PAGAN, UPRM

DHS Coastal Resilience Center

Education Project:

Annual Project Performance Report

Covers reporting period July 1, 2016 – June 30, 2017

1. **Project Title:**

   Education for Improving Resiliency of Coastal Infrastructure

2. **Principal Investigators / Institution:**

   Ismael Pagán-Trinidad (PI), Ricardo R. López (Co-PI), University of Puerto Rico at Mayagüez

3. **Other Education Participants/Partners:**

   ERDC-US Army Corps of Engineers, PR Emergency Management Agency, FEMA, PR Department of Natural Resources, Association of Professional Engineers of PR, UPRM partners (Marine Science Department, Sea Grant Program, CariCOOS NOAA project); NOAA (National Weather Service)

4. **Short Project Description ("elevator speech"):**

   This project will help educate the Coastal Resiliency community 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 (graduate school 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 advance knowledge on the state of practice on Resiliency of 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 estimates of causes and effects caused by of coastal flooding, storm surge, ocean waves, tsunami loads, earthquake effects, and strong winds. Courses will be alternatively offered in the form of conferences, workshops, and lectures. Lecturers from experts 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. Being a small and fully developed island, Puerto Rico offers the ideal setting to assess lessons learned of the effect of natural hazards on built and natural infrastructure including housing, commercial, industrial, institutional, transportation, communication systems, and others. The Island presents unique challenging settings like overdeveloped and exposed urban areas, vulnerable zones (flood prone, weak soils, hurricane wind exposure), highly concentrated and poorly planned urban communities, stressful tradeoff between urban development and natural ecosystems development and conservation, extreme economic development constraints and suboptimal first responders resources (e.g. funding, equipment, capabilities, training, and others) make the Island educational settings most challenging. All this setting will be available for first hand assessment and evaluation from the educational perspective. 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 ⅓ in Civil Engineering) it is also our goal to create and capacitate minority Hispanic students, faculty, professionals, and affected citizens to warranty up to date level of competency in Coastal Resilient Infrastructure to this part of the community. Our MSI university has been providing well qualified Hispanic Engineers to US for many years and will benefit from the opportunity to collaborate with DHS and the community it serves.

6. **End users:**

End Users	Role of Participation in the Project

Students:	Trainee; Interns; Undergrad/grad research experiences on RCI topics SUMMER 2016 Oregon State University-Internship: (July) SUMREX 1. Kevin Cueto, MSCE (Struct) Oregon State Univ. 2. Diego Delgado, BSCE, Oregon State Univ., Intern University of Central Florida - Internship (July) SUMREX 1. Felix Santiago, MSCE (Environ.), Univ. of Central Florida, Intern Coastal and Hydraulic Laboratory - ERDC-US Army CoE Internship (July -September 2016) 1. Efrain Ramos, MSCE (Environ.) 2. Jaime Calzada, PHD (Marine Sc.) 3. Gabriela Salgado, MSCE (Environ.) 4. Jesús Otero, MSCE, (Water Resources) 5. Stefanía Quiñones, MSMS (Marine Science) University of Puerto Rico - Mayagüez (UPRM) -Undergraduate Research (July-August 2016) 1. Gabriela Buono, BSCE **FALL 2016 (UPRM)** 1. Kevin Cueto, MSCE (Structures), UPRM, Graduate Research assistant in this project. **SPRING 2017 (UPRM)** **Undergraduate and Graduate research** 2. Alexander Molano-MSCE, UPRM, Graduate Engineering Project (Transportation) 3. Giovani Seijo, BSPH (Physics), UPRM, Research Assistant 4. Paola E Martínez, BSCE (Geotechnical), Undergraduate Research 5. Mark Rivera, BSCE, (Geotechnical), Undergraduate Research 6. Felix Santiago, MSCE(Environmental), UPRM, 7. Kevin Cueto, MSCE (Structures), UPRM, Graduate Research assistant in this project. **Capstone Course: Civil Engineering Senior Design Experience** 1. 32 students supervised by 5 professors and 5 graduate students participated in a 1-semester CE Senior Design Experience course. The course focused on training students on designing a coastal urban cluster (Hotel, Shopping Center, and Entertainment Center) considering coastal resilience risk and technology. Trainings were given by invited lecturers and speakers whose talks focused on coastal resilience technology. Community and professionals were opened to the community. Design Process: Founding a company; Feasibility Study; Conceptual; Preliminary and Final Design; Cost Estimate, Construction Management Plan, Sustainability **SUMMER 2017** **UPRM** 1. Ángel Alicea, PhD, UPRM, Research Assistant in the project

