcE Project is designed to eliminate institutional barriers to student success, using evidence-based practices to transform our courses and campus life so that they are more conducive to student success for all. Biology and Chemistry faculty will become champions of inclusive excellence as a result of their participation in professional development workshops designed to help them implement practices that mitigate racial/gender biases and other forms of miscommunication, privileging dominant norms, and value orientations.
The College of New Jersey

Through data-driven self-reflection, The College of New Jersey (TCNJ) has identified structural and cultural barriers that have inadvertently contributed to performance/opportunity gaps among our student population. TCNJ’s Inclusive Excellence project will target these barriers to student success through three main aims:

1. Create a more inclusive culture among our faculty and in our core science and math courses.
2. Develop more inclusive academic advising and research mentoring systems and cultures.
3. Enhance and reward a culture of evidence-based reflection and innovation to encourage inclusivity.

Aspirations and Goals: Inclusive Excellence at TCNJ ultimately means that all of our students view our institution as a welcoming and inclusive community. It also means that quantitative measures of student success are strong and equitable across our student population. Our first aim will result in our faculty utilizing inclusive pedagogies across our natural science curricula, particularly in 16 redesigned core courses spanning four departments that our students take during their first two years. Through this process, we will cultivate a culture of pedagogical experimentation to enhance student success. Our second aim focuses on steeping our faculty in knowledge of our students’ whole selves, which will inform all faculty-student interactions. Our third aim will enhance our capacity for assessing inclusivity and improve our structures to prioritize, recognize, and reward efforts to create an inclusive environment. A robust partnership between our faculty and TCNJ’s Center for Institutional Effectiveness will support data-driven experimentation, which is at the heart of our planned cultural shift.

Approach: We will first provide key faculty, staff, and students with targeted training and skills so that they can improve and incorporate inclusive practices into their teaching, advising, mentoring, and assessment. Because training alone will not create an inclusive culture, we identified ten milestones to achieve sustained engagement of our community, and a scaling-up of activities during and beyond the grant period. These include: (1) create a coalition of full-time and adjunct faculty members trained in scientific teaching methods; (2) designate Inclusivity Coordinators in each School of Science department; (3) maintain regular inclusivity training; (4) redesign 16 core courses; (5) revise student training protocols for peer roles; (6) establish an internal advisor/mentor training team; (7) implement a revised set of orientation seminars; (8) improve our system for accessing mentored research; (9) implement new measures for assessment; and (10) adapt tenure/promotion policies.

Progress and Institutional Learning: Our core leadership team will work with TCNJ’s Center for Institutional Excellence (CIE) to design targeted assessments to track and improve our work. The CIE, with assistance from an external assessment expert, will develop new measures for assessing scientific teaching and inclusivity that are sustainable. Finally, an external advisory committee comprised of three experts whose knowledge aligns with each our three main aims will provide formative guidance and help us to sustain Inclusive Excellence over the long-term. TCNJ’s Inclusive Excellence transformation will have broad impacts throughout our institution; in addition to our School of Science, our Center for Student Success, Tutoring Center, Diversity Office, the CIE and more will participate.
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.
**Trinity Washington University**

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**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.
Tufts University

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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 of 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.
University of California-Davis

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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.
University of California - Los Angeles

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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.
University of California-Merced

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Our aspiration is to establish welcoming and innovative curricular and social practices that encourage the success of students in the global majority and first-generation college biology students. Our implementation plan will begin with activities that promote diversity, equity, and inclusion (DEI) so that all faculty in the biology program can become aware of DEI issues on our campus and how the changes we propose in pedagogy can impact the way we interact with our students. Our vision is that by connecting the DEI training to our scientific work, our faculty will gain new perspective in the redesign and delivery of our courses, and also respect the diversity of backgrounds in our students in this context.

In order to be better positioned to work towards inclusive excellence, we will (1) establish and institutionalize a faculty development program in inclusive pedagogy, (2) incorporate faculty-student collaborations to produce new student-focused inquiry-based labs (IBLs) and course-based research experiences (CREs) to engage all biology undergraduates in the processes of scientific discovery, and (3) facilitate faculty-student learning communities to converse with STEM students on academic success, time management, perseverance and the collective diversity of the backgrounds on our campus.

UC Merced’s Principles of Community reflect our vision of inclusive excellence. These Principles rely on the values of mutual respect, celebration of our identities, collaboration, and “excellence in teaching and learning through contributions from all community members fostering a culture of open exchange.” We have recently initiated Living/Learning Communities (LLCs) in our residence halls, where students with similar academic interests are co-housed, and mentoring programs are managed by academic advisors and graduate students. We will build upon this mentoring structure by incorporating faculty into the LLCs via “What’s Your Story” faculty-student dinners focused on sharing stories of struggles and success in STEM, and create a family-like relationship between faculty and students. In the teaching laboratories, we will create laboratory experiences that reflect our students’ interests and our local research investigations.

