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International Research for Undergraduate Students in Cali and Cartagena Colombia, 2009 TO 2019

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INTERNATIONAL RESEARCH FOR UNDERGRADUATE STUDENTS IN CALI AND CARTAGENA COLOMBIA

Abstract
The integration of a Study Abroad/International Research internship at the undergraduate and graduate level is increasingly being seen as a critical contributor towards the development of a globally competent scientific and engineering workforce. In the past twelve years (2008 - 2019) over 250 students (primarily GlobalCUNY students) participated in research experiences in over 30 different countries. Programming began with students participating in Sweden in 2008, followed by Colombia in 2009, Austria in 2010, the Netherlands in 2010, Brazil in 2013, Morocco in 2015, China in 2017 and Japan in 2018. Students conducted research in the areas of Material Science, Economics, Water Quality, Environmental Science, Public Health, Biodiversity, Neuroscience, Transportation, Biochemistry, Chemistry, Civil Engineering, Chemical Engineering, Electrical Engineering and Ethno-Botany. From 2009 until the onset of the covid-19 pandemic, a total of sixty-one US students participated in the Colombia based programs, with twenty in Cali at Uni Del Valle and forty-one in Cartagena at Uni Cartagena and University of San Buenaventura Cartagena. The paper will cover the inception and development of both project sites, the different approaches to Global Engagement, the best practices, outcomes, program duplication, career outcomes of participants, and post covid-19 opportunities.

Introduction - U.S. Students Studying Abroad

The integration of a Study Abroad/International Research internship at the undergraduate and graduate level is increasingly being seen as a critical contributor towards the development of a globally competent scientific and engineering workforce. The Open Doors report published by the Institute of International Education, the leading not-for-profit educational and cultural exchange organization in the United States has shown that over the decade pre covid-19 there was a steady increase from 273,996 students participating in Study Abroad in 2010/2011 to 347,099 in 2018/2019, a 27% increase in the number of US studying abroad. The percentage of STEM students have also increased over that period from 19.0% in 2010/2011 to 26.8% in 2018/2019. All minority students and STEM students accounted for 28% and 25% respectively, in 2015/2016, and increased to 30.9% pre pandemic [1]. The 2023 Open Doors report has also shown that the areas of growth and reimagining of International Research, given the 91% reduction in participation (from 347099 in 2018/19 to 14,549 in 2020/21). This gain was followed by a rebound to 188,753 in 2021/22, an increase of close to 1200% and a nearly 13-fold increase over the previous year. The importance and benefits of STEM students having an international experience has been well documented [2]. Additionally, higher education is moving forward with embracing the concept of educating engineers as a global citizen [3, 4].

High Impact Practices (HIPs) have been shown to be effective in retention, persistence, and overall student success [5-10]. These practices include activities such as undergraduate research, service learning, experiential learning opportunities, internships, study abroad, collaborative projects and writing intensive courses. However, all do not have the same impact and these activities have been found to be very beneficial for underrepresented students. Institutional resources, curriculums and student body demographics limit the effectiveness of the activities and combinations of HIPs or a focus on a few may be more effective than others [11-15].

Table 1: US Study Abroad Participation Covid-19 Impact

	2018/2019	2020/2021	2021/2022
White	68.7%	68.3%	68.6%
Asian, Native Hawaiian	8.9%	10.0%	8.6%
Black or African American	6.4%	4.1%	5.3%
Hispanic or Latino	10.9%	12.3%	11.9%
Multiracial	4.7%	4.9%	5.3%
MINORITY	30.9%	31.3%	31.1%
Women	67.3	65.9%	68.7%
Men	32.7%	34%	31.1%
STEM	26.8%	29.2%	25.6
Business and Management	20.7%	17.3%	20.8
Social Sciences	17%	17.2%	17.6
Other Fields	6.8%	8.8%	7.6
Foreign Languages/International Studies	6.9%	8.8%	7.0
TOTAL Number of US Students	347,099	14,549	188,753

The move to internationalize campuses is a priority for many universities and the forms taken vary widely [16]. One curriculum approach by Worcester Polytechnic Institute (WPI), integrated it into the senior design project [17]. Highly resourced institutions have established International Branch Campuses (IBCs) that may even integrate this activity in the Bridge Programs for entering freshmen, allowing students to spend their freshman year abroad [18]. Others may prioritize the presence of international students studying on the campus. This approach is now rebounding post-covid [1].

