The Ohio LSAMP Alliance

Overview

The Ohio LSAMP Alliance will be a new alliance among 7 four-year institutions (Central State University, the University of Cincinnati, Cleveland State University, Miami University, The Ohio State University, Wilberforce University, and Wright State University) and 4 community colleges (Cincinnati State Technical and Community College, Columbus State Community College, Cuyahoga Community College, and Sinclair Community College). In addition, the Ohio STEM Learning Network (OSLN), the Ohio College Access Network (OCAN), e-Tech Ohio, and an Industry Advisory Board will offer programming support. Furthermore, the Ohio LSAMP Alliance will work collaboratively with other NSF-supported programs, including the Ohio STEM Ability Alliance (OSAA), the Ohio Science and Engineering Talent Expansion Program (OSTEP), and Comprehensive Equity at Ohio State (CEOS). Letters of commitment and support are provided with this proposal. The purpose of this alliance is to significantly increase underrepresented minority (URM) student recruitment, retention, persistence, and attainment of science, technology, engineering, and mathematics (STEM) degrees. The goal of the program is to double the number of underrepresented minority baccalaureate degrees in STEM disciplines at partner institutions within five years.

Current Enrollment and STEM Degree Production at the Ohio LSAMP Partner Institutions

Table 1: Undergraduate Enrollment in STEM Fields by Race/Ethnicity and Institution, 2010

<table>
<thead>
<tr>
<th>Institution</th>
<th>African American</th>
<th>Hispanic American</th>
<th>Native/PI American</th>
<th>2 or more races</th>
<th>Total STEM</th>
<th>Total URM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central State</td>
<td>247</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>258</td>
<td>249</td>
</tr>
<tr>
<td>U. Cincinnati</td>
<td>270</td>
<td>71</td>
<td>9</td>
<td>28</td>
<td>4,257</td>
<td>378</td>
</tr>
<tr>
<td>Cincinnati St. CC</td>
<td>318</td>
<td>24</td>
<td>8</td>
<td>32</td>
<td>1,849</td>
<td>382</td>
</tr>
<tr>
<td>Cleveland State</td>
<td>172</td>
<td>53</td>
<td>5</td>
<td>9</td>
<td>1,468</td>
<td>239</td>
</tr>
<tr>
<td>Columbus St. CC</td>
<td>115</td>
<td>11</td>
<td>11</td>
<td>0</td>
<td>439</td>
<td>137</td>
</tr>
<tr>
<td>Cuyahoga CC</td>
<td>1,128</td>
<td>149</td>
<td>34</td>
<td>0</td>
<td>3934</td>
<td>1,311</td>
</tr>
<tr>
<td>Miami University</td>
<td>110</td>
<td>57</td>
<td>16</td>
<td>31</td>
<td>2,203</td>
<td>214</td>
</tr>
<tr>
<td>OSU</td>
<td>522</td>
<td>309</td>
<td>26</td>
<td>72</td>
<td>10,697</td>
<td>929</td>
</tr>
<tr>
<td>Sinclair CC</td>
<td>197</td>
<td>30</td>
<td>10</td>
<td>0</td>
<td>1,979</td>
<td>237</td>
</tr>
<tr>
<td>Wilberforce</td>
<td>70</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>76</td>
<td>72</td>
</tr>
<tr>
<td>Wright State</td>
<td>287</td>
<td>67</td>
<td>55</td>
<td>74</td>
<td>2,426</td>
<td>483</td>
</tr>
<tr>
<td>Total</td>
<td>3,436</td>
<td>774</td>
<td>175</td>
<td>246</td>
<td>29,586</td>
<td>4,631</td>
</tr>
</tbody>
</table>

Table 2: Bachelor's Degrees Earned in STEM Fields by Race/Ethnicity and Institution, 2010-11

<table>
<thead>
<tr>
<th>Institution</th>
<th>African American</th>
<th>Hispanic American</th>
<th>Native/PI American</th>
<th>2 or more races</th>
<th>Total STEM</th>
<th>Total URM</th>
<th>% URM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central State</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>U. Cincinnati</td>
<td>37</td>
<td>14</td>
<td>2</td>
<td>3</td>
<td>821</td>
<td>56</td>
<td>6.8%</td>
</tr>
<tr>
<td>Cleveland State</td>
<td>12</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>189</td>
<td>22</td>
<td>11.6%</td>
</tr>
<tr>
<td>Miami University</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>0</td>
<td>517</td>
<td>20</td>
<td>3.9%</td>
</tr>
<tr>
<td>OSU</td>
<td>86</td>
<td>65</td>
<td>7</td>
<td>22</td>
<td>2392</td>
<td>180</td>
<td>7.5%</td>
</tr>
<tr>
<td>Wilberforce</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Wright State</td>
<td>17</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>317</td>
<td>31</td>
<td>9.8%</td>
</tr>
<tr>
<td>Total</td>
<td>188</td>
<td>102</td>
<td>17</td>
<td>33</td>
<td>4269</td>
<td>340</td>
<td>8.0%</td>
</tr>
</tbody>
</table>

These tables show that there were 4,631 URM students enrolled in STEM disciplines in autumn, 2010, but only 340 underrepresented minority STEM bachelor's degrees were granted from the seven 4-year institutions for the 2010-11 year (IPEDS National Center for Education Statistics, accessed 09/09/2012). Improvement in retention and transfers, therefore, will increase graduations.
Table 3, below, shows the number of STEM students who transferred from one of the four partner community colleges to OSU between summer of 2011 and spring of 2012. While these data are exclusive for OSU, they will be available for the other four-year institutions prior to funding. Transfers from community colleges will double with funding and will substantially increase URM degrees.

**Table 3: Transfers from Partner Community Colleges to The Ohio State University, 2011-12**

<table>
<thead>
<tr>
<th>Institution</th>
<th>African American</th>
<th>Hispanic American</th>
<th>Native/PI American</th>
<th>2 or more races</th>
<th>Total STEM</th>
<th>Total URM</th>
<th>%URM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinnati St. CC</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>7</td>
<td>38.8%</td>
</tr>
<tr>
<td>Columbus St. CC</td>
<td>145</td>
<td>44</td>
<td>9</td>
<td>31</td>
<td>984</td>
<td>229</td>
<td>23.2%</td>
</tr>
<tr>
<td>Cuyahoga CC</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>77</td>
<td>5</td>
<td>6.5%</td>
</tr>
<tr>
<td>Sinclair CC</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>79</td>
<td>8</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

**Need for STEM Education in Ohio**

In 2005, the Science and Mathematics Education Policy Advisory Council of Ohio called for an increase in the number of students who take challenging courses, master high-level mathematics and science subjects, and pursue STEM careers. They recommended building partnerships that improve the education community’s ability to meet the workforce needs of Ohio (Science and Mathematics Education Policy Advisory Council, 2007). To attract and retain businesses and create and sustain high-skill, high-wage jobs, Ohio must produce more workers with advanced knowledge and skills in STEM disciplines. In 2010, the National Science Board recommended that it is necessary to “cast a wide net to identify all types of talents and to nurture potential in all demographics of students” (National Science Board, 2010).

