ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

2017 ASEE International Forum:
Columbus , Ohio Jun 28 Paper ID #20778

Betting on the Progress – Forging a Collaborative Relationship between US and Cuban Engineering Institutions

Dr. Derek Guthrie Williamson, University of Alabama

Dr. Williamson obtained his undergraduate degree in 1990 in Engineering and Public Policy from Washington University in St.Louis. He received his MS (1993) and Ph.D. (1998) degrees in environmental engineering at The University of Texas at Austin. Dr. Williamson joined the faculty of the the Department of Civil, Construction, and Environmental Engineering at The University of Alabama in 1999. He has enjoyed 15 years of a dynamic profession of teaching, research, and service. he now serves as the Director of Undergraduate Programs for his Department.

Dr. Steven Jones, University of Alabama

Steven Jones earned a B.S. degree in civil engineering from Auburn University in 1992. In 1994, he earned an M.S. degree in civil engineering with concentrations in transportation engineering and economics. He holds a Ph.D. in civil engineering from the University of Virginia where he concentrated his education and research on the interaction of transportation and air pollution. His 20 plus years of transportation engineering and planning experience spans both academic and private sector consulting appointments working with government agencies and private land developers to promote balanced transportation/land use connections. He has participated in transportation projects throughout the U.S., Europe and sub-Saharan Africa. He is a charter member of the American Society of Civil Engineers' Transportation and Development Institute (T&DI) and chair of its Public Transportation committee. Steven is an active member of the Transportation Research Board where he recently served on its standing committee on Technology Transfer. Steven is currently the Technology Transfer Director for the USDOT-funded Southeastern Transportation Center and serves on the editorial board of its Journal of Transportation Safety and Security. He also serves on the editorial board of the African Geographic Review and is an Associate Editor for the ASCE Journal of Professional Issues in Engineering Education and Practice. He has authored or co-authored more than 150 technical articles, conferences papers, design manuals, and project reports on a range of transportation topics. Steven currently focuses his professional efforts on transportation issues in developing countries and cultivating international relationships to facilitate collaborative research, education and technology transfer.

Betting on the Progress – Forging a Collaborative Relationship between US and Cuban Engineering Institutions

Relations between the United States and Cuba are changing at an historic rate. U.S. and Cuban engineering institutions are eagerly anticipating future formal relationships. However, many institutional, legal, logistical, communication, and social challenges must be addressed before truly sustainable and mutually beneficial partnerships can emerge. The Universidad Tecnológica de la Habana José Antonio Echeverría (CUJAE) has been a leader in formal relationships with international universities for many years. Building on that infrastructure, the College of Engineering at University of Alabama (UA) has been working since 2012 to build a broad basis of trust and mutual respect to allow both of the US and Cuban institutions to move forward with a number of collaborative programs. To this end, the institutions signed a Memorandum of Understanding (MOU) in the Fall of 2015.

Faculty from UA College of Engineering met with their Cuban partners in Cuba several times between 2012 and 2015 building an understanding over the course of a number of short meetings. During this time, it was decided that a course taught at the Cuban Institution by faculty from both universities would be the best way to start a formal partnership and develop the type of deeper understanding and trust necessary to move forward with other collaborations and exchanges. The first two courses were taught in Cuba in May 2016 with eight U.S. students and two U.S. faculty traveling to the Cuban institution to launch the program.

This paper presents and discusses the emerging partnership between these colleges of engineering. The authors explore the motivations and backgrounds of the individuals, departments, and institutions involved. We discuss how the particular classes were chosen and how their curricula (including roles of different faculty) were developed. The class structure and activities are described and presented. An evaluation of student and faculty assessment of the success, strengths and weaknesses of this first course are discussed.

University Alabama hosted the Cuban faculty in October for one week. During this time, the experience to date was critically examined and future broader interactions between the universities were discussed and will be presented herein, along with a discussion of how personal relationships have been the key to this program's success.

