

# **Experience-Based Learning:** *Global Engineering Culture and Society*

**Julio Urbina, Patrick Tunno, and Angela Rothrock**

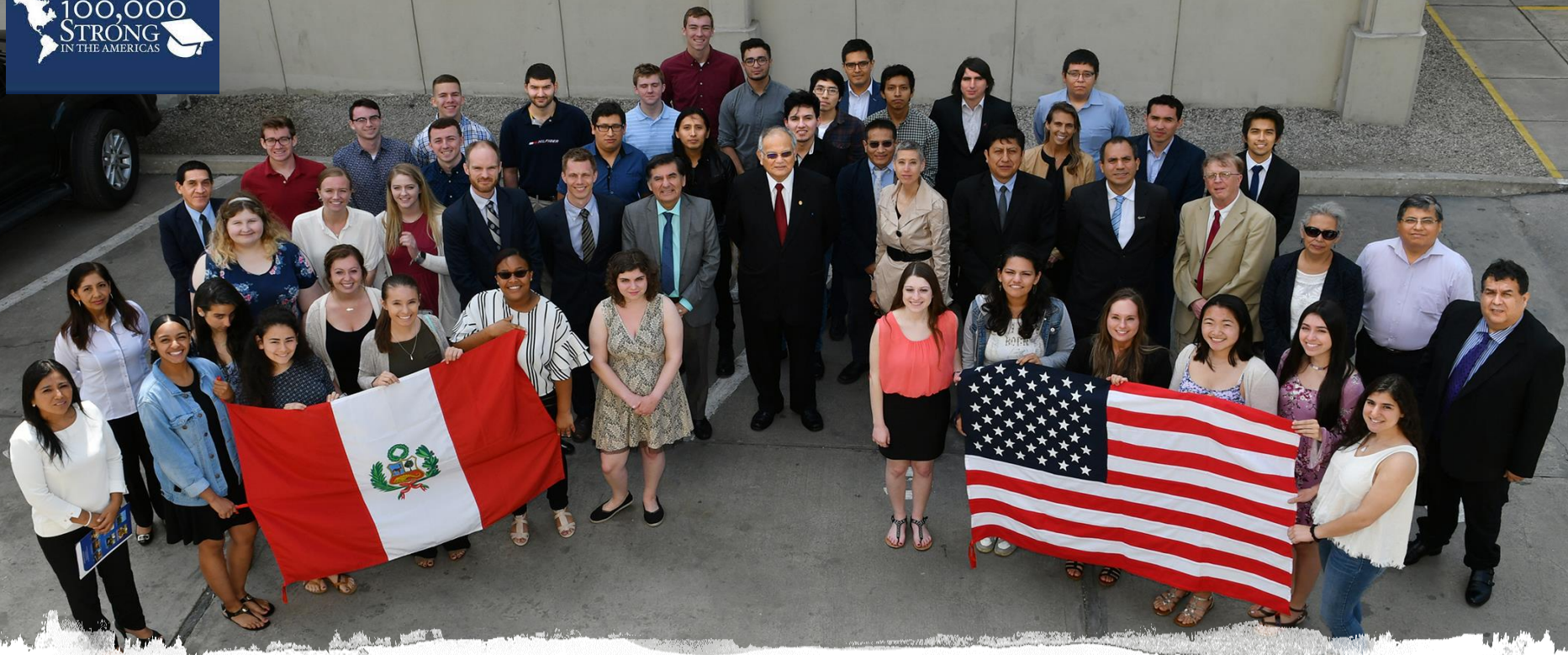
**The Pennsylvania State University**



**PennState**  
College of Engineering

# Program Foundations





*This partnership does not represent a northern neighbor coming to rescue a southern neighbor. We come to the table as equals to exchange ideas, learn from each other, and address joint challenges.*

**-Peruvian Dean**

**Need  
Vision  
Opportunity**





**Administrative role**  
**The outcome**  
**Clark Scholars gift**

# Program Structure

- Pre-departure (STS 115)
- UNI student engagement
- Maymester timing
- Multidisciplinary team
- Wraparound projects