The Ohio Board of Regents’ Fourth Report on the Condition of Higher Education in Ohio: Underrepresented Ohioans Need More Education to Meet the State’s Workforce Needs focused on the need to educate more underrepresented Ohioans for an economy that demands highly skilled workers. “Too many low-income, Black and Hispanic students drop out of high school or are not academically or culturally prepared for college. Many underrepresented students enroll in college, but too many do not reenroll after their first year, and many more fail to graduate or seek a higher degree” (University System of Ohio Board of Regents, 2011). Ohio’s adult white males are twice as likely to have bachelor’s degrees as black males (twenty-six percent versus thirteen percent) while fifteen percent of Hispanic males have bachelor’s degrees. Blacks are less likely to return for the second year than white students (seventy-five percent versus eighty-eight percent at university main campuses). “Returning to college for the second year is a critical tipping point that is essential for underrepresented students to realize long-term financial and workplace success” (University System of Ohio Board of Regents, 2011). Ohio ranks thirty-eighth among the states with only 26% of adults holding a bachelor’s degree, compared with a national average of 31%. That 5% gap represents billions of dollars in lost economic activity to Ohio (University System of Ohio Board of Regents, 2012). Just twenty-four percent of Ohio high school students take a rigorous core curriculum, which is the best predictor of college success, and only thirty-nine percent of nineteen-year-old students in Ohio enroll in college (Ohio Board of Regents, 2005). “It is important for Ohio that these students attain a degree. The degree matters to the individual, the state, and businesses and industries. Those who earn associate and bachelor’s degrees in Ohio stay in Ohio. They earn good incomes. They have low unemployment rates” (University System of Ohio Board of Regents, 2011).

Therefore, there is an identified need for programs to improve retention of underrepresented college students from the first to the second year of college. The Ohio LSAMP Alliance will concentrate its efforts on the first two years of college, although students will be involved in seamless LSAMP programming throughout their undergraduate experience, from recruitment to the baccalaureate. This new alliance will form a strong partnership among institutions of higher education, community partners, and industry partners. Working collaboratively, the Ohio LSAMP Alliance will take an aggressive approach to create a massive recruitment program and an effective retention program. Effective retention programs are committed to the development of supportive social and educational communities in which all students are integrated as competent members (Braxton and Lee, 2005; Tinto, 1993). Withdrawal from college is highest during the first year, during the transition to college, when the individual is least integrated into and least committed to the institution, and deficiencies in academic preparation are most evident. Institutions must provide advisement, academic support, monitoring, and community building (Tinto, 1993; Bean, 2005). The Westat Report, supported by the National Science Foundation in 2000,
found that the features that led to successful LSAMP programming were the residential summer bridge program, undergraduate research experience, mentoring, drop-in centers, caring staff, and an alliance structure that provided additional support for LSAMP scholars (Westat, 2000). According to the Urban Institute report, “Revitalizing the Nation’s Talent Pool in STEM,” the following were cited as the most important LSAMP project components: student research (82%), summer bridge (67%), mentoring (60%), stipend (48%), and tutoring (37%) (Clewell et al, 2006). The Ohio LSAMP Alliance will offer all these programs, as well as advisement, counseling, and strong relationships and support.

Objectives

The following are the objectives of the Ohio LSAMP Alliance:

1. to foster a partnership among alliance institutions, working with industry and community partners, that results in programming that is collaborative, effective, and sustainable;
2. to heighten the awareness of opportunities in STEM disciplines and increase the recruitment of underrepresented minority students to STEM majors at partner institutions;
3. to provide early and sustained programs to facilitate the critical transition from high school to college at each partner institution;
4. to increase the retention of first- and second-year underrepresented minority students in STEM disciplines;
5. to improve the disciplinary socialization of underrepresented minority students in STEM disciplines, particularly by providing undergraduate research opportunities through the baccalaureate;
6. to provide pathways for smooth transitions from community colleges to four-year institutions.

Program Approach

This proposal incorporates effective strategies identified in the literature and during the planning process and builds on the success of best practices already in place within the state and across the nation. Our external evaluator assisted us with expanding our preliminary logic model into a more detailed plan that specifies our outputs and impacts with proposed benchmarks for each activity within our objectives. (Appendix A contains the complete logic model, which is summarized below in Table 4.) The logic model also provides the framework for the evaluation plan. The program objectives (above) drive the inputs (the human, financial, organization, and community resources that are needed to accomplish the program’s objectives). These determine the activities and participants, what the program does with the resources to meet the objectives and the interventions that are expected to produce the changes or results. These in turn result in the outcomes and impacts. Therefore, the Ohio LSAMP Alliance programming will be discussed under each of the objectives.

Table 4, below, is a brief summary of the logic model (Appendix A), showing selected outcome measures and impacts for the key program components and activities. It can be noted that Ohio LSAMP Alliance partners have determined clear goals and objectives, as well as measurable indicators of progress. Year-to-year adjustments in programming and budgeting will be made in response to evaluation of the successfulness of funded programs.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Selected Outcomes/Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective 1: to foster a partnership among alliance institutions, working with industry and community partners, that results in programming that is collaborative, effective, and sustainable.</td>
<td>▪ Double the number of URM STEM students who transfer from 2-year to 4-year programs in 5 years</td>
</tr>
<tr>
<td>Facilitate articulation agreements for STEM disciplines across institutions</td>
<td>▪ 10 additional STEM programs with articulation agreements between 2-year and 4 year programs in 5 years (2 per year)</td>
</tr>
<tr>
<td>Biennial and institutional</td>
<td>▪ 8 workshops shared online (4 after year 2 and 4 after year 4)</td>
</tr>
<tr>
<td>Conferences</td>
<td>100 student and 20 faculty participants</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| Innovative curricular reform in mathematics following survey feedback from partner math faculty | Library of 50 math problems with STEM applications  
Online tutorials for 20 math problems with STEM applications  
Mathematics Curriculum Reform Task Force of STEM faculty evaluating best practices in math education |
| Technology delivery: website, webinars, videoconferencing, online courses | Sustained webinars, videoconferences, Task Force on Online Courses, development of “Introduction to STEM” course, workshops in undergraduate research and faculty development, and interactive web site as part of sharing best practices |
| Ohio LSAMP Alliance Brochures | 5000 brochures disseminated in 5 years at 250 outlets  
20% increase in URM STEM applications/year |
| Collaborative faculty mentoring for freshman and sophomore LSAMP scholars | Retention of mentored scholars 2 percentage points higher than retention of non-mentored URM STEM students  
40 faculty mentors/120 LSAMP Scholars |

