

PAGÁN-TRINIDAD & LÓPEZ-RODRÍGUEZ

DHS Coastal Resilience Center

Education Project Work Plan Template

1/1/2016 – 6/30/2020

1. **Project Title:** Education for Improving Resiliency of Coastal Infrastructure
2. **Principal Investigators:** Ismael Pagán-Trinidad (PI), Ricardo R. López (Co-PI)
3. **Other Education Participants/Partners:**

ERDC-US Army Corp of Engineers, Vicksburg, MS	<ol style="list-style-type: none"> 1. Dr. David Pittman- Deputy Director, ERDC 2. Eng. José Sánchez, Director, Coastal and Hydraulic Lab(CHL) 3. Mark Gravens, Chief, Coastal process Branch 4. Ty V. Wamsley, Chief, Flood and Storm Protection Division,
PR Emergency Management Agency, San Juan, PR	<ol style="list-style-type: none"> 1. Miguel Ríos, Director
FEMA, San Juan, PR	<ol style="list-style-type: none"> 1. Alejandro de la Campa, Director, Caribbean Area Division, US Department of Homeland Security, FEMA Region II
PR Department of Natural Resources	<ol style="list-style-type: none"> 1. Ernesto Diaz, Director, PR Coastal Management Program, San Juan, PR
PR Association of Professional Engineers	<ol style="list-style-type: none"> 1. Eng. Manuel Bermudez, President, Institute of Civil Engineers, PRSPE
National Weather Service NOAA, PR Office, San Juan, PR	<ol style="list-style-type: none"> 1. Mr. Roberto García, Director 2. Mr. Ernesto Rodríguez, Meteorologist 3. Mr. Ernesto Morales, Meteorologist
UPR-Mayagüez, Mayagüez, PR <ol style="list-style-type: none"> 1. Marine Science Department 2. Sea Grant Program 3. Caribbean Coastal Ocean Observing System (CariCOOS) 	<ol style="list-style-type: none"> 1. Dr. Manuel Valdés Pizzini, Dean of College of Arts/Sciences 2. Prof. Ruperto Chapparo, Director 3. Prof. Julio Morell, PI 4. Prof. Aurelio Mercado, PI, Coastal Flooding Mapping
Jackson State University, Jackson, MS	<ol style="list-style-type: none"> 1. Dr. Robert Whalin, PI, Educational Component CRC-CRI
FEMA, USDHS, Atlanta, GA	<ol style="list-style-type: none"> 1. Christina Lindemer, Coastal Engineer, Risk Analysis Branch
Lousiana State University	<ol style="list-style-type: none"> 1. Barry Keim, Storm Surge Data Bases
University of Illinois, Urbana, Illinois *	<ol style="list-style-type: none"> 1. * Randall John Sandone, Assistant Director of Critical Infrastructure Resilience Institute (DHS-CIRI) Center of Excellence, Illinois Applied Research Institute
USGS, Caribbean-Florida Water Science Center	<ol style="list-style-type: none"> 2. Rafael W. Rodríguez, Director, Florida, USA.
The University of North Carolina at Chapell Hill, Capell Hill, NC	<ol style="list-style-type: none"> 1. Rick Leutich, Director, Center of Natural Hazards and Disasters and PI of the DHS Coastal Resilience Center (CRCV) of Excellence
Oregon State University, Corvalis, Oregon	<ol style="list-style-type: none"> 1. Dan Cox, Civil Engineering Professor, Tsunami Simulations
Colorado State University, Fort Collings, Colorado	<p>John van de Lindt, Co-Director, Center of Risk Base Community Resilience Planning, Dept. of Civil and Environmental Engineering</p>

Note: Some of the partners identified in this preliminary list of partners are subjected to final confirmation of the protocols to establish formal partnership agreements based on each individual

institution protocols, should it be required by each institution or the specific partnering activity. However, all those in the list have been contacted for the purpose of the project.

*** - Formal agreement with this potential partner has been requested, however, the final decision is pending the confirmation and compliance with necessary protocols for this purpose at the UoI.**

4. Short Project Description.

This project will help educate the community on Coastal Resilient Infrastructure (CRI) by transferring state of practice knowledge to stakeholders (students, faculty, professionals, first responders, and work force) through formal (curriculum, internships, student projects) and informal (workshops, seminars, lectures, short courses, webinars) learning experiences. It will serve as a vehicle to engage the community as a whole to understand and learn its members' roles and responsibilities in providing resilient coastal infrastructure systems. The project will help the community understand better various stages in coastal infrastructure hazard prevention, preparedness, response, recovery and mitigation. It will also help create pipelines of students and professionals into CRI careers and practice.

5. Abstract.

The main goal of this project is to develop and offer formal and informal education through courses, workshops, seminars, lectures and other educational means leading to advanced knowledge on the state of practice in Resilient Coastal Infrastructure (built and natural). This initiative aims at creating a Certificate in Resiliency of Coastal Infrastructure. The focus of the project is to provide students and faculty, professionals and homeland security personnel, and affected citizens with capabilities to assess the effects of natural hazards on coastal infrastructure, the conditions of existing structures, and rehabilitation alternatives to mitigate future damage and potential risks. The educational content will focus on pre-incidents, incidents and post-incidents. New courses and existing course revisions will be evaluated in Civil Engineering and related disciplines dealing with the causes and effects of coastal flooding, storm surge, ocean waves, tsunami loads, earthquake effects and strong winds. Courses will be offered in the form of conferences, workshops and lectures. Lecturers from CRC, ERDC, FEMA, and other partners will be invited to participate. State of practice technology will be a priority (e.g., FEMA P646 publication for tsunami load estimates). The National Infrastructure Protection Plan and state infrastructure protection programs and plans will be addressed. Results of recent research work by UPRM, ERDC, and other CRC partner investigators regarding flood, wave, earthquake and tsunami, and hurricane wind effects on structures will be incorporated into curricula. Being a small and fully developed island, Puerto Rico offers the ideal setting to assess lessons learned on the effect of natural hazards on built and natural infrastructure including housing, commercial, industrial, institutional, transportation, communication systems, and others. The Island presents unique and challenging settings like overdeveloped and exposed urban areas, vulnerable hazard zones (flood-prone, landslide-prone, hurricane wind-prone), highly concentrated and poorly planned urban communities, tradeoffs between urban development and natural ecosystems development and conservation, extreme economic development constraints and suboptimal first responders resources (e.g. funding, equipment, capabilities). All of these factors make the Island educational setting particularly diverse and challenging. This setting will be available for first hand assessment and evaluation. This program has also the goal to facilitate internships at CRC universities performing research in CRI and in government agencies and industry dealing with

coastal hazards. Being a minority serving institution (MSI) with a high women's participation (near $\frac{1}{3}$ in Civil Engineering) it is also our goal to build the capacity of minority Hispanic students, faculty, professionals, and affected citizens through a program advancing a deep understanding of Coastal Resilient Infrastructure. Our MSI University has been providing well qualified Hispanic Engineers to the US for many years and will benefit from the opportunity to collaborate with DHS and the community it serves.