Programs modeled after the National Science Foundation (NSF) Research Experience for Undergraduates (REU) have been in existence for several years and allow undergraduate students to participate in cutting edge research. Such programs are tightly linked/focused in a research area [20]. Activities in the program may include professional development, career guidance, GRE preparation, and culturally enriching activities. International based REU programs have also been under the International Research Experience for Undergraduate Students (IRES).

Some minority STEM focused programs have been integrating international research experience in their programming over the last two decades [21-23]. Assessing the impact of the experience by educators attempt to measure the long-term impact of these experiences and influence on degree attainment and career trajectories. The results have been positive and point to a greater challenge of scale: increasing the number of students who consider participating in these programs.

The abovementioned programs are not faculty led programs. Faculty led programs are the leading vehicle that students utilize to integrate an international experience in their studies [1]. This approach is not limited to undergraduate students [24, 25]. Short term field campaigns/studies with graduate students have also been done as well as ones for undergraduates at lower academic levels [26]. A recent study emphasized the importance of the program design

and elements such as language, duration, and number of students in influencing the outcome of the experience. This is relevant to the study presented here as the stay is on average four weeks versus the eight-week program presented here [27].

The emphasis on STEM graduates developing global competencies is a central piece of the internationalization efforts underway at many campuses. With the international experience (varied duration) playing a central role, focusing on cost and the use of remote components are two direct components. The availability of financial support is an important factor for students and is critical in democratizing the study abroad experience. Remote and virtual internships post-covid is now seen as an approach that could increase the interest in participation in addition to decreasing the cost [28-30].

GlobalCUNY (GC)

The NYC Louis Stokes Alliance (NYC LSAMP) at the City University of New York has, since its inception in November 1992, been at the forefront of a concentrated effort to substantially increase the number of underrepresented minority students who pursue and graduate with Baccalaureate Degrees in Science, Technology, Engineering and Mathematics (STEM). Since its inception in November 1992, over 18,000 baccalaureate degrees have been awarded to underrepresented minority students at CUNY. The NYC Louis Stokes Alliance committed in 2008 to making the International Research (IR) Experience an important component of the High Impact undergraduate activities NYC Alliance participants engage in, and GlobalCUNY (GC) was inaugurated in 2009 [31].

GlobalCUNY builds on the Collaborative Infrastructure at CUNY of the NYC LSAMP [32-39]. The capacity building program focused on increasing the number of STEM majors going abroad for an international research experience directly linked to the mission of GlobalCUNY [40-44]. GlobalCUNY works 1) collaboratively with the Study Abroad/International Research Offices at CUNY and partner sites, 2) provides focused informational and workshop support on Study Abroad to member students, 3) seeks to increase the number of faculty led Study Abroad offerings in STEM, 4) Builds on the modest success of the GlobalCUNY in integrating an International Research Experience into STEM training, and 5) increase the number of students participating in Study Abroad before graduation from project partner sites.

In the past twelve years (2008 - 2019) over 250 students participated in research experiences in over 30 different countries. Programming began with students participating in Sweden in 2008, followed by Colombia in 2009, Austria in 2010, the Netherlands in 2010, Brazil in 2013, Morocco in 2015, China in 2017 and Japan in 2018. Students conducted research in the areas of Material Science, Economics, Water Quality, Environmental Science, Public Health, Biodiversity, Neuroscience, Transportation, Biochemistry, Chemistry, Civil Engineering, Chemical Engineering, Electrical Engineering and Ethno-Botany.

The paper describes the inception and development of the Colombia based programs, in Cali at Uni Del Valle and in Cartagena at Uni Cartagena and University of San Buenaventura. The best practices, outcomes, program duplication, career outcomes of participants, and post covid-19 modifications will be presented. Both project sites required different approaches to Global Engagement.

GlobalCUNY Site Programs

A summary of GlobalCUNY research sites with universities can be seen in Table 1, below. Previous publications on International Research (IR) for underrepresented minority students in Sweden, the Netherlands, and Austria provided detailed description of the university sites research facilities and activities [41]. From inception to the start of the pandemic, 25 students were hosted at TU Graz/Uni Graz and 12 were the recipients of the Marshall Plan scholarship. From 2008 to present, 32 students have participated in research at KTH in Sweden. In the Netherlands, from 2010-2019, 21 students were hosted at the Maastricht University. During the period, a total of seventy-four students participated from 2008 to 2018 in programs based in Sweden, the Netherlands and Austria, twenty-five in Brazil based programs [44], and over twenty in Morocco. All programs were modeled after the REU programs funded by the NSF.