**Objective: 2. To heighten the awareness of opportunities in STEM disciplines and increase the recruitment of underrepresented minority students to STEM majors at partner institutions.**

| Development of collaborative recruitment activities and materials | Increased awareness of STEM among URM students  
Distribution on recruitment materials and improved online recruitment |
| LSAMP advisement at orientation | 20% increase in URM STEM enrollments/year  
Double the number of URM STEM enrollments in 5 years |

**Objective: 3. To provide early and sustained programs to facilitate the critical transition from high school to college at each partner institution.**

| Bridge/Early Arrival Programs | Retention of freshmen students increases 2 percentage points alliance-wide |
| Culturally relevant advising | 40 Scholars participate in bridge/early arrival each year  
120 Scholars participate in workshops each year  
Retention of students who participated in bridge programs is 2 percentage points higher than for URM STEM students who did not participate in bridge programs |
| Workshops on financial aid, career goals, and study skills | 120 LSAMP freshmen and sophomores matched with LSAMP 40-60 LSAMP juniors and seniors |

**Objective: 4. To increase the retention of first- and second-year underrepresented minority students in STEM disciplines.**

| Supplemental instruction and tutoring | 120 URM STEM participants receive SI or tutoring  
Retention of students who participated in SI or tutoring is 2 percentage points higher than retention of URM STEM students who did not participate in SI or tutoring |

**Objective: 5. To improve the disciplinary socialization of underrepresented minority students in STEM disciplines, particularly by providing undergraduate research opportunities through the baccalaureate.**

| Undergraduate research for juniors and seniors | 20% increase in URM STEM undergraduate researchers/year  
Double the number of URM STEM researchers in 5 years |
| Industry and community partner interactions | Sustained collaboration with Alliance partners  
Source of funding and opportunities for LSAMP activities |

**Objective: 6. To provide pathways for smooth transitions from community colleges to four-year institutions.**

| Community colleges will be full partners in the Alliance, and their students will participate in LSAMP programming. | Faculty/staff confirm increased sharing of resources/practices among 4-year and 2-year institutions (Interview and survey)  
20% increase in URM STEM transfers from 2-year institutions per year  
Double the number of URM STEM transfers in 5 years |
Objective 1: to foster a partnership among alliance institutions, working with industry and community partners, that results in programming that is collaborative, effective, and sustainable.

The Ohio LSAMP Alliance consists not only of seven 4-year institutions of higher education and four community colleges, but also includes industry partners and community partners (Ohio STEM high schools, OSLN, OCAN, and e-Tech Ohio). The Alliance partners have complementary strengths and serve diverse populations. The Ohio LSAMP Alliance will be transformational at partner institutions through innovative shared curricular programs and courses, as well as through the evaluation of and sharing of best practices through conferences, the web site, meetings, and conference calls.

Activities that will be part of and evaluated to support objective 1 include:

Articulation Agreements and Credit Transfer

“Credit Transfer” is an initiative of the Ohio Board of Regents to enhance the ability of students to transfer effectively between Ohio’s public post-secondary institutions of higher education. By building a comprehensive credit transfer system, the University System of Ohio helps students customize an educational pathway that fits their needs and budget. Knowing in advance that the courses and programs taken at one of Ohio’s public institutions will transfer around the state gives students the flexibility of choosing options that best suit them in terms of cost, convenience, and opportunities. They can begin their programs at less expensive community colleges and transfer to four-year universities. Easy transfers make it more likely that students will excel academically and graduate with a bachelor’s degree. An Articulation and Transfer Advisory Council was created to facilitate and guide the efforts that will ease credit transfer among Ohio’s institutions of higher education. This includes the conversion from quarters to semesters for several universities so that now all institutions are on the semester system and follow the same academic calendar. The Ohio Transfer Module (OTM) is the set of general education requirements that represents a common body of knowledge and academic skills. Students can complete general education courses anywhere in the public system. The Transfer Assurance Guides (TAGs) include the OTM and additional courses needed in majors. Courses in TAGs are guaranteed to transfer and apply directly to the major. There are currently 39 TAGs in 8 specific discipline areas, and the courses are guaranteed to transfer and apply directly to the major. The Articulation & Transfer Clearinghouse (ATC) facilitates electronic exchange of student transcripts among Ohio, state-assisted higher education institutions. The ATC provides institutions receiving transfer students with additional electronic information regarding how a transfer student’s current coursework matches with his or her new institution’s coursework so that transfer credits are considered in a consistent manner across the state.

The Ohio LSAMP Alliance will facilitate the formation of articulation agreements for STEM disciplines among Ohio institutions of higher education. This will be particularly beneficial to students transferring from the community colleges to the four-year institutions. The Ohio LSAMP Alliance web site will bring all the information together for degree requirements at all institutions, along with equivalent courses. We will add ten STEM programs with articulation agreements between community colleges and four-year institutions in five years, adding two programs each year. We will double the number of URM STEM students who transfer from two-year to four-year programs in five years, with a 20% increase each year.

Biennial Ohio LSAMP Alliance Conference

The Biennial Ohio LSAMP Alliance Conference (years 2 and 4 of the funding period) will be structured to maximize networking interactions, to facilitate the development of an Ohio LSAMP Alliance community of scholars, and to reinforce students’ commitment to earn bachelor’s degrees and to pursue graduate study or employment in STEM-related fields. It will provide LSAMP scholars with the opportunity to present their undergraduate research in poster sessions, participate in small group discussions within disciplines, learn the advantages of networking, share ideas and best practices with faculty and staff, meet with students from Alliance partner institutions, meet with others interested in STEM careers, and reinforce their commitment to their programs. Students will have an opportunity to talk with representatives from Alliance graduate schools, corporations, and government agencies. We will have 100 student and 20 faculty registrants for each conference.

A variety of workshops will be available to students. Topics for these workshops will include: leadership skills development, interviewing, preparation for the GRE, applying to graduate school, development of the resume and personal statement, and research integrity. There will also be faculty
development workshops on mentoring and diversity sensitivity training. We will videotape the workshops and make them available online (three student workshops and one faculty workshops for each conference).

This one-day conference will take place at the Nationwide and Ohio Farm Bureau 4-H Center at The Ohio State University. On years 1, 3, and 5 of the funding period, each institution will hold its own undergraduate research conference, with sharing of presentations through multimedia conferencing. Several rooms at Alliance partner institutions are equipped for eLearning and multimedia conferencing. Support will be sought from industry to help defray the costs of these onsite and online conferences.