Importantly, we will create and institutionalize a faculty development program in inclusive pedagogy that can be utilized in the laboratories, in the lecture hall, and outside of the classroom as faculty engage meaningfully into empathetic mentoring relationships with our students. For each activity, we will incorporate both quantitative and qualitative assessments of faculty and student participation, evidence of changes in faculty and student attitudes towards each other, sense of belonging and connections across campus, gains in students’ mastery of key biological concepts, and other measures of academic success in our students. We will encourage faculty to include reflection on their progress towards inclusive excellence in their merit review statements.

In five years, we anticipate that our efforts will result in significant improvement in retention of BIO students, IBLs and CREs will be the “normal” laboratory curriculum, and the number of students that achieve proficiency in the BIO program learning outcomes will increase. Our goal is to establish inclusive excellence practices as a deeply rooted part of UC Merced’s campus culture for the advancement of all students.
University of Colorado Denver

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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.
University of Houston-Downtown

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The University of Houston-Downtown (UHD), Department of Natural Sciences (NS) aspires to create a culture of inclusive excellence (IE) through an experimental UHD SynergIE Program that will increase UHDs capacity for access and inclusion. In five years, we anticipate that NS will have a transformed faculty and curriculum that will equitably promote the engagement and success of all students. Approaching our fifth year, our emerging learning ecology model for inclusive excellence will be shared with the college and university as a potential model for inclusive excellence across the university.

The goal of the UHD SynergIE Program is to create a learning environment that promotes inclusive excellence. To reach this goal this program will (1) provide a faculty education and training program to develop faculty as culturally aware and responsive educators; (2) increase access and inclusion for all NS students through a new transparent curricula, with supporting co-curricular, and extracurricular activities targeting all student regardless of their background and entry points into NS degrees; and (3) develop physical and digital resources for students to increase their self-efficacy for learning and identity as future scientists.

The UHD SynergIE Program theory of change has five key preconditions: (1) developed IE-skilled faculty; (2) faculty and peer mentoring in key first-year and gateway courses; (3) transparent curricula; (4) engaged families; and (5) physical and digital structures that promote self-efficacy for learning.

Our progress will rely on faculty engaged in the principles and best practices of inclusive excellence. This fundamental goal will be reached via formal training of faculty through in-house and external trainings and conferences. The UHD Center for Student Diversity, Equity and Inclusion and the UHD Center for Critical Race Studies will further develop IE-skilled faculty. These faculty will then leverage current programs and practices at UHD to train fellow naïve faculty, creating a sustainable community of practice. Faculty development in inclusive excellence will be assessed through monitoring the emerging population of trained faculty and their subsequent efforts to develop the skills of their faculty colleagues in inclusive excellence and transparent pedagogy. The Progress towards Inclusive Excellence through Reflection (PIER) will serve as a framework for self-reflective learning by the leadership team, institutional evaluator, and NS faculty.

The ultimate metrics for program learning and progress will be how effectively we close the gap between declared NS majors and NS graduates, and how many underrepresented minority (URM) students graduate with NS degrees. Enhanced student self-efficacy for learning will manifest in student perceptions of inclusivity in the scientific enterprise and their effective use of cultural spaces and other developed resources. Inclusive practices and transparent pedagogy are assessed through traditional metrics of student success and surveys that measure student engagement with their education. Surveys regarding physical and digital resources, effectiveness of culturally-relevant instruction, and family engagement will reveal student satisfaction with the UHD SynergIE Program. Continuous self-reflection and professional assessment of SynergIE activities will assess organizational learning.
University of Illinois at Chicago

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This project will lead a long-term operational, organizational, and cultural change towards both excellence and inclusion in teaching of STEM disciplines at the University of Illinois at Chicago (UIC). As a diverse and highly research active, large, urban and public campus, UIC is well positioned to test and pioneer programmatic designs to promote and enhance STEM inclusion.

Our road-map consists of two parallel approaches directed toward inclusive STEM education.

Our professional faculty development will be based on engaging faculty as catalysts for change. A workshop-based intervention by external and internal experts will form a unique mentored program that will provide opportunities for core faculty that teach the gateway STEM courses to acquire the tools necessary to deliver culturally inclusive and evidence-based STEM pedagogy. Building upon the skills developed in this program the core STEM faculty will then act as effective change-agents contributing to the STEM community by presenting their own workshops describing how they incorporated inclusive classroom techniques in their instructional activities to take advantage of the cultural capital and knowledge of our diverse and unique student body.

