Broadening Participation of Underrepresented Minorities in STEM Research Abroad

Heidi Taboada, Carlos Ferregut, Benjamin Flores, Solomon Bililign, Laura Engel, Lynn Rathbun, Idalia Ramos, and Robb Winter

This report provides a brief overview of the workshop results, key research findings and links to available resources that could serve as reference to the academic community to help increase and enhance underrepresented (URM) participation in STEM research abroad.

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Background and Introduction

The challenges in recruiting and retaining a full range of American students in STEM areas are well-known. It has been recognized that the United States’ capacity to lead in the twenty-first century demands that new generations of students are educated in cultural and social realities beyond what they may have grown up with in the United States. To succeed and prosper in a global economy and interconnected world, university graduates need international knowledge, intercultural communication skills, and global perspectives. However, underrepresented students are often the least likely to have an international experience, such as studying abroad or conducting scientific research overseas.

Workshop Discussions

A workshop funded by the National Science Foundation (OISE1848137) was held in Arlington, VA on May 24-25, 2019 entitled “Broadening Participation of Underrepresented Minorities in STEM Research Abroad.” The workshop was attended by 54 U.S. and International experts involved in international academic activities ranging from public and private institutions, Hispanic Serving Institutions (HSIs), Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs) and Community Colleges. Participants included university administrators, faculty with established international research programs, student participants, and members of organizations (see page 21 for a list of contributing speakers).

The purpose of this workshop was to synthesize input from the attending experts to develop a report to the nation with recommendations, resources, and best practices that support international research experiences and exchanges for underrepresented minority (URM) undergraduate students by bringing together researchers and those actively engaged in successful international research collaborations in STEM fields.

The workshop organizing committee formulated the next set of fundamental questions related to how to increase underrepresented minority undergraduate students in international research abroad:

**Q1. How to increase the number of institutions participating in a STEM research abroad program?**

**Q2. How to grow the number and the diversity of the students’ population that participate in a research abroad program?**

**Q3. How to expand the number of international research collaborations in Latin and South America, the Caribbean, Africa, the Middle East, and Asia?**

**Q4. How to build a community of practice to explore, document, and disseminate effective processes and high impact activities that can enable participation of a more diverse set of undergraduate students in international STEM research?**

With these questions in mind, workshop activities were arranged in such a way that brief presentations by experts in the field of international research abroad were followed by panel discussions and break-out sessions aimed at answering these questions and gathering input and recommendations from the participants.
With the intent of providing concrete feedback to NSF and its communities on how to increase participation of URMs in research abroad, the outcomes of these discussions were documented and serve as one of the primary sources of input to this report.

The other sources of input for this report include existing literature and links to available resources that could serve as reference to help increase the numbers of undergraduate URMs in new or existent STEM research abroad programs.

Q1. How to increase the number of institutions participating in a STEM research abroad program?

Academic research is becoming ever more international, and there is no argument that research and education in STEM benefit immensely from international cooperation. International collaborations benefit both students and universities. Whether it is to gain access to specialized equipment, develop new ideas or tap into new sources of funding, researchers across academic institutions are reaching out to their colleagues around the world.

The benefits of international collaboration have been recognized, and some of the identified benefits are listed below:

- International collaborations allow researchers to share knowledge. International collaborations thus provide an important channel for pooling resources.
- Working with foreign scientists provides a good way of enhancing local scientific capabilities because knowledge and expertise are exchanged.
- International collaborations allow local researchers to access materials, labs and equipment that are not available locally. These include computing facilities, particle accelerators, among others.
- Other countries can offer unique geological ecological end environmental locations not accessible locally which can provide opportunities for enhanced research.
- International collaborations are also important for low-income countries because these collaborations help develop an academic climate and paving the way to increase research funding.
● Emerging scientists can also be given the chance to work with experts in the field, advancing their scientific careers.
● International collaboration increases the pool of knowledge and brings multiple perspectives needed to solve complex problems that are increasingly cross-disciplinary in nature.
● Lastly, international collaborations aid in finding solutions to more complex problems, problems that are increasingly cross-disciplinary in nature, broadly benefiting the scientific community.

Aside from this, institutions also benefit from international collaborations on a macro scale since they provide a pathway to national and international distinction. The American Council on Education recommends that universities aiming to increase their international activities undertake a policy of “comprehensive internationalization, defined as a strategic, coordinated process that seeks to align and integrate policies, programs, and initiatives to position colleges and universities as more globally oriented and internationally connected institutions. And, to do so, leaders must articulate a vision for internationalization—one that is right for each campus and that contributes to creating “globally competent” students, faculty and staff.

A useful resource for University Presidents looking to strengthen the components of their international organizational infrastructure can be found at the Council on International Educational Exchange (CIEE). The CIEE and the Center for Minority Serving Institutions (CMSI) have hosted several annual Presidential Leadership Workshops. These workshops are a one-day executive level meetings designed for university presidents from Minority Serving Institutions (MSIs) looking to expand abroad opportunities for their students. This workshop is part of Project Passport, a partnership between CIEE and CMSI created to increase access to study abroad opportunities for MSI students by facilitating dialogue about the importance of international education at all levels of MSIs, including presidents, faculty, and students.

Link to:
● Project Passport can be found in: https://www.ciee.org/about/blog/ciee-and-cmsi-announce-%E2%80%9Cproject-passport%E2%80%9D-comprehensive-initiative-develop-study-abroad-programs-minority-serving-institutions-0

A report produced by the Rutgers Center for Minority Serving Institutions, on ‘Increasing Diversity Abroad: Expanding Opportunities for Students at Minority Serving Institutions’ offers the perspectives of several University Presidents from MSIs about the importance of providing abroad opportunities to students regardless of students’ economic standing or background.

Links to:
● Rutgers Center for Minority Serving Institutions, https://cmsi.gse.rutgers.edu/
● The ‘Increasing Diversity Abroad: Expanding Opportunities for Students at Minority Serving Institutions’ report can be found in: https://cmsi.gse.rutgers.edu/sites/default/files/MSI_StdyAbrdRprt_R4fin.pdf

Ranging from undergraduate research, civic engagement, student employment to study & research abroad, high impact practices increase confidence, enhance personal and professional skills, and equip students with a competitive advantage when they graduate and enter the workforce or pursue a graduate degree.
Gary Edens, Vice President for Student Affairs at the University of Texas at El Paso presented the UTEP EDGE initiative, an intentional campus-wide program whose objective is to foster high impact practices such as undergraduate research, civic engagement, student employment and research abroad. Gary Edens highlighted how the university values and support faculty who contribute to the program.

Other resources, include an increasing number of organizations interested in establishing international collaborations, some provide scholarships to faculty and students to participate in research abroad programs (hyperlinks in Appendix II):

- The Global Engineering Education Exchange Program (Global E3) fosters exchanges among 40 U.S. and 60 foreign institutions.
- The Research Internships in Science and Engineering (RISE) program enables U.S. undergraduates to work with German doctoral students in their labs during the summer.
- International Student Exchange Programs (ISEP) has 160 member institutions and an entire section of its web site promoting education abroad for STEM students, including opportunities in 15 countries from Australia and France, to Botswana, Sweden, and the United Arab Emirates.