Introduction

The Summer 2016 Issue of ASEE's Prism Magazine contained an article entitled "Back to the Future" discussing the developing opportunities for engineering and science collaboration between the U.S. and Cuba (Mathews 2016). The article argues that the time is right for more collaborations between engineering institutions in both countries. Herein we present a developing program between the University of Alabama (UA), College of Engineering and The Universidad Tecnológica de la Habana José Antonio Echeverría (CUJAE). This program has already resulted in historic progress in the area of collaborative education between the two countries. Two courses were taught by engineering faculty from UA CUJAE on the CUJAE

campus in during May 2016. This collaborative event marks the first formal, official joint U.S./Cuba engineering courses taught since the Revolution in 1959.

Program History

While the first major waypoint on the path of developing a strong, sustainable collaboration occurred in the summer of 2016, years of preparatory work was necessary to reach this point. The University of Alabama has more than a 15-year history of collaboration with The University of Havana. According to leadership at The University of Havana, prior to congressional formalization of the Cuba Trade Embargo (The Blockade) and the collapse of the Soviet Union, multiple U.S. institutions had relationships with The University of Havana. (It is critical to note that The University of Havana has no engineering program.) As Cuba entered the Special period following these economic and political events, many U.S. institutions ended or greatly reduced their formal programs with The University of Havana. The UA College of Arts and Sciences started growing a formal vigorous program with the University of Havana, leading to a Formal Memorandum of Understanding between the two institutions in 2000. The program has been a tremendous success for both institutions leading to dozens of collaborative projects and publications (Curet, Dawdy, and Corzo, 2005; Davis, Brommer, and Diez-Argüelles, 2009; Keegan, 2010) and formal visits of dozens of faculty to/from both campuses, and the formation of a semester long study abroad program supported by a UA faculty in residence in Havana. There have been formal conferences at both institutions where the academic work of several faculty partnerships, under this MOU, have been publically showcased. It is imperative to note, that this collaboration grew out of the College Arts and Sciences and much of the work has been in the area of liberal arts, archeology, and the social and health sciences. Prior to 2012, there was very little engineering involvement and no formal collaborations between the University of Alabama and Cuban engineering institutions.

In 2012, co-author Jones joined a larger group of faculty from University Alabama as part of its visit to The University of Havana. Jones arranged, through the faculty in residence, a meeting with The Director of International Programs Office CUJAE. Professor Jones, a member of the department of civil engineering, had been engaged in a number international education and research efforts in locations around the world for several years. He conducted this first trip as an exploratory trip to determine if CUJAE had interest in collaborating with this U.S. institution. This trip was very illuminating and the following observations were made: (1)CUJAE had a vibrant international program with over 100 collaborative relationships/MOUs with engineering institutions from all over the world, (2) these relationships were for the mutual benefit of both institutions, with Cuban faculty often receiving Ph.D. degrees from these international institutions, (3) the institutions collaborating with CUJAE were in countries representing almost every type of political system, (4) CUJAE had no such relationship with any U.S. institution, and (5) while very desirous of developing a relationship with a U.S. institution, was cautious and stated that any such relationship would have to be developed slowly and planned extensively in order to be approved and viable.

Professor Jones reported his findings to the Dean of the University of Alabama College of Engineering (COE) and was given the full support of the college. About this same time, UA was in the middle of several major initiatives, including growing its undergraduate study abroad

program and its research and graduate education activities. As part of these initiatives, the UA founded its Cuba Center building on its previous success with the University of Havana. Professor Jones was appointed as a member of the Cuba Center Board, representing engineering. Given the context of 2012 (prior to the Obama Administration starting to thaw relations with Cuba), the interest of both institutions in developing a relationship, and these major initiatives of the University of Alabama, Jones continued his efforts to develop a formal sustained program.

Over the next two years, four more visits were made to Cuba and one visit to the University of Alabama by the staff of International Office of CUJAE, as part of a larger conference hosted by the UA Cuba Center. In order to visit CUJAE it was necessary to gain permission of the Cuban Ministry of Education for each U.S. faculty. A specific agenda and purpose of the meeting had to be approved at least 90 days prior to the visit. This process, still in existence today, is simply one of a number of administrative and cultural challenges encountered in the development of this program. It is very important to note that these challenges were not put in place by the involved faculty, and often not even by the institutions, but are part of the larger political context of U.S.-Cuban academic relations. During these brief visits (often only one or two three-hour meetings over the course of a week), several observations were noted: (1) both sides truly desired to develop a formal relationship, (2) the long view must be taken as the time required for development and evolution of such a program became readily apparent, (3) ultimately, faculty and research exchanges and agreements were desired by both sides, (4) a separate memorandum of agreement directly between The University of Alabama and The Universidad Tecnológica de la Habana José Antonio Echeverría was absolutely essential to moving forward.