Innovative Curricular Reform in Mathematics

Math can be a bottleneck to STEM degrees. When students need remediation in mathematics and are required to take courses in sequence, they can be delayed by one or more years in starting the requirements for their STEM majors. The curricular reform in mathematics will encourage students to learn math, help them succeed in their STEM disciplines, and help them understand the application of math to their STEM disciplines and why they learn the various skill sets in math (Wagner, 2005).

Each of the Ohio LSAMP Alliance partners has been working to develop math programming that fits the needs of their students. For example, Wright State’s National Model for Engineering Mathematics Education involves EGR 1101, Introductory Mathematics for Engineering Applications; it is changing the way math is taught to engineers at two dozen institutions across the county. An NSF STEP Type 1 award has funded the expansion of EGR 1101 and additional coursework to enhance the retention and scientific reasoning skills of underprepared science majors (Rattan and Klingbeil, 2011; Klingbeil and Bourne, 2012). The University of Cincinnati puts emphasis on their bridge program and the use of online math programs, such as ALEKS (Assessment and Learning in Knowledge Spaces) college math readiness program for all bridge students. It was developed through a NSF grant and is used by various universities to enhance the math skills of entering freshman students. Khan Academy, a library of videos covering math and other areas, has also been utilized by partner institutions; however, application to STEM is needed. Miami University, Cleveland State University, and Central State University have been expanding their supplemental instruction programs in math. The Mathematics and Statistics Learning Center at The Ohio State University offers tutoring, a resource center, exam reviews, and workshops. Therefore, all partner institutions are committed to investigating reforms to the math curriculum that will provide for application of math to STEM, student-centered approaches, interactive classroom instruction with student participation, and co-curricular activities.

In order to initiate this curricular reform in mathematics, Dr. Gregory Baker, mathematics professor and Ohio Eminent Scholar, and Dr. Azita Manouchehri, professor of mathematics education, both at The Ohio State University, will develop surveys of the mathematics and other STEM faculty at Alliance institutions. The purposes of these surveys are to learn more about the current math curricula; understand inquiry-based mathematics instruction and ways to develop STEM problem-solving applications; coordinate concepts and skills learned in the required math courses with physics, chemistry, engineering, and biology; and determine ways to transform courses to the benefit of our URM STEM students. Follow-up interviews will be conducted, and a Mathematics Curriculum Reform Task Force will participate in the development of a library of fifty math problems with STEM applications, along with twenty online tutorials that go through the solutions to each problem. The task force will evaluate and share best practices in math instruction that can be immediately implemented alliance-wide.

Web Site

The Ohio LSAMP Alliance web site will be a critical component for Alliance communication, recruitment, and sharing of best practices, expertise, resources, and updates. There will be an interactive (WIKI) component. The web site will also include information about the partner institutions, programming, a calendar of events, information about the people involved in the Ohio LSAMP Alliance (Governing Board, Steering Committee, Campus Teams, Community Partners, Industry Advisory Board, LSAMP Scholars), photographs and articles about Alliance activities, presentations, links, and resources. Results and other information from evaluation reports will be posted here.

Online Courses

The online sharing of courses can reduce duplication of effort while providing for collaboration among institutions for the development, teaching, and evaluation of courses. This can be effective in
increasing the retention of URM STEM students by providing structured experiences that welcome them to community membership, provide unique learning experiences and topics, enable interaction with other STEM achievers, solidify their career identity as scientists, and provide them with the knowledge and skills they need to be effective students (Kuh et al, 2010).

AFST 307, Blacks in Science and Technology, is an online course out of the University of Cincinnati that will be offered to all LSAMP Scholars. It is designed to increase the self-efficacy of African American students and examines the contribution of people of African descent to major STEM disciplines.

There is considerable enthusiasm among Alliance partners to assign a task force to develop additional online courses for our students at all partner institutions, including an “Introduction to STEM” course, using the model developed by Dr. Raymond Landis that focuses on student development and non-cognitive factors that influence student success (Landis, 2007). Topics will include: introduction to STEM, keys to success in STEM, STEM careers, STEM technology, the process of learning, problem solving, taking exams, writing a technical papers, student portfolio, and group projects.

Workshops in Undergraduate Research

The Ohio State University Undergraduate Research Office has developed workshops on many topics, including the following: information sessions on finding a topic, finding a mentor, what is research, why do research, how to find research opportunities; student panels, faculty panels, and international research panels; “Research with Human Subjects: IRB Training;” “Finding Grants for Research;” “Poster Presentation Basics;” “Library Special Collections;” “Summer Research Opportunities;” “How to Write a Research Abstract Workshop;” “Personal Statement Workshop;” “Poster Presentation Workshop;” “Resume/Cover Letter Workshop;” and “Applying to Graduate School.”

There are several rooms throughout The Ohio State University that have video- and teleconferencing capabilities, in which students from partner institutions will be able to participate in these activities while they are taking place. The workshops will also go “on the road,” in which faculty and staff from The Ohio State University will bring the workshops to the partner institutions. Workshops developed at partner institutions can also be cyber-shared or brought to partner institutions. At least two workshops in undergraduate research will be shared alliance-wide each year.

Faculty Development: Mentoring and Diversity Sensitivity Training

Workshops to promote faculty development in mentoring and diversity sensitivity training will be presented at the biennial Ohio LSAMP Alliance Conference. These workshops will be videotaped and made available on the Ohio LSAMP Alliance web site. The OSU Multicultural Center, InterACT Theater Project for Social Change, and the University Center for the Advancement of Teaching (UCAT) have produced many relevant workshops that can be used or modified for these purposes.

An online course will be available for all LSAMP faculty mentors: “Mentoring and Diversity.” In addition, “Mentoring and Diversity” handbooks will be provided to LSAMP faculty mentors and posted on the web site. These resources will provide information on the LSAMP program; STEM demographics; rewards, challenges, and barriers to mentoring; and the roles of a mentor. Mentoring can be improved through workshops, mentoring programs, publications, and opportunities for mentors to come together to share information (Girves, Zepeda, Gwathmey, 2005).

Ohio LSAMP Alliance Brochures

Brochures will be developed to highlight Ohio LSAMP Alliance partner institutions and the particular strengths of each. These can be used in recruitment to the institutions, to LSAMP, and to STEM disciplines. Five thousand brochures will be disseminated in five years at 250 outlets.