Additionally, organizations including the Institute of International Education, NAFSA, Diversity Abroad, and the Fulbright Commission are looking at how URMs can overcome barriers to study abroad. These organizations are developing resources to better prepare URMs for international research and study abroad experiences.

**At the workshop, panelists agreed that faculty play a crucial role in establishing research abroad collaborations** (American Council on Education, 2012; Dewey & Duff, 2009; Childress, 2009). However, it was mentioned that even with an ever increasing demand to nurture globally minded students (Engel & Siczek, 2018; Jesiek et al., 2014) faculty members several face institutional challenges which hinder their participation in research abroad programs. Workshop participants also mentioned that institutional leaders and department chairs should provide different types of support when revising practices to improve faculty engagement in study or research abroad. Some of the ideas mentioned include considering participation in abroad experiences and make them count toward tenure and promotion, have course buy-outs and faculty releases offered in exchange for international research collaborations, have sabbaticals abroad encouraged, consider study & research abroad experiences as part of the faculty’s service requirements, etc.

**Workshop participants mentioned that International Offices at HBCUs and HSIs are usually poorly staffed.** In addition, it was mention that staff frequently has a lack of understanding of the differences among study abroad programs (where students travel oversees to take a class and learn culture), short-term combined study & research abroad program (where student participants usually take an interdisciplinary course and perform research activities related to the program) and international research collaborations like NSF-PIRE and NSF-IRES.

Participants suggested to involve International Offices staff early in the proposal development process so that they learn about goals and expectations of the international research program. It was also recommended to establish stronger interactions between different university units such as the research & sponsored programs. In addition, they can act as facilitators to get travel authorization for students and faculty timely processed as well as help to make travel policies more simplified. International offices can also help to promote research abroad opportunities to local students.
It is valuable to have a diverse portfolio of programs that addresses the needs of all students. Most institutions are now serving a hugely diverse array of students and benefit from having research and education abroad portfolios that reflect their diverse needs. Workshop participants also recommended that institutions consider available resources to increase the number of undergraduate URMs in new or existing study & research abroad programs, such as the Institute of International Education’s (IIE) Embedded Programs as a model for increased study abroad access.

Link to:
- Link to ‘Embedded Programs as a Model for Increased Study Abroad Access’ can be found in: https://www.iie.org/Learn/Blog/2019/07/Embedded-Programs-as-a-Model-for-Increased-Study-Abroad-Access

For example, International Offices can find useful information in the Forum on Education Abroad’s Standards of Good Practice to provide quality assurance for education abroad programs for U.S. students. The Forum on Education Abroad is recognized by the U.S. Department of Justice and the Federal Trade Commission as the Standards Development Organization (SDO) for the field of education abroad. They have developed the Standards of Good Practice which universities can use as a tool to 1) guide program development, 2) evaluate program quality, 3) advocate for resources and support, 4) train new professionals, 5) educate stakeholders such as parents, faculty, students, etc., and 6) establish and maintain respectful, sustainable relationships among partners.

Link to:

Q2. How to grow the number and the diversity of the students’ population that participate in a research abroad program?

Much research has been dedicated to several aspects of study abroad with the recognized need for the development of global competencies in STEM (Science, Technology, Engineering, and Mathematics) education. However, the group concluded that more research is needed that focuses on documenting efforts or evidence-based strategies aimed at increasing URM participation of undergraduate students in international STEM research. In fact, there exists no available literature or organism that has documented data or provides reliable statistics about the number of URM undergraduate students that partake on research abroad every year.

Moreover, despite all the documented benefits and skills gained by students who participate in study and research abroad (academic development, interpersonal growth and career readiness of students), access for underrepresented groups and minorities continues to be limited especially for first-generation college students and those with lower socio-economic backgrounds (Institute of International Education, 2019).

Workshop participants affirmed that there is a need to increase student diversity in study and research abroad programs. They mentioned that URMs have less access to international opportunities and often miss academic opportunities that can benefit them in their careers, especially when it comes to studying or doing research abroad. In many cases, students are unaware of the available resources, either they have jobs and family responsibilities that impede them from traveling or they are simply afraid to leave their comfort zone.

One of the many goals of international education is to foster better cultural understanding. Carter (1991) stressed that this goal will never be met if cultural diversity within the programs themselves is ignored. Several
studies have highlighted the importance of including and increasing the numbers of URM students in abroad programs. For instance, Talburt & Stewart (1999) documented that having an African American student on a study abroad program benefited the White students in the program because they were able to couple the young Black woman’s experiences with racism with their own similar feelings of being different and being an outsider. Furthermore, in an abroad experience, the host country also benefits from URM student participation because the host country can observe a broader American perspective that is often ignored or portrayed negatively in the media (Jackson, 2005).

At the workshop, four recent student participants presented their personal experiences as URMs on the value of their international research experience. Ana Cram and Luis Ramirez (University of Texas at El Paso); Brandon Lewis and Ana Carrel (North Carolina A&T University) provided their perspectives on their international experiences in Mexico, Peru, Bostwana, and South Africa, respectively. The student participants made common observations and shared many similarities: they all stated that they are first-generation college students who thought that going abroad was impossible. They all were recruited and mentored by their academic advisors about research abroad opportunities at their institutions and were encouraged to apply to those programs in which financial support was offered for the selected students. They mentioned that they were able to overcome their fears after experiencing their first research abroad opportunity, and felt more comfortable if faculty were traveling with them. They all recognized that going research abroad is a high impact activity that helped them develop unique skills commonly not often found in a traditional classroom setting. They felt immensely benefitted by the research abroad experience not only at the professional level, but also at the personal level. All participating students felt more confident academically and continued with graduate studies (MS and Ph.D.).

Workshop participants expanded on suggestions made by students and presented different short-term integrated study and research abroad programs as a viable way to increase URMs participation in international programs. As noted in Donnelly-Smith (2009) and Ruth et al (2019), such combined programs are more affordable and provide more flexibility to nontraditional students (Donnelly-Smith, 2009, Ruth et al., 2019). Jose Espiritu presented an innovative combined education and research abroad program funded by the United States Department of Agriculture in which cohorts from different Hispanic Serving Institutions meet at the Soltis Center in Arenal, Costa Rica for an intensive two-week summer program. The students participate for one week prior to travel in pre-conference workshops to prepare for the research experience abroad. Once at Costa Rica, the students receive lectures from U.S. and local researchers, work in multi-institutional and multidisciplinary teams in research projects, activities include facility visits, lectures, lab practices, local tours, cultural activities and final project presentations. Since the program is academically aligned students receive academic credit at their home institutions.

Andrew Nyblade presented the AfricaArray story, which is a successful public-private partnership to support capacity building and research in the geosciences in Africa and the U.S., linked to Africa’s natural resource sector. AfricaArray was established through a partnership of three organizations: The University of the Witwatersrand
Participants mentioned that creating a multicultural faculty team can help to increase URM participation in the international research experience. Having a diverse pool of faculty is a win-win for the U.S. and the host institutions. A diverse team improves the results by offering a wider array of methods for inquiry, instruction, and research. In addition, it has been widely documented that underrepresented minority students benefit from having mentors and role models who are also from such groups (McGee et al., 2019). If the faculty team organizing the abroad experience is disproportionately composed of White males, the differences in backgrounds with URM students may make it more difficult to establish the mentor and role model relationships that encourage participation in abroad programs.