The visits of U.S. faculty to CUJAE were hosted by the International Office but involved a number of academic disciplines, including civil engineering, mechanical engineering, chemical engineering (academic home of the director of international programs), and social sciences. In these discussions, trust was slowly built, and an understanding of the personal and institutional motivations was developed. Shortly into this process, it became apparent that a U.S. course taught at the CUJAE would be the best next step in evolving this desired program. Co-author Williamson was brought into the discussions in 2014 to help in growing the program and specifically to help in course and assessment planning. In 2014 a general planning and "get-to know each other" meeting was held at CUJAE and involved all of the above academic units. It became apparent that some type of course(s) focusing on transportation engineering, fuels, environmental impact and engineering/social issues were of the most interest to parties present. In the summer of 2015, the MOU was signed and specific course planning began in earnest.

Course Development

While U.S-Cuba relations were changing, political, economic, and institutional realities meant that any collaborative course offering would have to occur in Cuba with U.S. undergraduate students traveling to Cuba with the involved U.S. faculty. The next planning meeting in Fall 2015 defined the scopes and subjects of the classes and defined a role for each of the participants. Assignments and tasks flowed out of this watershed meeting. One course would be an upper division elective in Transportation and Air Quality while the second course would be a social science course looking at the interaction of humans and the environmental through infrastructure in a particular geographic and cultural setting course syllabi are presented in

Figures 1 and 2. Basic logistics were decided. The course would be taught in English to maximize the initial interest for students from UA. Given this, few Cuban faculty felt comfortable leading an entire course in this foreign language. It was, therefore, decided that both courses would be led by UA faculty with select faculty from the two most relevant CUJAE academic units giving specific lectures in English (or with translation) in their areas of expertise. The CUJAE International Programs Office would host the courses and provide a modern classroom, institutional oversight, coordination between various academic programs, translation as needed, and input on cultural activities and field trips. The cultural activities and courses were planned in parallel through multiple emails after the last planning meeting.

The co-authors developed course outlines and shared these with their colleagues in the CUJAE International Programs Office. The outlines and course calendar developed in this way. The first course was to be a 400 Level Transportation and Air Quality Course. Dr. Jones would teach basics of transportation planning in terms of engineering and economic development using concepts from the U.S., Europe, and the developing world. Faculty member Williamson would present basic concepts in air pollution and transportation. Finally a Cuban faculty in mechanical engineering would present air quality modeling and measurements his research groups was performing in Havana and throughout Cuba, and would lead observation field trips into Havana.

The second course was entitled "Society, Technology and the Environment." This course was based on a social science course developed by engineering faculty at UA and previously taught in Pamplona Spain and Tours France. Those courses used the particular geographic locations to focus on current and historical sustainability practices in Europe compared to the U.S. and the impact of cultural values on engineering projects. The course to be offered in Cuba would focus on infrastructure sustainability in a rapidly redeveloping economy, resilience to natural hazards, and comparison to similar practices in the U.S. Williamson led this course with three guest lectures from Cuban Social Science Faculty. The course experience involved multiple cultural activities planned in concert with the International Programs Office.

Planning, Approval, and Recruiting

With the preliminary structure of the courses set, (1) the full plans were submitted to the Cuban Ministry of Education for approval, (2) a UA Study Aboard program was developed and approved and students were recruited, (3) a Canadian travel agent was used to book all travel to and within Cuba.

A study abroad course plan and budget was developed and submitted to both the COE and the Study Abroad Office. The COE approved the program as part of its commitment to offering quality study abroad programs to its undergraduate students. Moreover, the COE funded the faculty travel expenses as a necessary first-step in developing a larger faculty and research relationship with CUJAE. It was recognized that such faculty support would have to be displaced by larger student participation and course tuition over time in order for this study abroad program to be operated in the same sustainable manner as other faculty-led study abroad programs at UA.