Toyohashi, Japan - At Toyohashi University of Technology (TUT) research projects for students will include areas such as Chemistry, Mechanical Engineering, Computer Science, Biomedical Science/Engineering, Material Science and Nanotechnology.

Beijing, China - A partnership with the departments/faculty at Beijing University of Chemical Technology (BUCT) for selected students to develop and/or work on existing STEM research projects. The summer program also provides cultural experience for the participating students. The areas of research are within the Chemical Sciences focusing on Environmental, Biomedical Science/Engineering, Biochemistry, Material Science and Nanotechnology, Catalysis and Synthesis.

Bahia, Brazil - Partners include the Philadelphia Louis Stokes Alliance program, the State University of Feira de Santana (UEFS) and the Federal University of the Recôncavo Baiano (UFRB). The summer research activities included language instruction, fieldwork, and laboratory work, participating in ongoing projects involving microbiology (fungi), environmental monitoring of heavy metals and water quality, molecular biology, biodiversity and transportation [44].

Casablanca/ Meknes, Morocco - The GlobalCUNY /CSTEP-Moroccan research initiative give students the opportunity to conduct research in Morocco. At the Agropole of Mekness, students engage in Ethno-botany research, a study that involves the isolation and characterization of novel compounds from indigenous plants in Morocco. At Shiekh Khalifa hospital in Casablanca, students perform research in cytogenetics and cancer research.

From 2009 until the onset of the Covid-19 pandemic, a total of sixty-four US students participated in the Colombia based programs, with 23 in Cali at Uni Del Valle and 41 in Cartagena at Uni Cartagena and University of San Buenaventura Cartagena. In Cartagena, the project objective was focused on Environmental Monitoring of water, soil, and aquatic food systems. The research work is conducted with students from the University of Cartagena, the Universidad de San Buenaventura-Cartagena, the Fundación Universitaria Tecnológico Comfenalco in collaboration with the ProBoquilla and the Serena Del Mar Non-Governmental Organizations. Projects in Cali at Uni Del Valle included Water and Sanitation with CINARA, Civil Engineering, Electrical Engineering, Economics, Chemistry/Biochemistry (synthesis and spectroscopy), Sustainable Development, Entomology and Public Health with Instituto de

Investigación y Desarrollo en la Prevención de la Violencia y Promoción de la Convivencia Social.

Program Models for International Experiences

Study abroad courses that are faculty led and short term are seen as one of the major vehicles for students to integrate an international experience in their curriculum. The opposite is true for the GlobalCUNY model, which consists of eight weeks or more of a research experience modeled after the traditional REU programs. In earlier work, several essential operational elements were identified in the programming [43]. In the Colombia based programming, a site coordinator who serves as a liaison to the host site's international office is key. This role is sometimes filled by a graduate student who may also be conducting research with a host faculty. The international office is also crucial in securing housing and GlobalCUNY works with the host international office to attain smooth program operation and communication with the program office in the US. Financial support via the NSF stipend is crucial for the students being allowed to participate and defray the cost of participating. The award is in keeping with other NSF programs such as the International Experience for Students (IRES). In another case, the language element in the Brazil programming is not present in the programs in Colombia, whereas no graduate participation is seen in Brazil. A summary of the program elements at each university site/Latin America is shown in Table 2.

Table 2: Program Elements at International Research sites in Latin America

Program Elements	Uni Valle	UC/USB-Cartagena	UEFS/UFRB
Site Coordinator	x	x	-
"INSTITUTION" Faculty Led	-	-	-
International Office	x	x	x
Reciprocal Program	-	-	-
Laboratory Bench Fee	-	x	-
University Support	-	x	-
Student Exchange Agreement or MOU	-	-	-
NSF Support	x	x	x
Fellowship funding	-	-	-
Undergraduate participation	x	x	x
Community College Participation	x	x	-
Graduate participation	x	x	-
Language Program	-	-	x
NGO	x	**x**	-

UC=University of Cartagena, USB= University of San Buenaventura
UFRB= Federal University of Reconcovo Bahia
UEFS=State University of Fiera de Santana

In Colombia, the two cities and universities differ in many aspects. Cali is in the southwest in the Cauca department with a population of more than 2.25M. Cartagena is on the Caribbean coast in

the department of Bolivar and has a population of 1.025M. Both cities vary in poverty levels, economy, and culture. Universidad San Buenaventura-Cartagena is Colombian Catholic-private institution, Universidad Tecnologica de Bolivar is a Colombian private institution. and Universidad de Cartagena is a Colombian-public institution as is Uni Del Valle.