High numbers of prerequisites, high percentage of contact hours per earned credit, and lack of alternatives for students withdrawing from gateway courses often result in narrow pathways toward the STEM degree for many first-generation and underrepresented students. Our curricular and co-curricular program will effectively lead to removing these barriers in students’ STEM education by redesigning requirements for both “gateway” and upper-level courses in Biological Sciences, Chemistry, and Physics, and by increasing course coordination to better manage instruction and assessment across the many sections, and by ensuring curriculum alignment to better connect content of labs and lectures.

After identifying key concepts and topics that students are struggling with in gateway courses the program will develop the core-mastery courses and instructional techniques based on active learning to foster mastery and success by all students and to promote students’ facility with the critical exchange of ideas. The core-mastery course will be a culturally-relevant, problem-based course that will provide students frequent feedback about their performance. It will be targeted to students’ educational needs, while focusing on their active work in an inquiry-based setting toward content mastery. This problem-solving approach will provide an environment in which new subjects will be introduced and covered replacing lecturing.

In the course of this award the HHMI funds will be used as a catalyst to accelerate increase of institutional capacity for inclusion in STEM while we will also rely on resources and initiatives (like the Learning Sciences Research Institute (LSRI), LAS Math and Science Learning Center, and Center for the Advancement of Teaching-Learning Communities (TLC)) that are already part of the UIC landscape. A key member of the assessment and implementation team will be a grant-supported LSRI postdoctoral fellow.
University of Massachusetts-Amherst

Elizabeth Connor  

This project will develop and provide semester-long, course-based undergraduate research experiences (CUREs) for life science majors in the introductory biology laboratory course and upper level life science courses. Initially, our project focuses on the cohort of ~ 600 life science students who share a core introductory curriculum and represent about half of the students in the introductory biology sequence. We will subsequently expand the participant group to include ALL students in introductory biology. The goals and aspirations of this project are that, by the end of the award period, we will have

- a robust infrastructure to support faculty and instructional personnel in the creation of an inclusive learning environment,
- research-active faculty who will be engaged in and supported through the design and implementation of CURE curricula, allowing them to connect more deeply with student outcomes through a shared commitment to the research questions,
- established a culture of ongoing assessment, feedback, and planning within departments around student success, and
- begun to scale successful CURE practices to other STEM departments.

Our theory of change will lead from implementation-related activities, including CURE development, pilot testing, and scale-up, to cultural changes across the institution with respect to student success in STEM disciplines. The CURE-based work that comprises the short-term objectives of the program will lead into training and dissemination among the faculty and administration in which our goals will be to:

- shift faculty and administrator views about the synergies between teaching and research,
- increase the institutional recognition and reward of teaching, and
- deepen faculty understanding of the link between their pedagogical choices and students’ long-term academic success.

In the long term, the work of this project will result in deep structural changes in the way that the academic mission is approached. As a result, we will transform into an institution in which:

- every student feels welcomed to engage in STEM,
- every student has the confidence that they can pursue their interests successfully,
- every faculty and staff member is committed to the success of every student,
- everyone that interacts with students is committed to inclusive excellence, and
- every student feels that they belong at UMass.

We will measure inclusion by participation in high impact learning experiences that are currently not required in any life science major, and importantly, require faculty sponsorship. Formative assessment will include focus groups that examine students’ self-efficacy, belonging, science identity, and learning gains. Faculty attitudes and practices will be revealed by focus groups, observation of pedagogical practices and statistics about student participation and success. We expect to see a positive trajectory from the 2017 baseline in the percentage of underrepresented students in high impact learning experiences, first year retention, and graduation rates. We anticipate that faculty attitudes about the “readiness” of traditionally underserved students will change and we will see greater diversity among the students who participate in the limited apprentice-style research experiences. Faculty and administrator interviews will allow us to assess the status of and changes in faculty awareness of issues around inclusion as relates to student success in STEM disciplines.
The University of Missouri (MU) will transform instructional, institutional, and undergraduate experiences for new majority students across the natural sciences through intensive community building, deconstructing, and partnering efforts.

GOALS AND ASPIRATIONS. The vision is to disrupt current practices, attitudes, and structural barriers and create a campus environment in which students truly thrive. We aim to develop a culture of inclusive excellence, meaning the practice of extending a quality education to all students, the culture of welcoming students to belong in academic communities, and the act of empowering participants in the practice of science. The THRIVE project will develop a science identity for the new majority by enhancing faculty’s teaching identities (as inclusive teachers) and advisors’ supporting identities (as inclusive advisors). Due to retention gaps of underrepresented racialized groups and transfer students at MU, the project will zone in on these two target groups.