A note written by one of the students who participated in the workshop said that students who hope to study abroad must often do so in the face of both implicit and explicit disapproval from their families. And, therefore, she mentioned the importance of involving parents at some of the pre-departure sessions or distribute at some point some information to them about the program his/her child intends to undergo. One important aspect influencing URMs decisions to participate in study and research abroad programs is related to family concerns and attitudes. It has been found that negative parental attitudes affect the participation of minority students in study abroad (Brux & Fry, 2010). Burkart, et al (2001) mentioned that family attitudes towards the value of international experiences often discourage low-income students. Tsantir & Titus (2006) found that some parents are very supportive of students going abroad to connect with their culture while others are appalled by their child’s desire to return to a country that the parents had left to provide a better life for their family. Another important family concern is related to racism and discrimination as mentioned in Cole (1991).

Several workshop participants mentioned that lack of financial support is one of the main barriers preventing URMs from participating in study or research abroad opportunities.

A wide discussion among educators has focused on the benefits of diversifying study abroad. However, fewer studies focus on documenting the constraints URM students participating in study abroad face. Diversity in study abroad participation is a concern, previous research on URMs participating in abroad opportunities has identified several different barriers which prevent them from participating in study and research abroad programs. Some of them are lack of information, credit transfer, lack of support, financial and family concerns, perception of lack of benefit, among others (Stroud, 2010; Sweeney, 2013, 2014; Greenbaum, 2012, Vernon et al., 2017). Many of these constraints are not faced by students in Predominantly White Institutions. Whites and high socioeconomic status students are more likely to have family and friends who valued study abroad more than lower socioeconomic status and minority students. These advantaged students are better able to acquire and use cultural capital when accessing information from institutional agents. They were also more likely to possess the knowledge and background that complied with institutional standards. These factors contributed significantly to the race and class disparities in study abroad participation (Simon and Ainsworth, 2012). Simon and Ainsworth (2012) examines how race and socioeconomic status contribute to disparities in study abroad participation. Lambert (1989) argues that members of lower socioeconomic classes are underrepresented in study abroad primarily because of inadequate finances. In fact, there exist significant literature that reveal that finances are a constraint frequently faced by minority students (Burkart et al., 2001;
Brux & Ngoboka, 2002; Calhoon et al., 2003; Cole, 1991; Day-Vines et al., 1998; Doan, 2002; Fels, 1993; Gleason et al., 2005; Perdreau, 2002; Pickard & Ganz, 2005; Mattai & Ohiwerei, 1989; Raby, 2005; Rhodes & Hong, 2005). Therefore, to broaden access to study abroad programs, providing financial assistance is an essential factor to ensure underrepresented minority students participation, especially those attending minority serving institutions (MSIs). According to a recent report from the Center for Minority Serving Institutions (CMSI) on diversifying study abroad and expanding equity for MSI students (Blake et al., 2019), 10.9% (36,267) of all U.S. study abroad students came from Minority Serving Institutions (MSIs), which reveals the underrepresentation of MSI students in study abroad given that MSIs enroll over 25% of all college students.

Minority serving institutions (MSIs) play a critical role in the higher education landscape, providing access to postsecondary education for millions of students of color who come from disadvantaged backgrounds, including those who are first in their family to attend college (Espinosa et al., 2017). Study abroad or having an international experience can be expensive propositions, especially for URM students attending MSIs. On average, at public four-year HBCUs and HSIs, 65.6 and 50.4 percent of students are Pell grant recipients, respectively, compared to 33.7 percent at public four-year non-MSIs (NASEM 2019, Minority Serving Institutions: America's Underutilized Resource for Strengthening the STEM Workforce).

Many students at MSIs are not aware of the availability of financial aid or scholarships that support international experiences. The U.S. Department of State’s Benjamin A. Gilman International Scholarship is a grant program that enables students of limited financial means to study or intern abroad, thereby gaining skills critical to our national security and economic competitiveness. The Benjamin A. Gilman International Scholarship Program is open to U.S. citizen undergraduate students who are receiving Federal Pell Grant funding at a two-year or four-year college or university to participate in study and intern abroad programs worldwide.

Furthermore, some studies also note that the financial concern extends beyond actual expenses of the program. For instance, the opportunity cost of foregone earnings while studying abroad can be a major constraint (Hembroff & Rusz, 1993). Furthermore, some students are obligated to fulfill work and family responsibilities (Brux & Ngoboka, 2002).

Indeed, studying abroad or having an international experience can be expensive propositions for URMs. Kasravi (2009) showed that students usually overcome financial barriers by various means, including choosing a shorter or less expensive program, opting for a more affordable destination, applying for scholarships, working more, and moving home to save money.

As a resource, Appendix II in this report lists various organizations which provide scholarships to study abroad, with a special focus on URMs.

**Q3. How to expand the number of international research collaborations in Latin and South America, the Caribbean, Africa, the Middle East, and Asia?**

**Several participants pointed out the need to increase URM participation in research abroad experiences at non-Western countries.** Literature shows that most American students have traditionally chosen to study or research abroad in developed Eurocentric countries. In fact, 77% of all globally mobile students will go to an Organization of Economic and Co-operative Development (OECD) member state (OECD, 2012). Esmieu et al. (2016) shows that while the number of non-Western abroad programs has increased dramatically in recent years, study and research abroad programs are still largely concentrated in Western Europe. In fact, amongst the 332,727 U.S. students studying abroad in 2017-2018, 55% went to Europe; 31.8 % went to the UK, Italy, or Spain (IIE Open Doors, 2019).
Therefore, because the vast majority of study and research abroad locations for U.S. students are located in Western countries, URM students may face challenges in finding study abroad opportunities in locations that may be of greater cultural interest to them. As a result, URM students whose racial or ethnic origins are not represented in the offerings of the international programs, receive a clear message that their cultural origins and identities are not important (Carter, 1991).

Some participants suggested that undergraduate students from URM groups actually seek to have international experiences in countries that reflect their own ethnic origins. This statement is supported by literature. For instance, Tsantir & Titus (2006) stated that for heritage-seeking students, study abroad is an exploration of their own identities; and that although most [majority] study abroad students expect to be challenged by the culture, heritage seekers often expect to feel a sense of homecoming and acceptance. Tsantir & Titus (2006) also examined the benefits of study abroad for a large number of heritage-seeking multicultural students that included Latinos, Asian Americans, and African Americans. Additionally, multi-lingual URMs actually have a distinct advantage when they undertake research and study in a country where they speak the language; as heritage-speakers their language skills are an asset to themselves, their institution, and the nation.

Participants mentioned that it is important to change perceptions about traveling and partnering with research institutions in non-western countries. Poor knowledge of history, geography, and culture of people especially of the developing world, plus an exaggerated fear and sense of insecurity in developing countries among Americans, have been obstacles to developing long-term STEM collaborations with Universities in Developing Countries. In addition, the belief that European universities are higher-caliber than those in Africa, Asia, or South America is largely due to Western educational standards and so may reflect how well they conform to Western norms rather than their quality.