All universities/colleges were in varied states of development of a globalization or internationalization program and Cartagena and Cali were not leading destinations for US Study Abroad students in 2009. As is the case presently, Europe is the destination for most US Study Abroad students.

Summary of International Research Program
Eight-to-ten-week research program

- Cultural experience for the participating students (varied)
- First week of June and ends in the mid-August.
- Students conduct research full time at the international research site (Monday to Friday, 9am to 5pm).
- Students Participate in group/lab activities and seminars.
- Students submit Weekly Research reports to GlobalCUNY
- Standard Research Paper (reports submitted before 12AM Sunday night)
- The LSAMP Office/Program Coordinator or Executive Director will communicate with mentor (Mid-Summer review).
- Skype/Zoom (virtual) meetings will be conducted as required with GlobalCUNY
- Students present a Final PowerPoint presentation (poster session) to research groups at the international research site.
- Students submit a Final Research Report to GlobalCUNY by the end of August on return to the US.

Selection and Pre-Departure Preparation
Both US undergraduate and graduate students are selected by the Alliance Executive Director in collaboration, with the site coordinator, former student participant, and collaborating GlobalCUNY partners. Students apply, and a match is made based on their experience, site/project choice.

Four pre-departure meetings are held for students selected to participate. A total of 20 hours will serve to prepare students for the IR experience, educate students on the host institution, research, as well as operations. Topics to be covered included: required program documents, departure/return dates, research projects, weekly reports, Skype/Zoom meetings, housing and travel, ticket purchases, housing payment process, visas, administrative/program structure, international office at host site, communication, banking and currency, health insurance, emergency procedures and presentations/discussions with previous IR program participants.

Alums of the program are invited to make presentations, discuss their experiences, and provide the students with best practices that worked for them when they participated.
A manual was developed for the Cartagena based project and is regularly updated. Adherence to the country, state, city, and college/university regulations is always emphasized.

Cartagena Based Project
This project was part of an international research project to monitor the environmental quality of historically known fish/beach ecosystems in Cartagena, Colombia [40]. The environmental research and the data analysis for this project took place at Universidad San Buenaventura-Cartagena and at the University of Cartagena, Colombia. The requirements of the environmental research were conducted by students collaborating in teams from US institutions and Colombian institutions in Cartagena. The project consisted of students writing weekly research reports, cultural reports, and individual research reports. Students tested parameters relating to environmental quality such as pH, phosphate, iron, sulfate, nitrate, and fecal coliform. Sample collection was taken from public beaches in Cartagena (Boquilla, Boca Grande, Playa Blanca and Manzanillo) and from three rural underdeveloped communities Tierra Baja, Puerto Rey, and Zapatero [40]. The research project required students to work together in a group from multidisciplinary backgrounds. The Cartagena group met Mondays through Saturdays for eight weeks, eight hours a day, and Saturdays for three hours a day working with an NGO in Boquilla and Manzanillo. Participant students were enrolled in Private, private Catholic, Public, HBCU, and HSI.

Cali Colombia Projects
Participants in 2012 and 2013 focused on research being conducted by Instituto de Investigación y Desarrollo en Abastecimiento de Agua, Saneamiento Ambiental y Conservación del Recurso Hídrico (CINARA). CINARA is a research and development institution based at the Faculty of Engineering at Universidad del Valle in Cali, Colombia. The institute is widely recognized within the water supply and environmental sanitation sector in Colombia, as well as in other Latin America countries, mainly from the Andean and Central America regions.

- Evaluation of ecosystem services in 3 watersheds in Valle del Cauca
- Evaluation of 20 wastewater treatment plants (WWTP)
- Evaluation of sludge produced by industrial WWTP
- Evaluation of health risks produce by contaminants in the Cauca River
- Evaluation of pesticides use in Valle del Cauca.