PROGRAM. THRIVE’s theory of change is grounded in Spencer’s (2006) PVEST framework, an identity focused, cultural ecology framework. Our goal is for students to see that science at MU is ‘for me’ by addressing the various stress engagements they face as a result of their interactions with faculty, staff, and peers. THRIVE employs three mechanisms to drive change, 1) organizational catalysts, 2) institutional mindfulness, and 3) student leadership. The activities of the project are tightly coupled to data and to incentives for participation and change. Activities aim to: 1) Enhance the institution’s inclusive culture and capacity through: building relationships and breaking down the power dynamic with (a) three community colleges, (b) one Historically Black College, and (c) Columbia public schools; initiating a preliminary data repository and intervention training to enhance access to and understanding of student progress; 2) Enhance the inclusive capacity of instructors and advisors through communities featuring: team mentoring with both inclusion and pedagogy mentoring experts; reflective data and video interventions; a resource library for inclusive teaching and mentoring; and 3) Enhance the community and retention of new majority undergraduates through: developing intergenerational Peer Mentoring Networks; establishing communities of practice to enhance belonging and growth; implementing Leadership Development on the importance of diversity, equity and inclusion; synergizing with existing academic and extracurricular programming.

PROGRESS AND LEARNING. To measure change and learn from the evidence collected, we employ an innovative research and evaluation approach. We purposefully chose design based research because it offers a process for quickly trying out prototypes and refining them. This approach emphasizes what works and also how it works. With the two-fold goals of informing both theoretical principles and practice, it involves consecutive cycles of design, implementation, assessment, and informed redesign leading to a functional model. Two Core Team members and two evaluators will lead the research efforts. The evaluators were recruited due to their years of experience with equity related projects. One is a quantitative expert and the other is a qualitative expert and will focus on documenting issues, progress, and success through video documentaries of classrooms and individual interviews with students and faculty. The THRIVE project findings will be incorporated into a model to demonstrate effective routes for the challenging task of capacity building and institutional change.
University of Northern Colorado
Susan Keenan  

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 the 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 to engage 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.
University of Puerto Rico-Humacao

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The 1st GEN & PROUD (Puerto Rican Outstanding Undergraduate Diversified) program aspires to become the first center where first generation Latinx students will be welcomed, supported and empowered in STEM fields at a Hispanic Serving Institution (HSI) and faculty will be trained to support these students. Excellence in STEM requires diverse perspectives, which cannot be achieved without inclusive environments to recruit, retain, and train future scientists and engineers. Most HSIs lack formal spaces to discuss inclusion and equity strategies and there is a prevalent lack of knowledge about cultural and intersectional differences among Hispanic subgroups like 1st GEN, promoting the general misconception that Latinx students are “all the same.” There is need to study and establish best practices to prevent the institutionalization of “deficit models” and to reject cultural stereotypes related to Latinx achievement and interest in STEM. This project will be evaluated in such a way as to address new and more culturally relevant metrics of student perceptions and “lived experience” of Latinx students in STEM.

At UPRH, the graduation rate of students in STEM (20%) is less than half that of all majors (44%) and the three introductory courses with the highest rates of student failure campus-wide are all in STEM, effectively making them “bottleneck courses”. With the catalyzing influence of an HHMI IE award, UPRH intends to increase the STEM graduation rate for (1st) Latinx students in STEM within five years through multifaceted efforts to improve the way that faculty and other institutional representatives interact with and support students. Inclusive excellence training (such as best practices in culturally responsive pedagogy) will enhance faculty and administrator understanding of the most-effective ways to support diversity among students, utilizing an asset-model rather than a deficit-model (fixing the students). This will be achieved through development of a new Center for Teaching and Learning that will not only provide a mechanism for faculty development, course refinement, and student supports, which are key components of this proposal, but also a means for institutional learning through studies of student needs, various interventions, and student outcomes. This significantly increases UPRH’s capacity for inclusive excellence through continuous monitoring and assessment of student outcomes and utilization of findings through faculty development, course modifications, new services and resources for students, and potential policy change. Specifically, through the CTL, we will monitor program impacts on various measures of student learning and attitude outcomes (including metrics regarding ethnic identity, cultural congruity, and acculturative stress) to inform program activities, and ultimately to disseminate successes nationwide as a model for other HSIs. During the project, these processes will be guided with input from our external evaluator, who will provide formative assessment feedback to guide program modifications, as well as a summative final report.