Q4. How to build a community of practice to explore, document, and disseminate effective processes and high impact activities that can enable participation of a more diverse set of undergraduate students in international STEM research?

Participants pointed to the importance of forming alliances among different type of institutions as a way to grow the number of URM students in research abroad programs. MSIs possess faculties that are more representative of their student bodies. Therefore, a suggestion was made to consider allying one’s institution—especially if it is a PWI— with other diverse institutions, such as Historically Black Colleges and Universities, Hispanic Serving Institutions, Native American Universities, and Community Colleges (Brux & Fry, 2010). Perhaps, one of the most underutilized resource that can be used by universities is the thousands of immigrants from the developing world that have been successful and became faculty in the U.S. Participants highlighted that faculty at MSI institutions usually have many contacts at non-western countries, and know where to find the best research centers and academic institutions to partner with. MSIs not only enroll large percentages of students from diverse backgrounds, but also have the highest percentage of faculty from URM groups. Furthermore, a diverse pool of faculty has the potential to offer a wider array of methods for inquiry, instruction, and research strongly benefiting your international research program.

Workshop participants presented different successful international research programs. Edward Lungu, Deputy Vice-Chancellor at Botswana International University of Science & Technology presented the Southern Africa Mathematical Sciences Association (SAMSA), an organization whose main objective is to further research and teaching of mathematical sciences in the Southern African countries by holding conferences, workshops, academic exchange visits and research stays involving collaborations. Solomon Bililign presented different programs developed at his institution, North Carolina A&T State University (NCA&T, an HBCU), that have provided students with opportunities to engage in research abroad experiences. The programs presented were,
the Partnership for International Education and Research (NSF-PIRE, Lead Institution- Penn State University, 2005-2009) that promoted geophysics research at NCA&T and provided international research experiences for students in South Africa. He also described NSF-IRES awards that promoted interdisciplinary research experiences for undergraduate students in atmospheric sciences and geosciences in Ethiopia (2006-2009) and Botswana (2017-2020).

Lynn Rathbun from Cornell University presented the results of several NSF-funded projects under the National Nanotechnology Infrastructure Network (NNIN) aimed at recruiting UG students interested in Nanotechnology for an advanced research experience at the National Institute of Materials Science (NIMS) located in Tsukuba, Japan. The program was designed as a stand-alone summer research experience with a high level of scientific and logistical support from NIMS staff. For several years, this program was also funded by an NSF IRES award.

Several participants mentioned the Louis Stokes Alliances for Minority Participation (LSAMP) as a highly successful and exemplary model to recruit URM students. LSAMP, represented by 57 member alliances across the United States, has provided professional development, academic and financial support for undergraduate students from historically underrepresented minority groups in STEM disciplines. In addition, Denise Yates described the Louis Stokes Regional NSF International Center of Excellence (LSAMP-NICE) specifically charged with the dissemination of information and best practices to broaden participation in international collaborative research, LSAMP-NICE is a collaboration of four institutions: Salish Kootenai College (SKC), a tribal college in Pablo, Montana; Jackson State University (JSU), a historically black college/university in Jackson, Mississippi; Louisiana State University (LSU), an R1 (doctoral university, very high research) institution in Baton Rouge, Louisiana; and the University of Illinois at Chicago (UIC), an R1 and Hispanic Serving Institution.

Link to Louis Stokes Regional Center of Excellence: LSAMP - NSF International Center of Excellence (NICE) award abstract:


Participants also mentioned the importance of making broad-based coalitions and partner with the Council on International Educational Exchange and the Institute of International Education, for mutual support, shared programs, and resources.

Links to successful research abroad programs mentioned in the panel discussions are shown below:

- National Nanotechnology Initiative (NNI) https://www.nnci.net/sites/view-all
- LSAMP-NICE website http://lsamp-nice.org/
Workshop Outcomes - Key Recommendations from Participants

The workshop participants developed multiple recommendations that can help increase and enhance URM participation in STEM research abroad. Their suggestions were grouped in the next four sets of recommendations:

### Institutional Recommendations - Top Administration Perspectives -

1. **Institutional Commitment** - Internationalization plans should be part of the institutional strategic plan.
2. Commitment to education abroad should be reflected in the institution’s **mission and vision** statements.
3. Education abroad should be central to the University’s **vision of excellence**.
4. An **international enrollment plan** and an **international recruitment strategy** need to be developed to reflect international education as an institutional priority.
5. Proper staffing of the **Office of International Programs** is a critical factor in the internationalization process to provide the best support and services to faculty and students.
6. Universities should develop truly competitive and efficient International travel policies and improve communication between the **Office of International Programs and the Office of Research and Sponsored Programs** to simplify the travel approval process for faculty and students.
7. **Campus-wide infrastructure**: Invest in campus-wide strong infrastructure to support international programs and services.
8. **Embolden and promote integration of global perspectives** across the length and breadth of the curriculum.
9. The institution should recognize global education as one of the many available **High Impact Practices** that allow students to excel academically and personally.
10. Facilitat signing of **Memorandums of Understanding** and Cooperative Agreements with partner institutions.
11. The institution should have in place a **strong incentive infrastructure** to encourage faculty to participate and develop research abroad programs (travel funds, seed funds, student support, etc.)
12. Institutions should recognize faculty participation in education abroad programs and implement **flexible requirements** for their participating faculty members in these programs, especially for those working towards **tenure and promotion**.
13. Institutions should make the most benefit from **foreign born faculty** to provide authentic orientation to students going to those countries of origin of the faculty.

### Recommendations - Faculty Perspectives -

1. **Eliminate barriers** - Create incentives and eliminate barriers for faculty to incorporate international research activities in their teaching, research, and service assignments.
2. **Rebalance faculty workload allocations** - Administrators (Deans, chairs) should allocate value and specific time for research abroad activities and balance the workload of those professors engaged in these activities.
3. **Establish a reward system** – promote & incentivize faculty participation in research abroad and exchange programs.

4. **Institutionalize pre-travel logistics and planning** - Organize pre-trip orientation meetings to inform students of anticipated trip itineraries; passport, visa, insurance and immunization requirements, as well as curricular requirements and costs.

5. **Reward Internationalization in Tenure & Promotion** - Assign appropriate value, in appointment, tenure and promotion dossiers, to internationally oriented work (consider time dedicated to study & research abroad towards tenure and promotion and include these activities in the tenure portfolio)

6. **Share success stories** – Tell others about your experience to ignite interest in other faculty members to participate and expand research & study abroad opportunities to students.

7. **Find the right partners abroad** - Visit potential partners abroad well in advance, get to know them and seek synergy, establish collaborations with local industry and research centers.

8. **Measure impacts** - Develop a mechanism to measure impact (e.g., a journal focused on STEM research abroad, a center which can collect and disseminate information related to STEM research abroad) and share best practices.

9. **Disseminate value of study & research abroad** – Disseminate your findings in journal and conference publications, speak at conferences to engage others about the importance and impact of these programs.

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**Recommendations - Students Perspectives**

**Recommendations from STUDENTS to Faculty**

1. **Study & Research abroad programs can be introduced early as part of the students’ orientation and advising process** - Make study & research abroad programs part of the students’ advising and orientation processes to provide students with guidance on choosing the best program abroad that will help them enhance their academic careers.