Figure 1: CE 491 Transportation and Air Quality Syllabus

CE 491 Transportation and Air Quality

Engineering Elective Credit 3 hours

Instructors

Dr. Steven Jones, Civil Construction and Environmental Engineering (sjones@eng.ua.edu)
Dr. Derek Williamson, Civil, Construction, and Environmental Engineering (dwilliamson@eng.ua.edu)
Dr. XXXX, CUJAE Chemical Engineering

Catalog Description: CE 491 Transportation and Air Quality: Introduction to Urban transportation systems, traffic modeling, urban air quality, vehicle emission estimating, dispersion models, coupling traffic models and dispersion models, assessing impact of transportation emissions

Prerequisites: Chemistry 1 and Statistics 1

Course Objectives:

At the successful completion of this course, the student will be able to:

- Use transportation systems data to perform traffic modeling of a particular vehicle trips
- Evaluate and Assess accuracy of traffic model flow (ADT) and delay estimates
- Quantify Emissions estimates of particular subsample of traffic fleet
- Use dispersion modeling to estimate emissions plume movement and impact areas
- Combine traffic modeling and dispersion modeling to estimate plume concentrations of PM, nox, and vocs

Course Outline:

1.0 Transportation Systems Overview and La Habana Context
2.0 Detailed Transportation Description and Quantitative Assessment
    2.1 Road systems (stationary Infrastructure)
    2.1 Traffic Control
    2.3 Public Transit
    2.4 Formal and Informal multi-modal transit
    2.5 Transportation Safety
    2.6 Transportation role in Economic development
3.0 Computational Modeling of Vehicle trips
4.0 Urban Air Quality Overview and La Habana Context
5.0 Detailed Urban Air Quality Description and Quantitative Assessment
    5.1 Emission Composition from Vehicles
    5.2 The Internal Combustion Engine and Emissions
    5.3 Vehicle operations, engine performance, and emissions
6.0 Introduction to Dispersion Modeling
7.0 Dispersion Modeling of Roadway Emissions
8.0 Combining Traffic pattern modeling, emissions estimation, and Dispersion Modeling
9.0 Developing case study of focused implementation of transportation and air quality model

Course Grading:

Course grades will be based on:

1. Quizzes 20%
2. Weekly Projects 45% (3@15%)
3. Final project and report 25%
4. Participation and Professionalism 10%

Figure 2: Engineering, Society, and Infrastructure Syllabus

GES 225-003 Society, Technology, and the Environment – International Perspectives: CUBA

Behavior Science (SB) Elective; 3 Credit hours

Instructors

Dr. Steven Jones, Civil Construction and Environmental Engineering (sjones@eng.ua.edu)
Dr. Derek Williamson, Civil, Construction, and Environmental Engineering (dwilliamson@eng.ua.edu)
CUJAE Guest Lecturers and trip Leaders TBA

Catalog Description: GES 225 Society, Technology, and the Environment – International Perspectives. SB Core. The focus of this course is the interaction between society, technology, and the environment within the context of a specific geographical region and society outside the U.S.

Prerequisites: None

Course Objectives:

At the successful completion of this course, the student will be able to:

- Discuss the technological, social, political, and engineering issues associated with the geographical region being studied
- Define and give examples of infrastructure and the natural and built/managed environments and how they may impact and be impacted by society
- Summarize and communicate ethical, global and social issues of technology and the environment within the context of the geographical region and society being studied

Course Activities:

In additional to class discussions, the course includes various industrial, cultural, community, and other visits and tours. Students are expected to fully participate in all organized activities and excursions.

Areas of Discussion all support Course Objectives and may include but not be limited to:

1. Cuban Geography, Culture, and History (led by CUJAE Faculty)
2. Caribbean Climate and Infrastructure systems design, materials, and maintenance
3. Transportation systems
4. Energy Systems
5. Sustainability: Energy use, Agricultural systems, Recycling
6. Urban vs rural challenges in sustainability and infrastructure system
7. Comparisons between International Systems (Cuba) and US systems

Course Grading:

Course grades will be based on a series of weekly assignments and projects, web journal entries, group participation, and a culminating course projects:

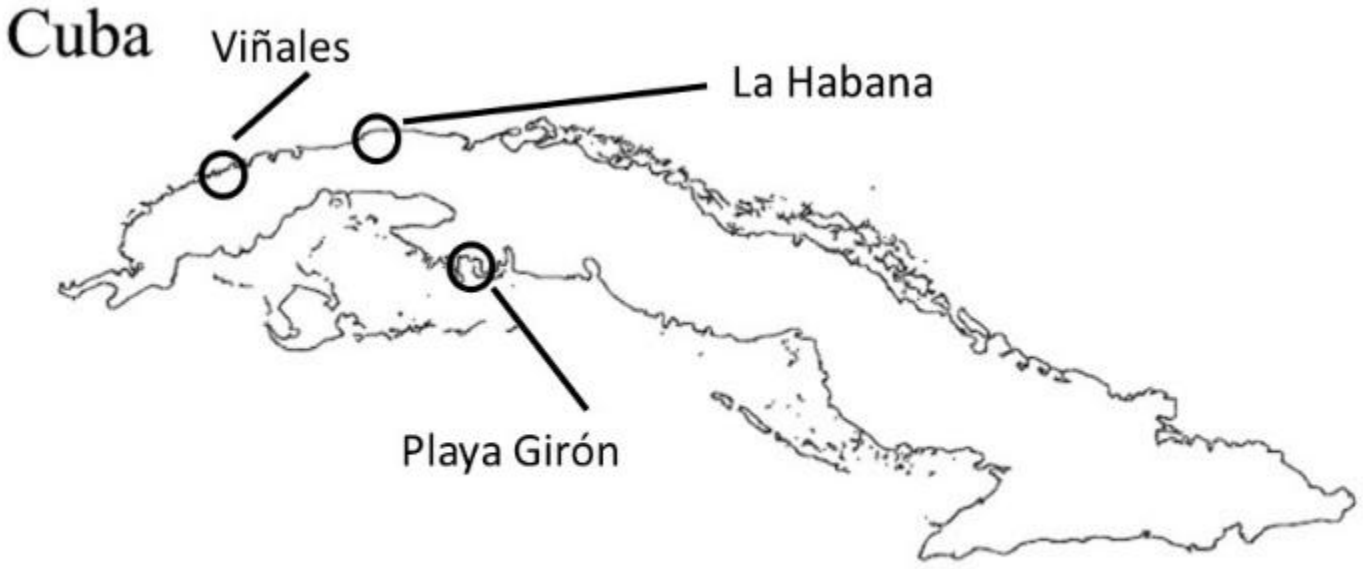
1. Three weekly Projects (10% each): 30%
2. Daily Journaling: 25%
3. Final Group Project (Video and Written Report): 30%
4. Participation in Group Discussions and Professional Behavior while representing UA in Cuba: 15%

With the program approved in August 2015, we started recruiting students through talking to classes, going to student professional society chapter meetings, developing fliers and presentations, and participating in The University of Alabama study abroad recruiting fair. The

time-frame for recruiting for the MAY 2016 three-week study abroad experience was shortened due to the three months needed for VISA and Ministry of Education approval, as well as the time needed for travel arrangements.

In the last planning meeting in Cuba in 2015, the overall schedule was approved for the course to take place in the last 3 weeks of May 2016. It was decided that two weekend excursions outside of Havana would become part of the course, in addition to almost daily local cultural trips. The locations were decided in consultation with Cuban faculty as Viñales and Playa Girón. These were chosen for their cultural and Environmental significance and for giving the students a deeper understanding of Cuban life and culture, and are shown relative to la Habana in Figure 3.

Figure 3: Locations of Program Activities in Cuba



Eight students were recruited into this program. They were composed of seven undergraduates and one student just beginning the M.S.C.E. program. Five of the students were female and three were male. Six of the students were from civil engineering, one from mechanical engineering and one from chemical engineering. The undergraduates ranged from just finishing their freshman year to finishing their senior year with this course.