Collaborative Faculty Mentoring for Freshman and Sophomore LSAMP Scholars

Because new LSAMP alliances are required to focus efforts on innovative recruitment and retention interventions at the undergraduate level, with particular emphasis on pre-college, freshman, and sophomore persistence in STEM disciplines, the Ohio LSAMP Alliance undergraduate research programming will begin with non-intimidating, introductory research experiences for freshmen and sophomore LSAMP scholars. Faculty researchers will mentor three LSAMP scholars interested in their area of research. The mentor will meet with their three LSAMP scholars ten hours throughout the academic year. Their first meeting will be an informal meal to get acquainted. Subsequent meetings will include tours of research laboratories and working together through simple research projects that can be
Objective 2: to heighten the awareness of opportunities in STEM disciplines and increase the recruitment of underrepresented minority students to STEM majors at partner institutions

OCAN, OSLN, the Ohio STEM Equity Pipeline, and Ohio STEM high schools work with parents and high school students in high schools across the state to explain college and career opportunities, as well as to help students apply for, pay for, and enroll in higher education. College recruiters from each Ohio LSAMP Alliance partner institution provide similar information and services. Working together, a joint recruitment initiative will be offered, in which these efforts will complement and reinforce a clear message to students interested in pursuing a STEM degree. This coordinated approach will lead to a more efficient utilization of available resources.

The activities that will support objective 2 will include:

**Development of Collaborative Recruitment Strategies**

Working with OCAN, OSLN, the Ohio STEM Equity Pipeline (of the National Alliance for Partnerships in Equity, NAPE), and Ohio STEM high schools, Ohio LSAMP Alliance partner institutions will share best practices and develop collaborative recruitment strategies. The Ohio STEM Equity Pipeline Project, started in 2009, has 12 sites in which middle schools, high schools, career centers, community colleges, and four-year institutions, and business and industry partners are collaborating in using the Program Improvement Process for Equity in STEM to identify root causes for low participation and low completion of underrepresented students in STEM. OSLN was established in 2005 to develop and connect a statewide system of innovative STEM schools and programs of excellence. Several of the state’s STEM high schools have dual-enrollment opportunities with Ohio LSAMP Alliance institutions: Metro High School with The Ohio State University, Dayton Regional STEM School and Dayton Early College Academy with Wright State University, Horizon Science Academy with Cleveland State University, and Hughes STEM High School with the University of Cincinnati. The web site, social media, and Alliance brochures will aid in recruitment of URM students into STEM majors at partner institutions.

**LSAMP Advisement**

All partner institutions will advise their students about the Ohio LSAMP Alliance programs. They will do this in pre-collegiate programs, during bridge and early arrival programs, during orientation, and throughout academic year advisement. In particular, students who are STEM majors, as well as those who are undecided in their majors, will be provided with information and counseling.

Objective 3: to provide early and sustained programs to facilitate the critical transition from high school to college at each partner institution

Activities that will support objective 3 will include: 1) bridge/early arrival programs; 2) advisement; 3) workshops on financial aid, career goals, and study skills; 4) faculty mentoring (discussed under Objectives 1 and 5); and 5) peer mentoring.

**Bridge/Early Arrival Programs**

The Ohio LSAMP Alliance bridge and early arrival programs for entering first-year students will focus on social integration and academic enrichment activities in STEM fields to accelerate their performance in first-year courses and their integration into the academic community. All Ohio LSAMP Alliance partners offer a variety of residential bridge programs. NSF funds will be leveraged to enable individual institutions to expand existing programs for students majoring in STEM and to host students from other Ohio LSAMP Alliance institutions.

For example, at The Ohio State University there are a variety of bridge programs to fit the needs of the populations served. The OSTEP bridge program offers a six-week academic component with classes in freshman science, technology, engineering, and math and professional development activities. Room and board are provided, and OSTEP participants receive an OSU student mentor. The College of Engineering also offers the Pre-Freshman and Cooperative Education (PREFACE) Program, a five-week summer bridge to accelerate students’ progress through the first year of engineering curriculum. The
Office of Diversity and Inclusion Bridge Program focuses on the use of progressive Transition, Integration, and Preparation (TIP) themes for the 3-week period prior to autumn semester. The Todd A. Bell National Resource Center on the African American Male has its own early arrival program, retreat, gathering of men (keynote and fellowship), as well as a lecture series and leadership institute. Specific STEM disciplines on campus have additional early arrival.

At the University of Cincinnati, the Emerging Ethnic Engineers (E3) program is a seven-week residential program for incoming underrepresented ethnic engineering freshmen. Toyota is a partner in this program, in which over five hundred students have participated since 1989. In autumn, E3 students register as an E3 Learning Community. Wright State University, on the other hand, has tailored its Academic Advantage summer bridge program to the needs of its students. It is a one-week program designed to increase the math preparation of incoming students so that students can begin advancement in their chosen degree programs. Cleveland State University has two successful summer bridge programs, including the four-day Striving Toward Academic Readiness Together (START), presented by the office of Diversity and Multicultural Affairs, which provides remediation to students. At Miami University, the Office of Admission offers a residential bridge program to underrepresented minority students, which makes participants eligible for a four-year scholarship. Wilberforce University will establish a six-week residential summer bridge program in mathematics and science for incoming freshmen STEM students.

While all of these bridge programs are tailored towards the students they serve, best practices will be evaluated and shared through the Ohio LSAMP Alliance. At least 20 LSAMP scholars will participate in bridge programs each year, and their retention will be two percentage points higher than underrepresented STEM students who did not participate in these programs.

Advisement

Effective academic and retention advisement is critical to the retention of underrepresented minority students in STEM disciplines (Tinto, 1993; Kuh et al, 2010). Culturally relevant advising in an environment sensitive to the needs of African American, Hispanic American, Native American, and Native Pacific Island students will take place at all Ohio LSAMP Alliance partner institutions for LSAMP scholars. Advisement will initiate from a holistic perspective, addressing personal, social, financial, emotional, developmental, cultural, and ethnic issues that may affect the academic performance and retention of underrepresented minority students. Orientation and advisement play pivotal roles in the student’s transition from high school into college. They help underrepresented minority students become integrated into the university community and can provide validation by reinforcing to the students that they matter and will be supported as they proceed toward degree completion (Holmes et al, 2007).

For example, the Ohio State University will use holistic retention counselors, who will direct students toward the LSAMP programs and retention services that will assure their success, while tracking students through LSAMP programming. Wright State University is modeling their LSAMP Student Success Advising program on the success of the Ohio STEM Ability Alliance, with advisers not only monitoring academic progress but also minimizing barriers, providing professional development training, coordinating acculturation programming, and monitoring mentoring relationships. Cleveland State University will use the retention advisor/coordinator to supervise peer mentors and coordinate arrangements for meetings and field trips.