2. **Past program participants are the best ambassadors** - Allow returning students to talk to other students to describe the hard and soft skills learned in their research abroad experience.

3. **Provide resources such as resume samples** - Provide resume samples (i.e. from past participants) on how to highlight international experiences in resumes, cover letters and job/graduate school interviews.

4. **Capture program impact through surveys** - Include surveys that allow students to not only provide hard data but also to self-reflect and write about the skills learned in research abroad.

5. **Provide financial support** – provide financial support to underrepresented students for study/research abroad to make these programs a viable possibility

6. **Make deadlines available** - Provide a check list for students to apply for an abroad program, including deadlines and websites.

7. **Develop a pre-departure check list** – This pre-departure check list should include specific requirements and deadlines to international travel (e.g. passports, special visa, vaccinations, etc.)

**Benefits of Study & Research Abroad as seen by the students:**

1. Gaining important global competencies such as language, cross-cultural communications, empathy, adaptability, team-working abilities, leadership and problem solving skills.

2. Increasing the likelihood of exploring graduate school study possibilities.

3. Gaining exposure to interdisciplinary research and global perspectives.

4. Working with top faculty and professionals from around the world.

5. Enhancing competitiveness through intensive research skills development.


7. Making a significant positive difference to student persistence.
Industry & NGOs’ Input to Universities and Faculty

1. There is a need to expand the number of opportunities from federal agencies to support STEM related research abroad.
2. Reach out to alumni and corporate partners to support international research.
3. Institutions should improve and increase communication with the industry/private sector to underscore the skills that students gain while abroad and will ultimately impact the workforce.
4. Expand existing community partnerships that support students that study and research abroad.

Recommendations from INDUSTRY to Faculty

1. Increase internship and research opportunities abroad to provide additional benefits to students to understand an international workplace setting.
2. Make STEM international experiences part of curricula requirements to satisfy the increasing demand for STEM jobs in the U. S. and abroad.
3. Measure the long-term impact of study abroad on career outcomes by tracking participant student’s employment performance after graduation.
4. Train students to better articulate the soft and hard skills learned through international experiences to employers.
5. Increase coordination and collaboration between the international and career services offices to infuse explicit career-oriented learning outcomes into the design of study and research abroad programs
6. Develop and increase the number of short-term study/research abroad programs for students that do not have the time to study/research abroad longer.
7. Encourage students to study/research in non-traditional destinations (culturally or linguistically different).
8. Students who experience different environments acquire greater intercultural skills and obtain greater career impacts than students who choose traditional destinations.
Broadening Participation of Underrepresented Minorities in STEM Research Abroad
# DAY 1 – MORNING SESSION

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>7:30 – 8:00 AM</td>
<td>Registration</td>
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<tr>
<td>8:00 – 8:30 AM</td>
<td>Breakfast</td>
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<tr>
<td><strong>8:30 – 8:45 AM</strong></td>
<td>WELCOME AND INTRODUCTIONS</td>
<td>Dr. Heidi Taboada, Dr. Solomon Billig, Dr. Lynn Rathbun, Dr. Laura Engel</td>
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<tr>
<td></td>
<td>The steering committee will present workshop goals, objectives and</td>
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<td>anticipated outcomes.</td>
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<tr>
<td><strong>8:45 – 9:00 AM</strong></td>
<td>Opening Remarks</td>
<td>Dr. Elizabeth Lyons, NSF Office of International Science &amp; Engineering, Program Manager</td>
</tr>
<tr>
<td><strong>9:00 – 10:15 AM</strong></td>
<td>CREATING AN INSTITUTIONAL CULTURE OF INTERNATIONAL STEM RESEARCH</td>
<td>Dr. Gary Edens, Dr. Firew Tegegne Amogne, Dr. Edward Lungu</td>
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<td>The aim of this session is to examine the current state of STEM focused</td>
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<td>International Research and the forecasted need to increase the number of</td>
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<td>underrepresented students within STEM that benefit from these experiences.</td>
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<td>The speaker will talk about the components within institutions that aid</td>
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<td>the formation of strong global collaborations and study abroad programs</td>
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<td>with an emphasis on resources that increase the participation of</td>
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<td>underrepresented groups within these programs. A community goal will be</td>
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<td>to determine key components that must be present within an institution.</td>
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<td><strong>10:15 – 10:30 AM</strong></td>
<td><strong>BROKEN</strong></td>
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<tr>
<td><strong>10:30 – 11:30 AM</strong></td>
<td>SHOWCASE PRESENTATIONS:</td>
<td>Dr. Robb Winter, Dr. Idalia Ramos, Dr. Eduardo Nicolau, Dr. Zeta Wheeler</td>
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<td>Successful International Research Programs</td>
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<td>Speakers will present the challenges, barriers, success stories in</td>
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<td>including URMs in international research, program evaluation, lessons</td>
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<td>learned, and future work that needs to be done to bring more URMs into</td>
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<td>International STEM research as well the overall impacts their programs</td>
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<td>have had on their students and campus culture</td>
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<tr>
<td><strong>11:30 – 12:00 PM</strong></td>
<td><strong>BREAK &amp; SETUP FOR LUNCH</strong></td>
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<tr>
<td><strong>12:00 – 1:00 PM</strong></td>
<td>WORKING LUNCH</td>
<td>Dr. Andrew Nyblade, Dr. Sekazi Mtingwa</td>
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<td></td>
<td>LUNCH PLENARY PANEL I</td>
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<td>The New Generation of Global Citizens – Promoting Inclusion in International STEM Research.</td>
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## DAY 1 – AFTERNOON SESSION

