

## *Research Study Abroad Experience in Peru during December 12-20, 2018*

A series of short presentations and demonstrations at Universidad Nacional de San Agustín de Arequipa (UNSA) and Universidad Nacional de San Antonio Abad del Cusco (UNSAAC) will be part of the visits.

**Objectives:** To develop a deep understanding of renewable energy as well as other potential sources of energy for Peru. To learn to integrate wind energy, solar systems with water nexus, storage, irrigation or other areas (e.g., agriculture), economics and policy. Evaluate the history of Incas Empire in terms of engineering, energy and sustainability.



Students in our wind energy class (Fall 2018) will bring a test-bed of a Cyber-physical system of a hydraulic wind turbine to show how different inlet wind profiles affect the energy production. In addition, this system will include a continuous variable transmission (CVT) to expand the operational point of the wind turbine, and evaluate its potential for the region. Furthermore, we seek to explore various energy resources: wind, solar, geothermal, hydro-electric and water will permit us to deploy optimum energy systems integrating renewable energy with water desalination.

Team work will allow us to look at new opportunities for innovation in Peru in terms of renewable energy & water desalination as well as communications and micro-economic systems using our microgrid portable systems. The economics and environmental aspects and impact of wind harvesting will be analyzed, and how Peru use effectively renewable energy to build its country over time. As part of the visit, we will also explore how microgrids with water system integration could potentially help grow the local economy by exploring installations of cell towers for wireless communication.

**Faculty Mentors:** Prof. Luciano Castillo (Lead), Prof. David Warsinger, and Visiting Scholar Dr. Walter Gutierrez. They will conduct research plans for the students and short seminars for faculty and students from Peru and Purdue.