The CTL is a sustainable model for increasing UPRH’s capacity for inclusive excellence because it represents a vitally needed resource in Puerto Rico. We predict other institutions and industry will participate in this tuition-driven programming once it is developed and tested. To this end, professionals from the main HSI in Puerto Rico, the University of Puerto Rico (UPR), will work in collaboration with the Latinx online scientific network/platform Ciencia Puerto Rico (CienciaPR) to create the 1st GEN & PROUD national network which will provide an online/interactive database/platform for sharing of research, ideas, best practices, etc. among minoritized and allied 1st Gen students and faculty in STEM. The network design will be grounded in the Anti-Deficit Achievement Framework (ADAF), which was validated with students of color in STEM. An innovative element of 1st GEN & PROUD is that it will be designed by Latinx for Latinx to especially welcome and support 1st GEN (and other groups such as Afro-descendants, and women).

Expected key outcomes: 1) the 1st GEN & PROUD CTL at UPRH promoting gender- and culturally-responsive strategies in STEM; (2) Curricular changes in core courses increasing the graduation rates of STEM undergraduates from 20% to 30%; (3) Faculty Institute on STEM Best-Practices at HSIs training HSI faculty on curricular materials, training strategies, and successful interventions; (4) Self-sustaining National Association of 1st GEN Students; (5) Increased ethnic identity and pride in Latinx students; and, (6) Enhanced capacity for institutional learning and change at UPRH, promoting inclusive excellence.
University of Saint Thomas (MN)  

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**Goals & Aspirations:** We aspire to improve our institutional teaching, advising, and governing policies and practices in ways that facilitate success in the sciences for students from all backgrounds. This inclusive excellence framework will call on us to redesign our introductory science courses; embed high-impact, culturally-responsive mentoring into our undergraduate advising; and reform our faculty evaluation processes such that inclusive practices are tracked and rewarded. In five years, our goals are that:

1) A majority of our full-time and regular adjunct science faculty members will undergo training in evidence-based, culturally responsive pedagogy;
2) Our science division student leaders and academic support staff will be trained in diversity and inclusion in the workplace;
3) STEM faculty members will be trained in and practice strengths-based mentoring;
4) At least 20 course sections will be redesigned to incorporate culturally responsive teaching practices in our introductory science sequence; and
5) We will assess inclusion practices and effective advising as part of departmental and faculty annual evaluations.

Our aspirations are that we eliminate the observed racial, ethnic, and socioeconomic disparities in rates of students graduating with STEM degrees, matriculating to graduate programs, and participating in cocurricular research and leadership opportunities, and that students’ narratives reflect experiencing a more welcoming, engaging, and inclusive environment.

**Program:** Our theory of change model builds on the need for increased faculty awareness that acceptance of implicit college norms perpetuates racial and economic inequities. Increased awareness of factors that perpetuate inequity is not sufficient to motivate change. Therefore, as we work to increase learning and conversation opportunities for faculty and staff members about these issues, we will also integrate progress toward inclusion as part of regular individual and department level assessments. Specifically, we will:

- Create a **STEM-specific series** within our Center for Faculty Development **Inclusive Classroom Institute.** Faculty members will be incentivized to participate in workshops, faculty and staff co-led discussion groups, and learning communities on evidence-based practices for culturally responsive teaching. Faculty will also receive teaching enhancement grants for revising or adding new STEM classes that align with campus-wide curriculum revisions.
- Establish and assess the impact of a **High Impact Mentor Training program.** STEM faculty members will be trained in culturally-responsive, strengths-based mentoring and student advocacy.
- Build a culture of inclusive accountability through the appointment of departmental **Inclusion Liaisons,** and the integration of inclusion plans and assessments in our academic units annual reports.

**Progress and Learning:** We will annually assess multiple measures of progress, including qualitative data from student, staff, and faculty focus groups; introductory STEM course completion rates; demographics of students engaging in on-campus research and student leadership positions within the natural sciences; and formal assessments of teaching, learning, and student engagement. We will also use a pre-post design and institutional audits in years 1 and 5 to measure changes in inclusion following implementation of our faculty education and mentor training programs. To determine whether second order organizational learning has occurred, we will assess to what extent policy changes in teaching evaluations and departmental assessments incorporate inclusivity best practices.
University of South Dakota

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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 three 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.
University of Utah

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.
University of Wisconsin-Madison

The University of Wisconsin–Madison (UW-Madison) aspires to build guaranteed, inclusive and flexible pathways for STEM students transferring from 2-year Wisconsin Technical College System (WTCS) institutions to 4-year University of Wisconsin System (UW System) institutions. We will increase the number of successful STEM student transfers through guaranteed admission agreements, tailored transfer student courses and programs, and professional development for faculty and advisors. Collectively, we aim to decrease or eliminate institutional and cultural barriers to transfer student success.