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<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Speaker(s)</th>
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</table>
| 1:00 – 2:00 PM | PANEL: Key Institutional Support to Promote, Facilitate and Support International Research Experiences (Senior International Officers, Diversity Officers, Deans)  
*This session will discuss how these components within institutions when working together aid in the formation of strong global research programs. An emphasis will be placed on discussing what type of resources are needed to increase participation of underrepresented groups within these programs. A community goal will be to determine which key components must be present within an institution.*  
*MODERATOR:* Mr. Arturo Barrio  
Ms. Danielle Gilliam  
Dr. Lucy Okumu  
Dr. Binod Tiwari |                                                                                                                             |
| 2:00 – 2:45 PM | **MODERATED ROUNDTABLE DISCUSSION I**  
**TOPIC 1:** What are the Issues and Challenges of Promoting International Collaboration at Your Campus?  
*The International Programs are poorly staffed specially at HBCUs or HSIs, often, trying to get travel authorization for students and faculty takes too long and is frustrating. Though there is an understanding of the need for international collaborations, the how is not clear among administrators. How do we include HBCU and HSI academic officers and administrators to be part of the conversation? How early and how involved do they need to be?*  
*MODERATOR:* Dr. Solomon Billigen |                                                                                                                             |
| 2:45 – 3:00 PM | **BREAK**                                                                   |                                                 |
| 3:00 – 4:00 PM | **STUDENT PANEL:** Experiences from Past Student Participation in S&RA  
*Students will speak about their S&RA experiences and the impacts these had on their lives.* | Ms. Ana Carrell  
Mr. Brandon Lewis  
Mr. Luis Ramirez  
Ms. Ana Cram  
*MODERATOR:* Ms. Ana Cram |
| 4:00 – 5:00 PM | **MODERATED ROUNDTABLE DISCUSSION II**  
**TOPIC 2:** What Resources Can We Use to Prepare and Motivate Students to Apply for Global Research Experiences?  
*MODERATOR:* Mr. Arturo Barrio |  
<p>| 5:00 – 5:30 PM | <strong>BREAK</strong>                                                                   |                                                 |
| 5:30 – 7:00 PM | <strong>DINNER AND PRESENTATION:</strong> Industry, Innovations and a Global Workforce   | Ms. Claudia Camacho                             |</p>
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<tr>
<td>7:00 – 8:00 AM</td>
<td>Breakfast</td>
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| 8:00 – 9:00 AM   | **SHOWCASE PRESENTATIONS:** Successful International Research Programs     | Dr. Steve Dupuis  
Facult from Universities  
Dr. Carlos Ferregut  
Dr. Solomon Billiag  
Ms. Denise Yates  
MODERATOR: Dr. Solomon Billiag |
|                  | *Speakers will review the challenges, barriers, success stories in including*  |                                                                            |
|                  | *URMSs in international research, program evaluation, lessons learned,*     |                                                                            |
|                  | *future work-what else needs to be done to bring more URMSs into*           |                                                                            |
|                  | *international STEM research, and the overall impact their programs have*    |                                                                            |
|                  | *had on their students and campus culture.*                                 |                                                                            |
| 9:00 – 10:00 AM  | **MODERATED ROUNDTABLE DISCUSSION III**                                     | Dr. Carlos Ferregut  
MODERATOR: Dr. Carlos Ferregut                                            |
|                  | **TOPIC 3:** How do we Engage Immigrant STEM Faculty to Seek International* |                                                                            |
|                  | *Research Opportunities with Institutions at Their Home Countries?*         |                                                                            |
|                  | *The most underutilized resource that can be used by Americans is the*      |                                                                            |
|                  | *thousands of immigrants from the developing world that have been*          |                                                                            |
|                  | *successful in the US. How do we engage the diaspora community in*         |                                                                            |
|                  | *facilitating research collaborations and training of students? How can we*  |                                                                            |
|                  | *include members of the host institutions (developing countries) as*        |                                                                            |
|                  | *program participants?*                                                     |                                                                            |
| 10:00 – 10:15 AM | **BREAK**                                                                    |                                                                            |
| 10:15 – 11:15 AM | **SHOWCASE PRESENTATIONS:** Successful International Research Programs     | Dr. Jose Espiritu  
Dr. Della Valles  
Dr. Isaac Adeath  
Dr. Lynn Rathbun  
MODERATOR: Dr. Laura Engel                                                  |
|                  | *Faculty from Universities*                                                 |                                                                            |
|                  | *Speakers will review the challenges, barriers, success stories in including*|                                                                            |
|                  | *URMs in international research, program evaluation, lessons learned,*     |                                                                            |
|                  | *future work-what else needs to be done to bring more URMs into*           |                                                                            |
|                  | *international STEM research, and the overall impact their programs have*   |                                                                            |
|                  | *had on their students and campus culture.*                                 |                                                                            |
| 11:15 – 11:30 AM | **BREAK & SETUP FOR LUNCH**                                                 |                                                                            |
| 11:30 – 12:30 PM | **WORKING LUNCH GROUP ACTIVITY**                                           | Dr. Andrew Gordon  
Dr. Heidi Taboada                                                           |
<p>|                  | <em>The New Generation of Global Citizens – Promoting Inclusion in</em>            |                                                                            |
|                  | <em>International STEM Research.</em>                                              |                                                                            |</p>
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<tr>
<td>12:30 – 1:30 PM</td>
<td>PANEL: Hearing from Partners at Foreign Institutions</td>
<td>Dr. Susana Vegas Dr. Victor Larios Dr. Pavel Hrubes MODERATOR: Dr. Carlos Ferregut</td>
</tr>
<tr>
<td>1:30 – 1:45 PM</td>
<td>BREAK</td>
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<tr>
<td>1:45 – 2:45 PM</td>
<td>PANEL: Funding Agencies, Professional Organizations and Industry Efforts to Promote and Support International Research Experiences for URM</td>