A Plan Realized

The course took place in May 2016 and roughly followed the schedule shown in Table 1. The first weekend trip was to Playa Girón and the Second to Viñales. We arrived midday on a Sunday and stayed at the Hotel Monte Habana in Miramar approximately 7 miles to Old Town Havana and a 20-minute private van ride to University CUJAE. After unloading at the hotel we took the students into Old Town to get a flavor for the culture of La Habana. The next day, the we went to CUJAE and were given an orientation by the International Programs Office. Over the next three weeks the course fell into a semi-routine schedule: picked up after breakfast at the hotel by our private chartered vans, lessons in the morning, lunch brought into classrooms, and lessons ending by about 2pm. We then had cultural visits in the afternoons: Hemingway House, Museum of the Revolution, old town walks, art museums, Nunez foundation, Marti Memorial Tower, Plaza of the Revolution, etc… Some afternoons we had our Cuban colleagues giving lectures or having discussions with the students: this included a viewing and discussion of the recent film about Jose Marti's youth entitled "Eye of the Canary." Figures 4 shows US and Cuban students socializing in the program classroom during a cultural break. The first full weekend in Cuba we visited Playa Girón and the Zapata swamp and the Second weekend we visited Las Terraces and Viñales. These visits were critical to understanding the local and national culture that were key to getting deeper meaning from the classes. Figure 5 shows Alabama Students getting an onsite lecture by Cuban faculty at the Museum of the Revolution.in Playa Girón

Figure 4: In the Classroom

Figure 5: Playa Girón

As the courses developed a rhythm, we added components to the experience. All of this was under the guidance of the International Programs Office. Our two colleagues brought immense experience of working with foreign students at their university. Lectures on cultural competencies and differences preceded meeting the local university students, learning dominoes from them and ultimately spending considerable time outside of the course with Cuban students.

The course was viewed by all as a great first step and a strong success. The three week course required one co-author to stay 10 days and another to stay the full three weeks. This allowed multiple additional formal and informal discussions with many CUJAE faculty and staff, aiding the long-term viability and sustainability of the program.

Table 1: Schedule for Engineering in Cuba Summer 2016

8 May Group meets in Miami airport and leaves for Havana, Cub on chartered flight (details TBD)	9 Orientation at CUJAE - CE 491 lecture - GES 225 lecture	10 - CE 491 lecture - GES 225 lecture	11 - CE 491 lecture - GES 225 lecture	12 - CE 491 lecture - GES 225 lecture	13 - Weekend 1 Excursion to Play Girón	14 - Weekend 1 Excursion to Play Girón
15 - Weekend 1 Excursion to Play Girón	16 - CE 491 lecture - GES 225 lecture	17 - CE 491 lecture - GES 225 lecture	18 - CE 491 lecture - GES 225 Local site visit	19 - CE 491 lecture - GES 225 lecture	20 - Weekend Excursion 2 to Viñales	21 - Weekend Excursion 2 to Viñales
22 - Weekend Excursion 2 to Viñales	23 - CE 491 lecture - GES 225 lecture	24 - CE 491 lecture - GES 225 Local site visit	25 - CE 491 lecture - GES 225 Local site visit	26 - Last Lectures and Grad Dinner	27-28 - Free exploration days	29 - Return to U.S.

Assessment and Sustainability

Both formal and informal assessment was performed. The formal assessment consisting of both the U.S. and Cuban Faculty asking the students to identify strengths and weaknesses and asking if they could chose to attend knowing what they knew after the three week experience or if they could recommend to a friend. The response was unanimously in favor of recommending or repeating the course. Some of the comments included:

> "more understanding of recent Cuban History prior to the course would help"
>
> "changing the order to get an overview of culture first before going into more detailed discussions"
>
> "really benefitted from Cuban faculty informal discussions in evenings and during the weekend excursions",
>
> "let's get more Cuban students involved and actually sitting in on more of the course with us."

In October 2016, four months after completing this first experience, the organizers met on the campus of UA and discussed the successes and minor modifications needed. Moreover, this visit gave a chance for the our Cuban colleagues from the International Programs Office to formally present their views of the experience to a general audience of faculty and students, to meet the UA Study Abroad Director (who is from Latin America), and to meet with departmental leadership and faculty from the Civil, Chemical, and Mechanical Engineering Departments and

from the Dean's Office. All of this helped develop the basis for broader collaborations in expanding the current UA faculty participation in the current course, but more importantly building a dialogue on future possible joint research endeavors. There was strong interest to expand what we are doing on both sides.