From 2015-2019, other projects included Civil Engineering (Structures and Transportation), Electrical Engineering, Mechanical Engineering, Economics, Chemistry/Biochemistry (synthesis and spectroscopy), Sustainable Development, Entomology and Public Health with CISALVA (an institute focused on Public Health).

Lessons Learned/Best Practices
A stand-alone International Relations Office was not present in 2009 at both Colombia institutions. Each, however, had a Coordinator that reported to a Senior Director, Dean or Vice Chancellor. Given the differences in the institutions, a one-size-fits-all approach in the partnership was not utilized. The partners were very instrumental in assisting with safety, housing, transportation, and cultural components of the experience.

Table 3: Listing of Research Projects by GlobalCUNY Participants

Project Titles University Del Valle
Employment and Education Demographic Study of Major Cities in Colombia
Walking Bridge Stability And Modelling
Assay Development For Water Testing
Deriving A Diffusion Coefficient Of N-Hexane Nitrobenzene Binary Mixture Using Spatially Selective NMR Spectroscopy Techniques
Synthesis Of Polymer Gels To Be Used In NMR Research And Improving The RDC Algorithm Using Python.
Sun-Induced Chlorophyll Fluorescence Measurements
Incorporating Treated Wastewater For The Cultivation Of Sugar Cane Crops
Neurological Effects of Arboviruses: Dengue, Chikungunya and Zika
Stabilization Mechanism for a Water Rocket
The Effect of Photon Intensity on Differentiating Avian Species Using UV-NIR Spectroscopy
Mechanism of Environmental Restoration and Conservation an Approach to Sustainability
Bridge Health Monitoring System
Using R to Compile an Aggregated Data Analysis Report on Cisalva Institute´s Ondas Project
Relationship between two Blood Metabolic Products, Body Condition and Ectoparasitism Infestation in Birds of an Urban Area in Universidad del Valle (Cali), Colombia

At most universities, Study Abroad courses that are faculty led, and short term as well as Summer Sessions/Schools Abroad, are seen as one of the major vehicles for students to integrate an international experience in their curriculum [1]. The NYC LSAMP model (surveyed across program sites), modeled after the traditional Research Experience for Undergraduates (REU) programs identified fourteen core elements of the programing that contribute to the success of the programming for each site [43]. In Colombia, the partners were very instrumental in assisting with safety, housing, transportation, and cultural components of the experience. The on-site coordinator is critical in making the link between the NYC LSAMP/GC program and institutions. All were bilingual and were housed in the same location as the students. As the program in Cartagena involved the management of both Colombian and American students, fluency in Spanish and English was mandated for the coordinator. All site coordinators were graduate students, or in one case a recent doctoral graduate. Two site coordinators from the Colombia sites have completed doctoral degrees, and one is currently pursuing a doctoral degree. Five have completed master's degrees and two have faculty appointments.

Program Participants and Student Outcomes

In total, 92 students participated in programming at both Colombian sites. Students participating in the Cartagena based program worked in a group model whereas in Cali, students were paired with an individual research supervisor/mentor.

Of the total participants 75% were at the Cartagena site where a group model was used in the project. At this site 40% of the participants were Colombian students and non-CUNY US based

students comprised 22% of the participants. Non-CUNY US based students comprised 37% of the US students participating (Table 4).

Of participants across both programs, 45% were male and 55% female. However, the Cali based program had greater gender equity whereas the Cartagena program was 59% female. Students participating in the Cartagena program were immersed in a diverse group setting with participants coming from different countries, colleges, and academic levels [40].

Table 4: Colombia Site Participants

Descriptor	**Cartagena**	**Cali**	**Total**
Project Participants	69	23	92
Colombian Students	28	0	28
US Students	41	23	64
US Non- CUNY Students	15	5	20
CUNY Students	26	19	45
CUNY Male	12	12	24
CUNY Female	14	6	20
Program US Male	17	12	29
Program US Female	24	11	35

We were able to track several of the participants post-participation in the program (Table 5). A total of 7 participants (Colombian and US students) have completed their doctoral degree, 2 the MD with 7 (US students) are still enrolled in doctoral granting programs and 2 in MD programs respectively. Of the US based participating students, 33% of the participants obtained the MS degree and overall, 41% of US based participants earned a graduate degree. The impact is not confined to the US students. Two of the Colombian participants from the Cartagena have received doctoral degrees. More effort is now needed to track the participants from Colombia as well as the US based non-CUNY participants.