Our project will use a collaborative development approach to leverage the participation and ownership of multiple stakeholders, including faculty, staff, administrators, and students, to create and institutionalize transfer policies and programs. We will apply what is known from research on transfer student success and harness the expertise of colleagues and students from across the UW System and the WTCS. We will establish and seek guidance from an Advisory Board with members from all institutions and we will collect data from our transfer students to identify specific barriers they face and develop policies and sustainable programs to eliminate those barriers.

Specifically, we will:

- **Establish guaranteed admission agreements for WTCS students to transfer and pursue STEM degrees at UW System 4-year institutions.** To do this we will first bring disciplinary faculty together from Madison Area Technical College (MATC) and UW-Madison to create “Technical Colleges STEM Pathway Course Packages” that when completed with the minimum GPA requirement will guarantee admission to UW-Madison STEM degree programs. During development we will partner with our Advisory Board members from the UW System and the WTCS to present the agreements to their institutions for vetting, with the ultimate goal of approval and adoption.

- **Prepare students for successful transfer and ensure that they are supported by faculty to completion of their 4-year STEM degree.** We will bring faculty experts and student services professionals at UW-Madison and MATC together to collaboratively develop, implement, and evaluate model programs in faculty/advisor professional development and student transfer transition programming. The faculty/advisor programming will be adapted from a successful model program of culturally aware mentoring and the student programming model will adapt existing and develop new sustainable programs and courses to address barriers transfer students face, such as lack of social and cultural capital, cultural differences, financial need, and academic preparation.

- **Continuously evaluate our efforts through ongoing data collection.** A team of professional evaluators will collect institutional data to track transfer and graduation rates. Beyond the numbers, we will use surveys, follow-up interviews, and focus groups to evaluate the impact of the faculty/advisor and student development programs. We will measure the extent to which faculty members and advisors are implementing the strategies they learned through participation in professional development, and we will measure the extent to which transfer students are able to successfully navigate challenges and persist to graduation. Importantly, we will also measure whether institutions in Wisconsin, other than MATC and UW-Madison, are able to successfully adopt and sustain the policies and model programs we develop.
Utah State University

Utah State University aspires to build a more inclusive community, where students and faculty of all backgrounds feel welcome and where the academic success is assured for all students. Within this context, USU will establish a program to improve the institutional environment and academic services for students transferring from our two-year campus in Blanding, where over 70% of students are Native American, to the main campus in Logan, where Native Americans comprise only 0.3% of students. With support from the HHMI Inclusive Excellence Program, USU will inaugurate Mentoring and Encouraging Student Academic Success (MESAS), a program designed to reduce existing institutional barriers for the success of these students and to encourage higher numbers of Native students to pursue four-year degrees. MESAS will build upon a summer internship program that has greatly increased the transfer rate from Blanding to Logan. We recognize, however, that those transfer students must be better and differently served if they are to thrive on the larger and less diverse Logan Campus. MESAS is designed to improve the campus environment, academic services, and social support for these students.

MESAS is built upon four pillars of institutional change. First, we will develop and deliver a program of cultural competency training for Logan faculty and staff, to establish a more welcoming and supportive campus environment. The training will address biases that negatively impact student performance by focusing on self-awareness, knowledge, and skills in working across cultures. Second, MESAS will work with the Office of Housing and Residence Life to establish a Native American Living Learning Community. This will provide the option for Native students to enjoy a greater sense of community in Logan, reducing the sense of separation from their families and communities. Cultural programming and social support will be provided to reduce the sense of cultural isolation. Third, MESAS will improve the preparation of Blanding students who plan to pursue a four-year degree in Logan. Because of its history as a two-year campus, essential prerequisites for four-year STEM degrees have historically not been offered in Blanding, placing transfer students at a disadvantage. MESAS will support the development of new and innovative courses and will promote interactions between Logan faculty and Blanding. Finally, MESAS will support a new faculty-level position whose primary responsibilities will be to advocate on behalf of Native American students and monitor their progress, ensuring that they have the academic resources and cultural support required for success.

An integral part of MESAS will be the assessment not only of student success but also of the underlying changes in institutional culture and in faculty attitudes and cross-cultural skills. We believe that the steps taken to improve the success of transfer students from Blanding will strengthen the university generally, by improving the cultural competency of our faculty and demonstrating a tangible commitment to greater inclusiveness. We also believe that addressing the needs of these students in the MESAS program will set the stage for future progress in serving other underrepresented student populations.
Vassar College

Vassar College embarks on an ambitious interwoven faculty and curriculum development program to enlarge our capacity for inclusive excellence in our campus STEM community by reducing barriers to student success and nurturing an inclusive and equitable learning and research environment. At the heart of the program will be an ongoing series of interdisciplinary collaborative learning clusters centered around Grand Challenges – complex problems of current global concern and pressing social and economic importance, that call for scientific or quantitative analysis.