	2. Juan Rodríguez, PhD, UPRM, Research Assistant in the project Coastal and Hydraulic Laboratory - ERDC-US Army CoE Internship (June) 1. Gabriella Buono, BSCE, UPRM. 2. Nelson Cordero, MSMS, UPRM 3. Kevin Cueto, MCSE (Structures), UPRM. University of Central Florida - Internship (SUMREX) 1. Diego Delgado, BSCE, UPRM. Oregon State University - Internship (SUMREX) 1. Peter Rivera, BSCE, UPRM 2. Héctor Colón, BSCE UPRM
Faculty	Trainers/Teachers in courses, seminars, workshops; CRI leaders; Project Advisors; Course content evaluators; **Capstone Course: Civil Engineering Senior Design Experience** 1. Five Professors: J. Guevara (Structures), B. Camacho (Geotechnical), C. López del Puerto (Construction); A. Figueroa (Transportation), I. Pagán-Trinidad(Environmental) - Mentors/Supervisors **Faculty In-Charge of Offering Courses or Course Topics** 1. INCI 6066 Master Thesis: Ricardo López, Walter Silva, Luis Aponte 2. INCI 6995 Graduate Special Problems: Ismael Pagán Trinidad 3. INCI 6065 Graduate Civil Engineering Project: Ricardo López 4. INCI 5996 Civil Engineering Special Problems: Benjamín Colucci, Ismael Pagán Trinidad, Ricardo Ramos 5. INCI 4998 Undergraduate Research: Ismael Pagán Trinidad **Faculty In-Charge of Developing Courses or Course Topic and Modules** 1. A.Saffar: Reliability Based Design of Coastal Resilient Structures 2. J. Guevara - Rehabilitation of Coastal Infrastructure 3. W. Silva - Modeling of Riverine and Coastal Flooding

Professionals	Trainee; Trainers; Advisors; Providers of lessons learned; Survey responders for priority needs 1. 7 mentors and 5 mentees at 2016 and 3 mentors and 3 mentees at 2017 Summer Research Internship program at Engineer Research and Development Center of the US Army Corp of Engineers 2. 4 mentors and 3 mentees at OSU, UCF, and LSU 2016 SUMREX 3. 3 mentors and 3 mentees at OSU and UCF 2017 SUMREX Other professionals participated at these activities: 1. 9 professionals, 16 faculty and 6 students attended the Seminar "Earthquakes, Hurricanes and Other Disasters: A view from Space" presented by Mr. Ron Eguchi on February 23, 2017 at the Civil Engineering Auditorium. 2. 1 professional, 8 faculty and 36 students attended the Seminar "Tsunami Inundation Modelling for Risk-Based Decision Making to Increase Community Resilience" presented by Dr. Dan Cox of Oregon State University on March 7, 2017 at the Civil Engineering Auditorium. Dr. Cox is a Center researcher andhis visit is part of the ReTalk program. 3. 81 participants (59 professionals, 14 faculty, 8 students) attended the 2-day Conference "Lessons Learned and Best Practices: Resilience of Coastal Infrastructure". Lecturers represented the US Army Corps of Engineers, UPRM, Sea Grant Program, PR Professional Engineers Association, Department of Natural Resources, Puerto Rico Climate Change Council. It was held March 8 and 9, 2017 at the Headquarters in San Juan of the Professional Engineers and Surveyors Association. Nine (9) Researchers from the US Army CoE and one from Oregon State traveled from the US to present their results and participate in discussions. 4. 1 professional, 5 faculties and 38 students attended the Seminar "Coastal Resilience in Changing Climate" presented by Eng, José Sánchez, Director of the Coastal and Hydraulics Laboratory of the US Army Corps of Engineers on March 30, 2017 at the Civil Engineering Auditorium. The talk is part of the ReTalk program. 5. 1 professional, 37 students, and 6 faculties attended the 2 hour lecture "Coastal Management Program: PR Infrastructure Inventory, Risks and Vulnerability by Ernesto Díaz, Director of the PR Coastal Management Program Department of Natural and Environmental Resources and the PR Climate Change Council as part of the Capstone Design Experience Course on Jan 26, 2016.