# Assessment

S sarahchekan1 · Jun 13, 2022 · 2 min read

## Lima Reflection

Updated: Jun 17, 2022

Reflexión sobre la Huaca Pucllana



Escogí la Huaca Pucllana para me tema de este ensayo reflexivo porque la Huaca tenía una parte grande en mi vida diaria en Lima. La ubicación de la casa en cual viví por las dos semanas en Lima estaba directamente al lado de la Huaca. Yo podía mirar por mi ventana de mi cuarto y ver la Huaca. Estaba la primera cosa que veía después de despertarme y la última cosa que veía antes de acostarme. Por eso, la visita de la Huaca Pucllana por la clase de español tenía un impacto grande para mí. Antes de la visita, creía que la Huaca fue construido por los Incas. Aprendí que no solo fue construido por los Incas, pero construido un mil de años antes de los Incas existían. Para mí, eso era muy difícil creer. Es increíble que esta huaca haya existido por tanto tiempo y todavía esté en una condición relativamente buena. Aprendí que eso es porque las personas la construyeron en una manera para que la Huaca pudiera sobrevivir los sismos y otros eventos naturales. También, el hecho que Lima es en un desierto ayuda mucho. El guía de la visita dijo que la Huaca sería destruida si hay lluvia en Lima

porque el sedimento de que la Huaca es construido sería erosionado. Este hecho me



Building a Sustainable Future: Peru Water Edition

ENGR397: Global Engineering, Culture and Society

The Pennsylvania State University

Obiutodike Nnabugwu, Brooke Bires, Tyler Hazlett & Stella Kibinda

June 17<sup>th</sup>, 2022

## CREATING A MORE SUSTAINABLE PERU THROUGH ENGINEERING

As a part of a the Peru study abroad experience, students were tasked to produce a report that addresses a focused challenge identified in Peru. Provided below is the abstract:

"Peru, a developing country located in South America. As it is developing, there are several challenges that need attention and solutions. Such challenges include a lack of easily accessible water, traffic, and more. After discussion, acknowledging that certain communities are not able to obtain water due to not only political quarrel but bad pipelines infrastructure, was the topic that was chosen to address. To address this specific issue, innovation is required. More specifically, an agreement between the Peruvian government and those communities that are deprived of water access due to not paying taxes will need to come together.

Following this, a pipeline that not only filters clean water but is built to reach these communities will need to be engineered. Applying these innovations addresses the UN Sustainable Development Goals of 2030 by addressing goals #3,6,12 and 16. In addition to the Water-Energy-Food nexus and Drawdown, it directly correlates to water".

Click on the "Learn More" button to read  
"Building a Sustainable Future: Peru Water Edition"

Learn More



**PennState**  
College of Engineering

**GLOBAL ENGINEERING  
ENGAGEMENT**





# Student Perspective

---

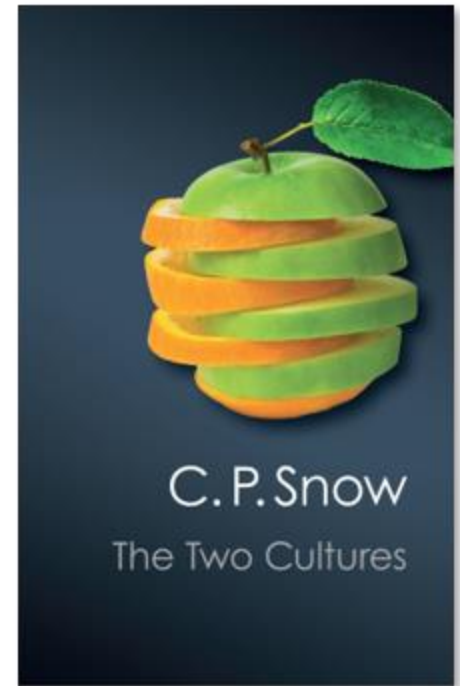
The Cross-Cultural Engagement Program in Lima, Peru greatly impacted my life-as a student, as an avid traveler, and as a young adult. My homestay provided a rare chance to hone my Spanish speaking skills through daily life. Learning in an environment with Peruvian students helped us collaborate while bridging cultural gaps. As someone who hopes to work globally, this was surely a step in the right direction. This early exposure to working in a setting with multiple cultures was invaluable to me. I also learned to work with people in other fields of study. I love that this program is not limiting to engineering students. I learned a lot about myself and others while working in groups of students from different academic backgrounds. Of course, I also loved taking in every excursion during my six weeks. From sandboarding in Huacachina to hiking up Machu Picchu in Cusco, I soaked up every moment - taking plenty of pictures along the way. Overall, I was sad that my time in South America had come to an end, but I am eternally grateful for the opportunities and experiences that this program has provided me.