Workshops on Financial Aid, Career Goals, and Study Skills

The Ohio LSAMP Alliance partner institutions offer a variety of workshops on financial aid, career goals, and study skills to help students adjust to university life. The Office of Diversity and Inclusion at The Ohio State University offers the following workshops: “The Time Management Investment Portfolio,” “Win as much as You Can,” (about group dynamics and collaboration), “Are You Man Enough?” “Suite Life: Dorm Edition,” “Learning Styles,” “Note Taking and Reading Skills,” and “Test Taking Strategies.” These workshops can be shared through multimedia conferencing. In addition, many resources are available online; these include videos, articles, and assessments on a variety of topics, including reading skills, note-taking skills, test-taking skills, time management, stress management, and learning styles inventories. Other partner institutions have developed similar seminar and workshops, including the following offerings by Miami University: “Approaches for Science” and “Writing in the Sciences.” LSAMP Scholars at all partner institutions will have access to all these resources.
Peer Mentoring

Studies on students uncertain of their interest in STEM careers show that mentoring relationships are critical in determining a student’s decision to remain in STEM disciplines (Girves et al, 2005; Hill et al, 1990). Underclassmen benefit from the previous experience of peer mentors, role modeling, and friendship (Packard, 2004). LSAMP freshmen and sophomores will be matched with mentors in their own discipline, and each mentor can work with up to three scholars. The peer mentors will function both as coaches, who provide guidance, information, and support to the minority STEM students, as well as models for successfully negotiating the academic pitfalls of a STEM major. One hundred twenty freshmen and sophomore LSAMP Scholars will work with forty to sixty junior and senior LSAMP Scholars.

Objective 4: to increase the retention of first- and second-year underrepresented minority students in STEM disciplines

Enhancing the first-year experience is critical in order to improve retention and degree completion. The highest percentage of students who drop out do so after their first year, and the decision to do so is often made during the first term (Braxton, 2000; Tinto, 1993; University System of Ohio Board of Regents, 2011). Therefore, the Ohio LSAMP Alliance is focusing a significant amount of attention on integrating students into the academic community very early in the college careers. The activities listed with objective 3 (bridge/early arrival programs, advisement, workshops, faculty mentoring, and peer mentoring) not only provide early and sustained support to students to facilitate the critical transition from high school to college, but they will also serve to increase retention of first- and second-year underrepresented minority students in STEM disciplines in the first year and beyond. However, the primary activity associated with objective 4 and in which all Alliance partners will participate is supplemental instruction.

Supplemental instruction uses peer-assisted study sessions to improve student retention in difficult gatekeeper courses (Malm et al, 2011; Parkinson, 2009). For STEM students, these courses include calculus, chemistry, physics, and biology. Students who have already demonstrated competence in these courses will attend all classes along with students and conduct additional regularly-scheduled recitation sessions each week. They will guide students in study strategies, vocabulary acquisition, and test preparation, in addition to reviewing content and concepts (Hurley et al., 2006). Sessions plans will be developed by SI leaders in consultation with the faculty. This type of mentoring has been shown to provide psychological and emotional support, help students set goals and career paths, improve subject knowledge, and provide role models for the students (Henry et al, 2011).

In addition, there are a variety of other types of tutoring and supplemental instruction programs that are offered at Ohio LSAMP Alliance institutions. For example, the University of Cincinnati offers Supplemental Cooperative Learning Courses (SCLC), one-credit courses in which students meet twice a week for two hours with a dedicated instructor for the course. Wilberforce University is offering supplemental instruction in mathematics, physics, and chemistry to freshmen and sophomore STEM students. Students will meet weekly for recitation outside the regularly scheduled classes. Wright State University has developed a number of first-year curricular interventions to increase student retention and success in STEM. Central State University has identified eight gateway STEM courses in which student tutors will be employed to supplement instruction. Miami University provides cohort enrollment in chemistry, biochemistry, mathematics, and the life sciences. Most Alliance partners also offer drop in centers for a number of STEM departments, cluster courses, living/learning communities, scholars programs, collaborative learning, early warning or early academic intervention, and peer study groups to aid in the retention of students.

At least 120 LSAMP Scholars will participate in supplemental instruction each year and retention will be compared to underrepresented STEM students who did not participate.

Objective 5: to improve the disciplinary socialization of underrepresented minority students in STEM disciplines.

The activities that support this objective include: 1) training of faculty mentors for LSAMP scholars participating in undergraduate research; 2) undergraduate research; 3) the biennial Ohio LSAMP Alliance Conference (and other professional or scientific conferences); 4) workshops on topics that contribute to disciplinary socialization, including undergraduate research and professional development;
and 5) field trips. The faculty mentors will not only advise students in undergraduate research, but they will provide academic, social, and disciplinary advising, guidance, modeling, and support to the LSAMP scholars. For example, at Cleveland State University, each faculty mentor will be responsible for arranging and leading one off-campus field trip to a STEM-related site and one on-campus program or presentation. In addition, the industry and community partners have agreed to fund and provide field trips and tours of their research and development facilities, presentations or guest lectures, and mentors or internships to give students a better understanding of the level and scope of career opportunities open to individuals with STEM degrees. Although the emphasis of this new alliance is on the retention of undergraduate students in the first two years, upperclassmen will continue to participate in the following activities: advisement and counseling (including discipline counselors); undergraduate research internships with stipends; faculty and peer mentoring; tutoring or supplemental instruction; Ohio LSAMP Alliance conferences; and workshops. Additional information will be provided here on undergraduate research opportunities for upperclassmen (Jones et al, 2010).

### Undergraduate Research

In addition to the collaborative freshman/sophomore introductory research program, junior and senior LSAMP scholars will have research internship opportunities within Ohio LSAMP Alliance institutions and partners. Students may participate in summer and/or academic year research internship programs (Carter et al, 2009). The research internships are modeled after the Committee on Institutional Cooperation’s (CIC) (the academic consortium of the Big Ten institutions and the University of Chicago) Summer Research Opportunities Program (SROP). The Undergraduate Research Office at OSU collects information on a variety of research opportunities, in addition to SROP, including URO Summer Undergraduate Research Fellowships, Mayers Natural & Mathematical Sciences Summer Research Scholarships, Biochemistry Summer Undergraduate Research Program, Earth Science Shell Undergraduate Research Experience, NSF Research Experiences for Undergraduates, and many others. The Alliance program manager will maintain an inventory of internships and research opportunities at partner institutions, including industry, community partners, and national laboratories.

Summer research intern will be expected to work full-time on their projects and will receive a stipend. They may intern on any Alliance campus, as well as at national laboratories or other universities. In addition to in-depth research experiences with a faculty mentor, LSAMP juniors and seniors will participate in educational enrichment activities and coursework designed to broaden their view of research and graduate education and strengthen their communication and technical skills. They will present their research at the biennial Ohio LSAMP Alliance Conference or at another professional or scientific conference.

To be eligible, underrepresented minority students must be rising juniors or seniors majoring in a STEM field, with a GPA of at least 3.0. They must complete the Ohio LSAMP Alliance Research Internship application form, which will be available online. Research faculty and the Steering Committee members will select the participants and will help match all interns with the most appropriate faculty/industry/agency mentors. The matching process will ensure a research experience that is both meaningful and focused on a topic of mutual interest to the student and mentor. Selection decisions and the determination of specific research projects are functions of the interests and capabilities of the student, the nature of the discipline, and the research areas and directions of the mentor.