As this engineering program was developed in the larger context of both the broad Cuba Center set of programs and under the study abroad office, there is much institutional support to help sustain this program. That was seen in the October conference when several ties were developed to link our developing engineering institutions program to other programs with our University and the University of Havana (non-Engineering).

With the MOU in place and our first shared teaching experience completed, the stage has been set for building a sustainable program. It was seen that the course in Cuba gives us the institutional backbone to bring faculty together and work towards a broader relationship involving research and faculty exchange.

Several Specific recommendations in the context of this program are listed below to build upon the current start and develop a long-term sustainable program. The first recommendation is to send a follow-on delegation of UA Engineering Faculty and the Director of the Study Abroad Program to develop robust plans to control program costs and attract more students in the second course offering in the summer of 2018. As stated earlier, personal relationships are the key to the long-term sustainability of this program, and given communications challenges, these are best done face to face and in Cuba.

Secondly we must continue to broaden the participation of research-focused faculty on both campuses in this program. The broader we distribute participation and benefits at the faculty level, the more sustainable the program. We intend on using this course as a mechanism for bringing faculty from Civil, Chemical, and Mechanical Engineering at UA down to CUJAE. The program founders (Williamson and Jones) will lead the efforts each year, with each faculty being there approximately ½ of the three week course. Our participation will be funded by the student fees in the program. In addition, we will ask for College funds to bring down one to two additional UA faculty during the program. Building on the infrastructure and program in place, we will introduce these faculty to colleagues at CUJAE and engage them in both the courses AND developing research ideas, collaborations, exchanges with CUJAE faculty. Such efforts fit the College's strategic vision of building more international research collaborations, and are critical to long-term sustainability.

We will examine moving the course to be fully contained in the interim May semester. This will allow students on scholarships to apply their scholarships to the program and then take classes in the traditional summer semester at UA, to use a full semester worth of scholarship on 15 hours of classes. In this way the students will exchange one normal academic semester for a summer while still receiving 15 credits and paying for the study abroad with their existing scholarship support. While this only applies to scholarship students, such a mechanism has been used in other UA engineering study abroad opportunities to help provide a sustainable base pool of students to the program.

We will continue to develop ties to the larger UA in Cuba programs under the Cuba Center. Initial ties have been made with both the chemistry department and the Cuba geology research center to interact. The University of Havana is interested in the building environmental impacts into its curriculum and developing some UA tie in this area. While they are currently working with UA political science faculty, engineering is a natural fit for critically examining environmental impact of economic and industrial development.

This program also will benefit from ties to the College of Engineering's strategic plan expand the international experiences of its undergraduate students. In addition major thrust areas at UA and within the college of engineering: Transportation, Water, and Resilience all are strong fits for collaborative funded research (with CUJAE and other Cuban colleagues developed through this program), as political and funding restrictions lessen in the future.

Finally, it is imperative to work with CUJAE participants on focused data collection and experimental design within the courses to allow research and formalized assessment of the study abroad experience, pedagogy, and class activities. By publishing such work, the course gains more internal and external credibility as a vibrant part of the academic research mission.

The authors want to gratefully acknowledge the support and friendship of Dr José Ma. Ameneiros and Dr. Heidi Trujillo Fernández in spearheading the development of this program. Furthermore we would like to recognize that CUJAE as an institution and its many academic and administrative faculty and staff were supportive and welcoming to both U.S. faculty and students.

Cited References

Cret, L. A., Dawdy, S.L., and Corzo, G. 2005 **Dialogues In Cuban Archeology,** The University of Alabama Press, Tuscaloosa Al. 0-8173-1464-4

Davis, L. & Brommer, D. M. & Diez-Argüelles, E. R. "Observations of Environmental Change in Cuba." *Southeastern Geographer*, vol. 49 no. 1, 2009, pp. 84-93. *Project MUSE*, doi:10.1353/sgo.0.0034

Keegan, W. (2012). Beyond the Blockade: New Currents in Cuban Archaeology, edited by Kepecs Susan, Curet, L. A. and Corzo, G., 2010. Tuscaloosa (AL): University of Alabama Press; ISBN 978-0-817-31720-1

Mathews, Mark. 2016. "Back to the Future," Prism, American Society of Engineering Education, may 2016. http://www.asee-prism.org/past-issues-2-2/