<td>Ms. Araceli Partearroyo Ms. Hazel Blackmore Dr. Connie Gomez MODERATOR: Ms. Araceli Partearroyo</td>
</tr>
<tr>
<td>2:45 – 3:00 PM</td>
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<tr>
<td>3:00 – 3:45 PM</td>
<td>MODERATED ROUNDTABLE DISCUSSION IV</td>
<td>MODERATOR: Dr. Laura Engel</td>
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<td>TOPIC 4: MEASURE YOUR IMPACT - Determine what should be gathered to evaluate program impact and what comparative studies are possible. Developed versus developing locations. Quantitative versus qualitative data. How to use and present data.</td>
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<tr>
<td>3:45 – 4:30 PM</td>
<td>FINAL WRAP UP - DEBRIEFING SESSION &amp; CLOSING REMARKS MODERATED ROUNDTABLE DISCUSSION V</td>
<td>MODERATOR: Dr. Heidi Taboada</td>
</tr>
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<td>What are the Next Steps for Increasing the Number of Underrepresented Students Participating in Study Abroad and Global Research Experiences? What support do you need to create a sustainable program at your institution? How will you start forming global collaborations? How can you scale up your current programs?</td>
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<tr>
<td>5:00 – 7:00 PM</td>
<td>CLOSING RECEPTION – Prince William, Third Floor</td>
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</tbody>
</table>
- CONTACT INFORMATION -
LIST OF CONTRIBUTING SPEAKERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Title</th>
<th>Institution/University</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms. Ana Carrell</td>
<td>MS Student</td>
<td>North Carolina A&amp;T State University</td>
<td><a href="mailto:aacarrel@ncsu.edu">aacarrel@ncsu.edu</a></td>
</tr>
<tr>
<td>Ms. Ana Cram</td>
<td>Doctoral Student</td>
<td>The University of Texas at El Paso</td>
<td><a href="mailto:accram@miners.utep.edu">accram@miners.utep.edu</a></td>
</tr>
<tr>
<td>Dr. Andrew Gordon</td>
<td>Diversity Abroad Network CEO &amp; Founder</td>
<td>Diversity Abroad Network</td>
<td><a href="mailto:aigordon@diversityabroad.org">aigordon@diversityabroad.org</a></td>
</tr>
<tr>
<td>Dr. Andrew Nyblade</td>
<td>Professor of Geosciences</td>
<td>Penn State University</td>
<td><a href="mailto:aan2@psu.edu">aan2@psu.edu</a></td>
</tr>
<tr>
<td>Dr. Araceli Partearroyo</td>
<td>Senior Academic Affairs Specialist U.S. Embassy</td>
<td></td>
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<tr>
<td>Mr. Arturo Barrio</td>
<td>Special Assistant to the President for Mexico &amp; Latin America</td>
<td>The University of Texas at El Paso</td>
<td><a href="mailto:abario@utep.edu">abario@utep.edu</a></td>
</tr>
<tr>
<td>Dr. Bertha Susana Vegas</td>
<td>Vicerrectora Academica</td>
<td>Universidad de Piura, Peru</td>
<td><a href="mailto:susana.vegas@udep.pe">susana.vegas@udep.pe</a></td>
</tr>
<tr>
<td>Dr. Binod Tiwari</td>
<td>Professor</td>
<td>California State University, Fullerton</td>
<td><a href="mailto:Btiwari@fullerton.edu">Btiwari@fullerton.edu</a></td>
</tr>
<tr>
<td>Mr. Brandon Lewis</td>
<td>MS Student</td>
<td>North Carolina A&amp;T State University</td>
<td><a href="mailto:bmlewis5@ncsu.edu">bmlewis5@ncsu.edu</a></td>
</tr>
<tr>
<td>Dr. Carlos Ferregut</td>
<td>Department Chair Civil Engineering</td>
<td>The University of Texas at El Paso</td>
<td><a href="mailto:ferregut@utep.edu">ferregut@utep.edu</a></td>
</tr>
<tr>
<td>Ms. Claudia Camacho</td>
<td>Chief, Labor and Employment Section</td>
<td>Department of Human Development, Education and Employment Organization of American States</td>
<td>MCamachom.org</td>
</tr>
<tr>
<td>Dr. Connie Gomez</td>
<td>Engineering Faculty</td>
<td>San Jacinto College</td>
<td><a href="mailto:connie.gomez@sjcd.edu">connie.gomez@sjcd.edu</a></td>
</tr>
<tr>
<td>Ms. Danielle Gilliam</td>
<td>Strategic Projects Officer</td>
<td>University of New Mexico</td>
<td><a href="mailto:dgilliam@unm.edu">dgilliam@unm.edu</a></td>
</tr>
<tr>
<td>Dr. Delia Valles</td>
<td>Associate Professor</td>
<td>Industrial Engineering Department New Mexico State University</td>
<td><a href="mailto:dvalles@nmsu.edu">dvalles@nmsu.edu</a></td>
</tr>
<tr>
<td>Ms. Denise Yates</td>
<td>Director for Programs, Site Coordinator and Director NSF</td>
<td>LSAMP Bridge to the Doctorate Co-PI LSAMP NSF International Center of Excellence</td>
<td></td>
</tr>
<tr>
<td>Dr. Eduardo Nicolau</td>
<td>Assistant Professor</td>
<td>Department of Chemistry University of Puerto Rico – Rio Piedras</td>
<td><a href="mailto:eduardo.nicolau@upr.edu">eduardo.nicolau@upr.edu</a></td>
</tr>
<tr>
<td>Dr. Edward Lungu</td>
<td>Deputy Vice-Chancellor</td>
<td>Botswana International University of Science &amp; Technology</td>
<td><a href="mailto:lungue@biust.ac.bw">lungue@biust.ac.bw</a></td>
</tr>
<tr>
<td>Dr. Firew Tegegne Amogne</td>
<td>President</td>
<td>Bahir Dar University</td>
<td><a href="mailto:firewtegegne@yahoo.co.uk">firewtegegne@yahoo.co.uk</a></td>
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<tr>
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<td>Position/Program</td>
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<tr>
<td>Dr. Gary Edens</td>
<td>Vice President for Student Affairs, The University of Texas at El Paso</td>
<td><a href="mailto:gedens@utep.edu">gedens@utep.edu</a></td>
<td></td>
</tr>
<tr>
<td>Ms. Hazel Blackmore</td>
<td>Executive Director, COMEXUS</td>
<td><a href="mailto:hazel.blackmore@comexus.org.mx">hazel.blackmore@comexus.org.mx</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Idalia Ramos</td>
<td>Professor of Physics and Electronics, PREM Program Director, University of Puerto Rico-Humacao</td>
<td><a href="mailto:idalia.ramos@upr.edu">idalia.ramos@upr.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Isaac Azuz-Adeath</td>
<td>Research Coordinator, CETYS University System</td>
<td><a href="mailto:isaac.azuz@cetys.mx">isaac.azuz@cetys.mx</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Jose Espíritu</td>
<td>Associate Professor, Industrial, Manufacturing &amp; Systems Engineering, The University of Texas at El Paso</td>
<td><a href="mailto:jfespiritut@utep.edu">jfespiritut@utep.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Lucy Okumu</td>
<td>Director of International Programs, King Abdullah University of Science and Technology (KAUST)</td>
<td><a href="mailto:lucy.okumu@kaust.edu.sa">lucy.okumu@kaust.edu.sa</a></td>
<td></td>
</tr>
<tr>
<td>Mr. Luis Ramirez</td>
<td>UTEP Alumnus, Operations Research Analyst, NAVAIR</td>
<td><a href="mailto:luis.e.ramirez@navy.mil">luis.e.ramirez@navy.mil</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Lynn Rathbun</td>
<td>Senior Research Associate, IRES PI, Cornell University</td>
<td><a href="mailto:lcr2@cornell.edu">lcr2@cornell.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Pavel Hrubeš</td>
<td>Dean, Czech Technical University in Prague</td>
<td><a href="mailto:hrubes@fd.cvut.cz">hrubes@fd.cvut.cz</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Robb Winter</td>
<td>Department Head and Professor of Chemical and Biological Engineering, South Dakota School of Mines</td>
<td><a href="mailto:robb.winter@sdsmt.edu">robb.winter@sdsmt.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Sekazi Mtingwa</td>
<td>Retired Professor of Physics, North Carolina A&amp;T State University TriSEED Consultants LLC</td>
<td><a href="mailto:sekazi.mtingwa@gmail.com">sekazi.mtingwa@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Solomon Bililign</td>
<td>Professor Department of Physics, Director, NOAA-ISET Center, NSF PIRE co-PI, 2011 PAESMEM Awardee, North Carolina AT&amp;T State University</td>
<td><a href="mailto:bililign@ncat.edu">bililign@ncat.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Steve Dupuis</td>
<td>Director, Indigenous Math &amp; Science Institute, Salish Kootenai College</td>
<td><a href="mailto:steve_dupuis@skc.edu">steve_dupuis@skc.edu</a></td>
<td></td>
</tr>
<tr>
<td>Dr. Victor Larios</td>
<td>Full Professor &amp; Director of the Smart Cities Innovation Center, CUCEA Universidad de Guadalajara</td>
<td><a href="mailto:victor.larios@academicos.udg.mx">victor.larios@academicos.udg.mx</a></td>
<td></td>
</tr>
<tr>
<td>Ms. Zetra Wheeler</td>
<td>Program Manager, Salish Kootenai College</td>
<td><a href="mailto:zetra_wheeler@skc.edu">zetra_wheeler@skc.edu</a></td>
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Appendices I-IV