### Objective 6: to provide pathways for smooth transitions from community colleges to four-year institutions

The credit transfer program and articulation agreements among partner institutions will enhance the ability of students to transfer among institutions. Community colleges will be full partners in the Alliance, and their students will participate in LSAMP programming, including advisement, early arrival and bridge programs, supplemental instruction, mentoring, undergraduate research, conferences, and all Alliance-wide activities. There is already some sharing of faculty and course work among the Alliance four-year institutions and the community colleges, and this will be encouraged through the Alliance-wide development of math programming, supplemental instruction, online coursework, multimedia conferencing, research opportunities, faculty development workshops, and student advisement and mentoring activities, which have already been discussed.
Organization

Principal Investigator

The Ohio State University is the lead institution. It is consistently ranked as a top public university by *U.S. News & World Report*, with a status as a research powerhouse and unequalled opportunities for students to participate in the discovery of new knowledge. Descriptions of the other Ohio LSAMP Alliance partners can be found in the “Facilities, Equipment, and Other Resources” section. President E. Gordon Gee will serve as the principal investigator and chair of the Ohio LSAMP Alliance Governing Board. He will provide intellectual leadership and general oversight to the entire project. As chief executive officer, he oversees Ohio State’s six campuses, 64,000 students, and nearly 40,000 faculty and staff.

Governing Board

The provosts of the participating institutions, together with representatives from partner organizations, will form the Governing Board, which will provide leadership to their institutional personnel to ensure that appropriate infrastructures and support mechanisms are in place. They will provide overall governance for the Alliance, exercising ultimate control over its program directions. They will assist in broadening the base of support for Alliance objectives among academic, industrial, governmental, and community partners and assure the commitment of resources where required. The Governing Board members include: Dr. Patrick R. Liverpool (Central State University), Dr. Lawrence Johnson (University of Cincinnati), Dr. O’Dell M. Owens (Cincinnati State Technical and Community College), Dr. Geoffrey S. Mearns (Cleveland State University), Dr. Jack Cooley (Columbus State Community College), Dr. Belinda Miles (Cuyahoga Community College), Dr. Conrad Ge depos (Miami University), Dr. Joseph Alutto (The Ohio State University), Dr. David Collins (Sinclair Community College), Dr. Lewis Jones (Wilberforce University) and Dr. Thomas Sudkamp (Wright State University).

Steering Committee

The Steering Committee will be appointed by the provosts and will oversee and provide intellectual leadership for the STEM-related activities of the Alliance. It will recommend policy, establish priorities, review and evaluate ongoing programs, and foster new initiatives. It will report to the Governing Board and will meet at least twice a year. The Alliance Director will chair the Steering Committee and will report directly to the Governing Board. The Steering Committee members are from the eleven institutions of higher education: Central State University (Krishna Kumar Neunuri, Subramania Srinathan), University of Cincinnati (Kenneth Simonson, Jeffrey Johnson), Cincinnati State Technical and Community College (Connie Sketch, Doug Bowling), Cleveland State University (Richard Rakos, Rosemary Sutton), Columbus State Community College (Jeffrey Richardson), Cuyahoga Community College (Pamela Ellison, Geza Varhegyi), Miami University (Christopher Makaroff, James Kiper), The Ohio State University (Christopher Andersen, David Tomasko), Sinclair Community College (Lorraine Kapka, Jennifer Day), Wilberforce University (Edward Asikele), and Wright State University (Martin Gooden, Nathan Klingbeil). The Steering Committee will also meet through conference calls and videoconferencing. In addition, the Alliance Director, along with members of task forces and the evaluation team, will visit members of the Steering Committee at their institutions every year.

Alliance Administration

Office of Diversity and Inclusion

The Ohio LSAMP Alliance will be housed in the Office of Diversity and Inclusion (ODI) at The Ohio State University, where Dr. Valerie Lee, Vice Provost and Chief Diversity Officer, heads up a staff of eighty-eight dedicated individuals, who provide programs for the recruitment and retention of underrepresented minority students and will assist with LSAMP programming and activities. The offices at ODI include: ODI Scholar Program (ODISP), Community Outreach and Engagement, the Todd A. Bell National Resource Center on the African American Male, the Frank W. Hale, Jr. Black Cultural Center, Latino and Latin American Space for Enrichment and Research (LASER),
Access Collaborative Program, Leadership Initiatives for Women of Color, Special Programs, the Office for Disability Services, the Kirwan Institute for the Study of Race and Ethnicity, the Collaborative Diversity Initiative (diversity representatives appointed by academic units who work on issues of diversity), and pre-collegiate pipeline programs, including the Young Scholars Program, Upward Bound, and OSU Bound. Yolanda Zepeda, Assistant Provost at ODI, will coordinate the efforts of the ODI offices in LSAMP programming. ODISP, under the leadership of Shannon Gonzales-Miller, provides the following services: holistic retention counseling, tutoring, mentoring, bridge and early arrival programs, as well as academic and social support to low-income minority single parent students.

**Alliance Director**

Dr. Barbara A. Fink will serve as the Alliance Director. She is the Faculty Fellow at ODI, and she will be responsible for the day-to-day administration of the Ohio LSAMP Alliance. She will oversee the maintenance of student, program, and financial records; monitor the progress of student participants; convene the Steering Committee; work with industry and community partners in fundraising and program coordination; assure the maintenance of the Ohio LSAMP website; and prepare annual reports to the National Science Foundation. She will also assure the success of alliance-wide programming, including the annual Ohio LSAMP Alliance Conference, online courses, faculty development workshops, credentialing programs in tutoring and mentoring, and cyber-enabled workshops in undergraduate research. She will travel to partner institutions, as needed, and assure good communication, resource sharing, and sharing of best practices among Alliance partners. She will communicate frequently with the evaluation team and make the results of data evaluation known to partner institutions in a timely fashion.

**Program Manager**

The Program Manager will be a full-time position responsible for providing administrative support to the Alliance office, including logistical arrangements for the Ohio LSAMP Alliance Conference and the professional development workshops, tracking of students and data gathering, records and financial management, maintaining an inventory of internships and research opportunities, and alliance-wide communication. Once the notice of award has been received, a search will begin to fill this position. Qualifications for this position include at minimum a bachelor’s degree, preferably in an education or policy-related field, with a minimum of three years of experience.

**Campus Teams**

Each institution will establish a Campus Team, which will be responsible for coordinating local Alliance activities and for disseminating information concerning these activities to their respective campus communities. Each Campus Team will involve and inform academic and administrative units across campus as well as STEM faculty. Membership in the Campus Teams will include representatives from engineering, the sciences, student affairs, admissions, financial aid, and faculty mentors.