Table 5: Colombia Site Participants – Degree Attainment

Descriptor	**Cartagena**	**Cali**	**Total**
US-Completed MS degree	12	9	21
Colombia-Completed MS degree	6	-	6
Completed the MD Degree	2		
Enrolled in the MD program	2		
Completed the Ph.D. degree	5 (2 Colombian and 3US)	2	7
Enrolled in doctoral program	5 US Students	2	7

In total CUNY participants constituted 49% of program participants in Colombia (Table 6). The programming attracted participants from 18 different US based institutions with 10 being CUNY institutions. Students from three colleges, City College, Brooklyn College and Lehman College, accounted for 56% of the participating CUNY students. The partnership with the SUNY Louis Stokes Alliance Program and the Greater Philadelphia Louis Stokes Alliance Program was a successful one. Participants from the two alliances (13) accounted for 20% of US based participants. Students selected to participate were not selected by GlobalCUNY. This decision was made by each alliance with the main guideline that they must have completed at least one

semester of research or participated in an internship. This guideline was not met by most of the non-CUNY community college participants.

Table 6: Colombia Site Participants – Higher Education Institution

Descriptor	Cartagena	Cali	Total
CUNY Participants	26	19	45
SUNY Institutions	6	3	9
Private Institutions	6	2	8
Colleges/Institutions represented	9	10	-
City College participants	9	7	16
Brooklyn College participants	4	1	5
Lehman College participants	3	1	4

In both programs gender balance was maintained, as well as participation from a very diverse pool of institutions, STEM majors along with the participation of community college students (25% of US based participants, Table 7). The previously mentioned indicators are all above the national averages reported in the Open Doors report. SUNY and private institutions participating along with CUNY students (10 different campuses) increased the diversity/inclusivity of both programs. Students at the Cartagena site had a unique experience conducting research in a diverse team based international research environment [42]. Non-CUNY US participants comprised 22% of the participants overall, and 16% of US students were US based graduate students (Table 7).

Table 7: Colombia Site Participants – Academic Level

Descriptor	Cartagena	Cali	Total
Community College Students	12	4	16
CUNY Community College Students	4	1	5
Graduate Students	5	5	10

Opportunities And Models for Expansion Post Covid

We have seen two models for International Research presented that are substantially different and specific to each site working closely with the administrators at the two Colombian sites. The requirements of the environmental research in Cartagena saw mixed collaborating teams from US institutions and Colombian institutions [40 and 42], while the Cali based program used the traditional one-on-one faculty-student model and did not include the mixed team model. The core elements for each follow the standard REU program.

As the cost of participation in Study Abroad/International Research is a major barrier for minority participation, Latin America programs are attractive as they cost about 50% of the European destinations. NYC LSAMP/GC sites (2019 costs were approximately $5000 for Latin America versus $10,000 in Europe). Programs in Latin America/South America represent an opportunity for further expansion of the program sites because of the lower cost. Our work combines in one destination country programming that is inclusive of community college students, maintains gender equity, and is of low cost in comparison to destinations in Europe.

Degree attainment and progress to graduate study is one outcome that is utilized to make assessments of REU and IRES programs. Other indicators include publications, presentations at professional conferences, and securing Graduate Research Fellowships and fellowships such as a Fulbright award. Determining the degree to which the international research experience in Colombia had an impact is ongoing. The results presented here are encouraging as we continue to examine career trajectories and conduct additional studies that move beyond these summative outcomes.

WPI's serves as a model for curriculum integration in internationalization. However, it is a model that will be difficult for a resource poor institution such as CUNY. An analysis of CUNY course offerings has shown over 35 course listings across CUNY for Independent Study in STEM and these mechanisms are not confined to CUNY, they exist at many institutions. Many faculty in STEM do maintain collaborations with international institutions, and some disciplines (such as Ecology and Evolutionary Biology, Environmental Sciences, and the Geosciences), lend themselves to field work internationally in Latin America/South America.

As campuses seek to further their internationalization goals, that may include increasing the participation of students from underrepresented populations, income levels, and include curriculum reforms the balance of High Impact activities, at lower costs will become increasingly important.

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