Resources to Learn from or Borrow
Appendix I

Professional societies and organizations which can be reached out to promote research abroad programs to URMs

- National Society of Black Engineers (NSBE): https://nsbe.org/home.aspx
- Society of Hispanic Professional Engineering (SHPE): https://www.shpe.org/
- Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS): https://www.sacnas.org/
- The Council on Undergraduate Research: https://www.cur.org/
- Rutgers Center for Minority Serving Institutions: https://cmsi.gse.rutgers.edu/
- Computing Alliance of Hispanic-Serving Institutions (CAHSI): https://cahsi.utep.edu/
- Center for Minorities and People with Disabilities in IT (CMD-IT): http://www.cmd-it.org/
- The Kapor Center: https://www.kaporcenter.org/
- TechLatino: Latinos in Information Sciences and Technology Association: https://techlatino.org/
- Anita Borg Institute for Women and Technology: https://anitab.org/
- Association for Women in Science (AWIS): https://www.awis.org/
- Grace Hopper Celebration Conference: https://ghc.anitab.org/
- Society of Mexican American Engineers and Scientists: https://mymaes.org/
Appendix II

List of organizations who provide scholarships to study abroad, with a special focus on URMs

- **The Fund for Education Abroad (FEA)**, provides scholarships of up to $10,000 for students from traditionally underrepresented groups. Most FEA scholars are first-generation, minority, community-college, LGBTQ, or returning adult students ([https://fundforeducationabroad.org](https://fundforeducationabroad.org)).

- **The German Federal Foreign Office**, offers the Research Internships in Science and Engineering (RISE) to undergraduate students from North America, British and Irish universities to complete a summer research internship at top German universities and research institutions. About 300 scholarships are available each year. ([https://blog.daad.de/rise/en/](https://blog.daad.de/rise/en/))

- **The U.S. Department of State’s Benjamin A. Gilman International Scholarship** is a grant program that enables students of limited financial means to study or intern abroad. The program has been successful in supporting URMs who have been historically underrepresented in education abroad. Over 3,600 scholarships of up to $5,000 were awarded in AY 2018/19. ([https://www.gilmanscholarship.org/program/program-overview/](https://www.gilmanscholarship.org/program/program-overview/))

- **The Frederick Douglass Global Fellowship**, aims to make study abroad accessible to students from Minority Serving Institutions (MSIs). Recipients receive 100% tuition and travel costs for an intensive 4-week, 3-credit summer study abroad program. Ten scholarships are awarded annually based on a combination of financial need, academic achievement, and nominations from students’ MSI senior leadership. ([https://www.ciee.org/go-abroad/college-study-abroad/scholarships/frederick-douglass-global-fellowship](https://www.ciee.org/go-abroad/college-study-abroad/scholarships/frederick-douglass-global-fellowship))

- **Hispanic Association of Colleges & Universities (HACU) Study Abroad Scholarship**: HACU has a number of affiliations that can help Hispanic and Latino students find financial aid to study abroad. HACU works with the American Institute for Foreign Study (AIFS), to help select Hispanic students study abroad by offering up to 50% off tuition. ([https://www.hacu.net/hacu/200611_MOUs_for_Study_Abroad.aspx](https://www.hacu.net/hacu/200611_MOUs_for_Study_Abroad.aspx))

- **American Institute for Foreign Study (AIFS)**. Provides financial assistance to support study abroad. AIFS funding, combined with other sources of financial support that the student can access, helps study abroad attainable, especially for URMs. There are several scholarship opportunities listed in their website. ([https://www.aifsabroad.com/financial-aid/](https://www.aifsabroad.com/financial-aid/))

- **National Association for Equal Opportunity in Higher Education (NAFEO) Scholarship**: AIFS collaborates with NAFEO to provide scholarships for outstanding students at Historically Black Colleges and Universities (HBCUs), the scholarship covers 50% of the AIFS all-inclusive program fee for qualifying students of color who attend a Historically Black College or University (HBCU), or a Predominantly Black Institution (PBI). ([http://www.nafeonation.org/](http://www.nafeonation.org/))

- **IFSA Diversity Scholarship**: Offered in collaboration with FEA, the IFSA Diversity Scholarship is intended for students with high financial need and/or students from traditionally underrepresented groups, such as first generation college students or minority students. The scholarship is valued up to $10,000 for year-long study, $5,000 for semester, and $1,250 for summer. ([https://www.ifsa-butler.org/scholarships/](https://www.ifsa-butler.org/scholarships/))
• **IES Study Abroad Scholarships:** offers different scholarship options and grants for study abroad. Their need-based, diversity and disability scholarships help make studying abroad more accessible to disadvantaged communities and minorities. [https://www.iesabroad.org/scholarships-aid](https://www.iesabroad.org/scholarships-aid)

• **Diversity Abroad:** Provides a tool to search for scholarship available to non-traditional study abroad students. Economically disadvantaged students, African-American, Asian-American, Hispanic/Latino, and Native American students are strongly encouraged to apply, as well as first-from-family college students. [https://www.diversityabroad.com/](https://www.diversityabroad.com/)
Appendix III

Institutional tools and resources

The Global Perspective Inventory (GPI) is a web-based assessment of individual experiences and three dimensions global learning (i.e., cognitive, intrapersonal, and interpersonal). The GPI is reliable and valid instrument that is beneficial for those involved with program assessment and institutional improvement initiatives. http://www.gpi.hs.iastate.edu/

USA Study Abroad offers a free Online Course (MOOC) to any higher education administrator who wants to learn how to build and grow a study abroad program at their institution. https://studyabroad.state.gov/value-study-abroad/highlights-and-activities/virtual-resources-study-abroad. Additional opportunities offered by the U.S. government and by foreign governments can be found here https://studyabroad.state.gov/study-abroad/resources/resources-

The Forum on Education Abroad’s Standards of Good Practice for Education Abroad (6th ed., 2020) is a commonly-developed and accepted set of standards, which can be used by institutions to provide a framework for accountability. Link: https://forumea.org/resources/standards-6th-edition/

Additional resources can be found in the following reports:


Some Funding Agencies that can Support Your Study & Research Abroad Efforts:

- National Science Foundation (NSF) - NSF Office of International Science and Engineering
- The United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA)
- Partners of the Americas - 100K Strong in the Americas Program
- U.S. Agency for International Development (USAID)
- U.S. Department of Education
- Department of Energy
- National Institutes of Health
Appendix IV

Funding organizations that provide support for globally-focused research initiatives

- Bill and Melinda Gates Foundation. [https://www.gatesfoundation.org/](https://www.gatesfoundation.org/)
- Bioversity International Fellowship Program. [https://www.bioversityinternational.org/](https://www.bioversityinternational.org/)
- Burroughs Wellcome Fund. [https://www.bwfund.org/](https://www.bwfund.org/)
- Carnegie Corporation. [https://www.carnegie.org/](https://www.carnegie.org/)
- EarthWatch Institute. [https://earthwatch.org/](https://earthwatch.org/)
- Fulbright Scholar Program. [https://www.cies.org/](https://www.cies.org/)
- Humboldt Foundation. [https://www.humboldt-foundation.de/web/home.html](https://www.humboldt-foundation.de/web/home.html)
- Marie Curie Actions Research Fellowship Programme. [https://ec.europa.eu/research/mariecurieactions/](https://ec.europa.eu/research/mariecurieactions/)
- Rockefeller Foundation. [https://www.rockefellerfoundation.org/](https://www.rockefellerfoundation.org/)
References:


End of report