Kim Sabol, 2019 participant

# Motivation

## *Redefining the Role of Science/Engineering in our Modern World*

- Growing divide between STEM and non-STEM
- Society has forgotten the impact of scientists/engineers on humanity
- The next generation of scientists/engineers want to change the world
- Creative problem solving is not just about technology solutions but also human-centric solutions





# Program's Conceptual Framework



# Essential Elements

## Vision

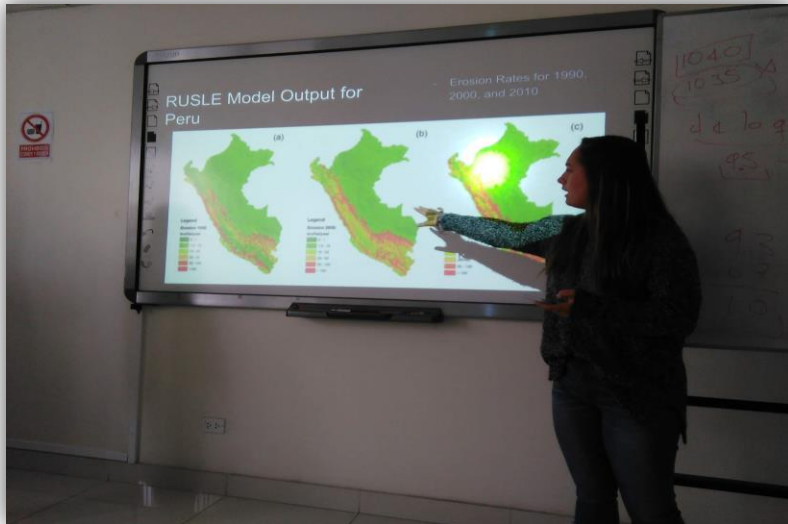
- Exposure to use of scientific methods in developing a problem statement revolving around identified global challenges
- Provide experience-based understanding of the value of multidisciplinary teams
- Practice investigating contemporary issues in a broader global context

## Objectives

- Increase access to study abroad in Latin America
- Increase retention and graduation rates of minority students
- Develop leadership skills and intercultural competence



# Student Activities





# Student Activities



# Student Activities



**Tratamiento biológico UASB/  
upflow anaerobic sludge blanket**

**Función/Función**

Remove la carga orgánica del afluente y en menor proporción los sólidos suspendidos.  
Remove the organic load of the tributary and to a lesser extent the suspended solids.

**Proceso/Procesos**

- Hidrólisis
- Acidogénesis
- Acetogénesis
- Metanogénesis

**Parámetros de control/  
Control parameters**

Afluente REFLUENTE

- Turbidez
- PH
- Temperatura
- DBO
- DCO
- Sólidos suspendidos

UNIVERSIDAD NACIONAL DE INGENIERÍA

**LAGUNAS FACULTATIVAS/  
Facultative lagoon**

**Función/Función**

Estabilización de la materia orgánica, eliminación de microorganismos patógenos, eliminación de huevos de helmintos.  
Stabilization of organic matter, elimination of pathogenic microorganisms, elimination of helminth eggs.

**Dimensiones/Dimensions**

- Laguna secundaria : 100 x 100 x 1.5 metros
- Laguna terciaria : 50 x 50 x 1.5 metros

**Parámetros de control/  
Control parameters**

- OXIGENO DISUELTDO
- PH
- TEMPERATURA
- DBO
- OLIFORMES
- TERMOTOLERANTES
- OLIDOS FIJOS
- OLIDOS VOLATILES

UNIVERSIDAD NACIONAL DE INGENIERÍA





# Questions







## Reflection & Discussion

- What types of intercultural experiences and community engagement programs are available on your campus? Do they address SDGs?
- What resources could you leverage on your campus/ in your network to design or enhance a program that addresses SDGs?
- What barriers are you facing?