Each year 3-4 faculty will design an interdisciplinary set of linked freshmen courses all motivated by the topic of the Grand Challenge, as faculty across campus address the Grand Challenge theme from different perspectives and fields of expertise through affiliated courses and mentored student research projects. Ongoing Grand Challenge activities, such as student research symposia, panel discussions, and career-building workshops, will foster an inclusive community of learners and scholars. Each Grand Challenge cluster will engage students and faculty in a three-year cycle of study, research, training, and mentorship, from which participants can emerge as leaders in Vassar’s scientific community. The Grand Challenge program will occur in parallel with a faculty development program aimed at supporting faculty as they build equity in the classroom and in their mentorship activities.

This program builds on our tradition of student-centered learning by providing new and exciting ways for faculty and students to come together and work together, starting with the introductory level and continuing through senior thesis work and faculty research collaborations. By establishing a curricular structure that demands diverse perspectives and expertise, and by supporting both faculty and students as they explore ways of building equity within the community, the Grand Challenge program enlarges Vassar’s capacity for inclusive excellence. At the conclusion of the GC program, Vassar faculty and students will experience a STEM community that evolves along with its entire campus community, based in inclusive and equitable practices, and with learning opportunities that allow its diverse members to thrive.
Virginia Commonwealth University

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The overarching goal of the Virginia Commonwealth University HHMI Inclusive Excellence award is to produce a marked improvement in the academic outcomes for transfer students and by extension first generation and African American, Latinx/Hispanic, and Native American (AALANA) students majoring in STEM disciplines. To do this VCU, John Tyler Community College (JTCC), and J. Sargeant Reynolds Community College (Reynolds) are focusing their energies to create broad, inclusive communities among students and faculty in STEM programs. We hypothesize that stronger community structures will increase capacity for student inclusion and thus success. This hypothesis will be tested by implementing the following:

- **Enhance inclusiveness of STEM courses, programs, and teaching of diverse learners.** We will adapt VCU’s Institute on Inclusive Teaching (IIT) to have a specific track focused on STEM disciplines, which will provide VCU, JTCC, and Reynolds faculty members a range of opportunities, strategies, and techniques for creating inclusive STEM pedagogy. The IIT-STEM will also be used to build strong faculty communities across VCU, JTCC, and Reynolds. Connecting faculty groups and enhancing the inclusiveness of STEM courses will increase the performance of transfer and AALANA students.

- **Reduce administrative barriers and facilitate a smooth academic and social transition for transfer students.** We will develop “Major Maps” and “Guided Pathways” that provide clear plans of study for transfer students. New STEM-specific processes for onboarding transfer students will be created that include workshop series focusing on academic success skills, cohort-building, targeted tracking, and proactive advising in the 1st year at VCU. In addition, administrative changes will be made that support successful transition by reducing administrative barriers and proving clear plans of study, resulting in reduced time to earning a bachelor’s degree and increased academic self-efficacy for transfer students, which in turn increases degree attainment.

- **Build community and cohorts among VCU STEM faculty and students.** VCU will create a new Science Learning Center that will serve as the hub of our inclusive teaching endeavors, provide additional learning resources, and science student gathering area. Creating an inclusive space will build community among students and faculty and increase sense of belonging and science identity in students, which in turn increases likelihood of STEM degree attainment.

Throughout the grant period, we will monitor progress toward the goal that transfer and AALANA students reach a comparable level of student success as other STEM students. Community-building milestones will be linked to assessments and surveys monitoring participation, satisfaction, and perceived value of program elements. Assessment will target the learning climate in STEM programs and sense of community experienced by students and faculty. Milestones with respect to transfer roadblocks will focus on DFW and retention rates, and establishing procedural changes that equalize paths for all students.

The HHMI Inclusive Excellence award will position VCU, JTCC, and Reynolds to increase the use of inclusive pedagogy in STEM classes, build the administrative infrastructure for transfer students, and enhance institutional climate to promote student success. We anticipate more than 75 faculty from our institutions and 7,000 students will be impacted.
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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 in 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 education.
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. On-going 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.
After two years of data analysis and self-examination, we at Wellesley College have realized that the experiences and outcomes of our Latinx, African-American, and 1st generation college students have not improved measurably over the last dozen years. This discovery led to a broader understanding that the context of science learning and socialization is just as critical to student success as the content, and a deeper commitment to enact broad institutional change to create an inclusive, welcoming community that embraces all of its members.