Research faculty members have been and will continue to be actively involved in program planning, selection of student participants, matching students with their research projects, mentoring, and assessing the quality of individual student performance. Research faculty will also participate in the professional development workshops where they will have an opportunity to share ideas and best practices.

**Community Partners and Industry Advisory Board**

Letters of collaboration and support have been received from the following community partners: Ohio STEM Learning Network (Dustin Pyles, Director of Operations), Ohio College Access Network (Reginald Wilkinson, President and CEO), e-Tech Ohio (Greg Davidson, Executive Director), the Ohio State University Alumni Association, Inc. (Archie Griffin, President/CEO), and Ohio STEM high schools throughout Ohio. In addition, the principal investigators of other STEM-related NSF programs have written letters of support; these include: Ohio’s Science & Engineering Talent Expansion Program (OSTEP, David Tomasko), Ohio STEM Ability Alliance (OSAA, Margo Izzo), and Comprehensive Equity at Ohio State (CEOS, Joan Herbers). We have also been in communication with several industries, who have agreed to provide support for LSAMP programming. Our industry partners include: American Electric Power, Applied Sciences, Inc., Battelle Memorial Institute, Center of Science and Learning, CSC,
Duke Energy, G.E. Aviation, Honda, Mound Laser & Photonics Center, the Procter & Gamble Company, Toyota, and Wright Patterson Air Force Research Laboratory. These Alliance partners have agreed to contribute to the program by providing any or all of the following to LSAMP Scholars: mentoring, internships, field trips and tours of their research laboratories and facilities, guest speakers, outreach opportunities, and funding of activities not covered by LSAMP funds.

**Evaluation Plan**

**Qualifications of the Evaluation Team**

Institutional Research Consultants, Ltd. (IRC) will serve as our external evaluator. Directed by Dr. Jan Upton, IRC is located in central Ohio and is currently evaluating four NSF-funded initiatives (including OSU’s OSTEP bridge program that is a partnership with three community colleges and assisting the lead evaluator of the STEP initiative at East Los Angeles College). Dr. Upton specializes in providing formative evaluation and has over 25 years of program evaluation experience. In addition to extensive experience evaluating STEM projects, Dr. Upton is a sociologist whose specialization is social stratification. She has also worked extensively with historically black colleges and universities (HBCUs), K-16 partnerships, and institutional research.

**Framework and Approach**

Dr. Upton will work very closely with the Alliance Director and the representatives from each site responsible for submitting their institutional research (IR) data. This group along with other key stakeholders will have an opportunity to review and to have input into all data collection instruments. IRC will also request documents and web information that describe institutions’ activities. Such information will be used to inform the development and revision of data collection instruments (e.g., surveys, interview protocols, and observation tools) to determine if partners’ activities are achieving the intended objectives related to the grant project. In order for the evaluation to be successful, the cooperation of Alliance partners in the data collection process is vital. The Alliance Director will share evaluation reports and findings with partners at meetings and online.

**Procedures and Methods**

IRC will use mixed methods, including surveys with closed and open-ended response items, telephone interviews, and case studies of two partner institutions. IRC will assess the progress on each of the specified objectives throughout each project year and provide feedback to the Ohio LSAMP Alliance. Use of mixed research methodologies will result in a more complete picture of implementation, progress, and achievement of the Ohio LSAMP Alliance’s broad goal of increasing the number of underrepresented minority baccalaureate graduates in STEM disciplines. Table 5, below, summarizes the external evaluation tasks.

<table>
<thead>
<tr>
<th>Table 5: External Evaluator (IRC) Tasks and Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Evaluator (IRC) Tasks</strong></td>
</tr>
<tr>
<td>Refine evaluation plan and update logic model as activities get underway</td>
</tr>
<tr>
<td>Assist the Alliance Director with developing a reporting process for collecting essential data from each participating partner institutions</td>
</tr>
</tbody>
</table>
Feature two of the partner sites in Years 3-5 as case study examples of best practices and lessons learned

- Data Collection: Jan.-Apr.

<table>
<thead>
<tr>
<th>Task</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform analyses on (IR) data submitted by the partner institutions</td>
<td>May-June</td>
</tr>
<tr>
<td>Formative reports</td>
<td>Ongoing as data are processed</td>
</tr>
<tr>
<td>Summative report</td>
<td>End of each project year</td>
</tr>
</tbody>
</table>

Appendix B provides the detailed plan that is closely linked to the Logic Model (Appendix A). The full evaluation plan in Appendix B shows for each objective the (a) input/resources, (b) activities, (c) data to be collected, (d) schedule, and (e) responsible party.

**Goals**

The overarching goal of the evaluation is to ensure that the broad objectives of the Ohio LSAMP Alliance are met. Therefore, the evaluation focus is two-fold. First, the evaluation will ensure that participating institutions are implementing core activities agreed upon by Alliance participants. Second, the evaluation will use the benchmarks as the criteria to verify that the programs are making the intended progress for each objective. The premise is that, if the program is being implemented and that the program objectives are being met, the broad goal of the LSAMP Alliance can be reached.

IRC will compile student achievement, demographic, enrollment, retention, and graduation data submitted by each Alliance Partner. Such information will be disaggregated by race/ethnicity, gender, STEM major, and institution. Evaluation reports will graphically compare the trends for the baseline year and project years. Additional insights about what is working at each site as well as aspects needing improvement will be informed by the survey and interview data. Beginning in Year 3, two institutions will be featured using case study research that will include observation as well as additional interviews to get a more detailed picture of the best practices and lessons learned that might emerge.

As indicated earlier, the formative evaluation is designed to support the continual improvement of the project. More specifically, it will include an examination of grant implementation that provides information to stakeholders to help them improve the project outcomes. The formative evaluation part of the project will determine the extent to which an activity is implemented as designed, the proportion of targeted students that participate, and the opinions of involved stakeholders (staff, faculty, students, and industry/community partners). Moreover, it will focus on whether or not activities adhere to goals, plans, activities, and timelines. It will also assess the overall quality of program activities and services and the responsiveness of targeted participants to these activities and services. During the summative evaluation phase, IRC will determine the extent to which project objectives and outcomes are attained. It will summarize what was achieved or not achieved each year and the final report will document progress through the duration of grant funding.

**Dissemination and Institutionalization**

Project results will be disseminated primarily through national conferences, higher education media networks, publications, and a well-developed web site. Because the partner institutions come into this proposal highly committed to its goals, best practices determined through programming evaluation will be fully in line with funding priorities of those institutions. LSAMP funding can be leveraged for additional community and industry support. Collaborative recruitment and mentoring, mathematics curriculum reform, additional supplemental instruction, and online sharing of courses, workshops, webinars, and videoconferences will remain as commitments from the institutions. Establishment of collaboration among 4-year institutions, community colleges, and community and industry partners will permanently enhance recruitment, retention, transfers, and STEM pedagogy.