Through Wellesley’s Inclusive Excellence Project, we will address deep-rooted institutional barriers that lead to differential success in our science departments. Recognizing that Wellesley’s most effective route to long-term change lies in changing community attitudes and practices through extensive professional development, this project will first engage faculty, staff, and students in sustained and intensive training in evidence-based research around equity, inclusive pedagogy, cultural competency, stereotype threat, and unconscious bias. Building upon what we have learned, we will then redesign courses and curricula to support diverse learning pathways; re-envision on-campus work as paid, academic-year internships to enhance concrete skills, faculty mentorship, and self-efficacy among students; and build an advising system that connects each student to a coordinated team of skilled professionals from both the academic and student support divisions.

We envision that at the end of the grant period, our faculty will be better trained to work with all students, and incoming faculty will enter into a culture that puts the success and satisfaction of all students at the forefront. Our science curriculum will support students along their individual pathways, enabling more students to persist in STEM and graduate with GPAs and skills that are competitive for top graduate programs. Students will engage in paid work that enhances their education and contributes to their sense of belonging, and they will experience academic advising as a proactive, collaborative mentoring effort across the academic, student life, and career education divisions.

Ongoing evaluation and assessment efforts will let us measure our success in realizing this vision. Activities will include student surveys, focus groups, and senior exit interviews with new or refined questions to collect data relevant to our project goals. Individualized assessments for newly-developed courses will measure students’ skills acquisition and progress toward goals. Faculty will be surveyed throughout the grant period to evaluate shifts in attitudes and practices. The core project team and Wellesley’s professional assessment staff will meet regularly to evaluate project components to determine the success of its outputs and outcomes, allowing us to make necessary adjustments or improvements.

Evaluation and assessment efforts will help us to determine holistically whether we are succeeding in making our Science Center a more welcoming place for all students, why, and/or why not. Results will inform adjustments to project design throughout the grant period. Wellesley is committed to promoting excellence in all areas of the College, and lessons learned from our program activities will be shared with other programs and departments. By the end of the grant period, we plan that these conversations and evaluations will become institutionalized to ensure that Wellesley continues to improve.
Western Washington University 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.
The past five years at Wheaton College represent a welcome period of intentional change and growth, and efforts to increase both the size and diversity of our student body have led to multiple record-breaking recruitment years. The current student body represents not only the largest in the college’s history but also includes a greater number of first-generation and domestic students of color than ever before. This influx of students also brings an increase in the number of students interested in STEM. Yet, growth in STEM participation is inconsistent across all student groups. Rates of engagement in STEM have stagnated for first-generation students and domestic students of color (a population we have determined to be our new majority or NM) as compared to other student groups at Wheaton. Recent data suggest that a focus on inclusive pedagogies and new approaches in introductory courses at Wheaton has the potential to increase the participation and engagement of NM students in STEM.

The Wheaton Inclusive STEM Excellence (WISE) initiative aims to improve student outcomes related to engagement, performance and persistence in STEM and to create a more welcoming STEM community for all students, especially students from the NM, through five primary activities: 1) understanding the Wheaton STEM student experience and identifying and removing barriers to student success by engaging in intentional and continuous assessment activities; 2) creating an innovative, collaborative campus-wide leadership team supporting inclusive excellence in STEM; 3) engaging STEM faculty in division-wide professional development; 4) promoting evidence-based curricular reform focused on inclusive pedagogies in all STEM departments; and 5) empowering STEM Student Leaders through peer mentoring, leadership training and campus-based internships with college partners.

With support from HHMI, the WISE initiative will improve the impact of STEM education at Wheaton for all students and increase the capacity for inclusive excellence campus-wide. An initial year of professional development will serve as a catalyst for subsequent self-examination and transformation processes. Wheaton STEM faculty will engage in discipline-specific pedagogical inquiry to create student-centered programmatic innovations that can be built upon for years to come. The activities proposed will not rely solely on the investment of the STEM faculty, but will also succeed due to cross-campus collaborations that will create new opportunities to address institutional barriers to student success. WISE student internships will connect NM STEM students with partners across campus. Together, all of the program components will work together to create lasting institutional change.

Realizing the goals of improving student outcomes related to engagement, performance and persistence in STEM will only result from creating a more welcoming STEM community for all students. The WISE initiative will transform teaching and learning in STEM to create a true culture of inclusion that will serve as a model of excellence for other areas of the college. Through a deliberate and comprehensive approach to promoting inclusive excellence in STEM, the WISE initiative aims to leave an immediate and lasting imprint on Wheaton College that will serve as a template for ongoing, campus-wide innovation that will lead to a more fully inclusive education for all our students.