Researchers from CRC	Advisors on course/seminar/workshop contents (breadth and depth); providers of internship opportunities; recruiters of students for graduate school; Trainers/lecturers; advisors · Dr. Dan Cox, Oregon State University-Mentor Internship, Lecturer · Dr. John van de Lindt, Colorado State University, Mentor, Internship · Dr. Stephen Medeiros, University of Central Florida, Mentor, Internship · Dr. Scott Hagen, Louisiana State University, Mentor, Internship · Dr. Robert Whalin, Jackson State University, Article coauthor and project Advisor
First responders (HLS Partners)	Trainee; Trainers/Lecturers; Survey responders of priority needs 1. 81 participants (59 professionals, 14 faculty, 8 students) attended the 2-day Conference "Lessons Learned and Best Practices: Resilience of Coastal Infrastructure". At least 15 can be classified as first responders. Lecturers represented the US Army Corps of Engineers, UPRM, Sea Grant Program, PR Professional Engineers Association, Department of Natural Resources, Puerto Rico Climate Change Council. It was held March 8 and 9, 2017 at the Headquarters in San Juan of the Professional Engineers and Surveyors Association. Nine (9) Researchers from the US Army CoE and one from Oregon State traveled from the US to present their results and participate in discussions. 2. 9 professionals, 16 faculty and 6 students attended the Seminar "Earthquakes, Hurricanes and Other Disasters: A view from Space" presented by Mr. Ron Eguchi on February 23, 2017 at the Civil Engineering Auditorium.
UPRM Partners	**Leverage; Support; Trainers; Collaboration** · Ruperto Chaparro, Sea Grant Director · Julio Morel, CariCOOS Director · Aurelio Mercado, Marine Sciences Researcher · Miguel Canals, Ocean Engineering Research Centre Director and Researcher · Sylvia Rodríguez, Materials Science and Engineering Researcher · Cecilio Ortiz, Social Science Research Center, Researcher · David Sotomayor, Agricultural Science Researcher · Raul Zapata, Assistant to Chancellor · Mrs. Lillian Ramírez, Puerto Rico Sea Grant Program · Juan González, CariCOOS Researcher · Patricia Chardón. CariCOOS Researcher · Various technical personnel

Government Agencies	Leverage; Support; Advice Various activities were coordinated with Government officials, programs and agencies, namely: Department of Natural and Environmental Resources-Coastal Management Program; the PR Sea Grant Program; the NOAA- Caribbean Coastal Oceanic Observatory Program (NOAA), the Transportation Technology Transfer Center sponsored by the Federal Highway Administration, FEMA, and municipalities.

7. **Unanticipated Problems:**

No changes from initially approved work plan.

8. **Project Impact:**

Ø Students: Training /Education through curriculum research and learning

· *Formal undergraduate and graduate research work experience (experimentation, modeling, simulation, programming, and analysis)*
· *Improve communications skills (oral, written, graphical, media) on RCI topics and literature*
· *Provide knowledge and tools on coastal hazards and its impact on coastal infrastructure*
· *Attract and motivate candidates into HS career with emphasis in RCI*
· *Provide access to state of the arts and practice in RCI*
· *Provide access to experts with RCI expertise*
· *Create a pipeline towards advanced degrees or work force on RCI and DHS priority job opportunities*
· *Develop maturity, confidence, satisfaction and expertise on new advances in RCI topics*
· *Support workforce through internships and summer jobs*

Ø Agencies: Trained, guided, and motivated workforce

· *Vision to new worldwide RCI challenges*
· *Provide human resources for workforce*
· *Upgrade human capital capabilities*
· *Trained professional with better capabilities to face new challenges in RCI*
· *Increase institutional expertise*
· *Provide continuing education on state of art and practice*
· *Facilitate institutional networking and collaboration*
· *Consultant to help regular work forces and advisors*

Ø Constituents: Continuing education RCI and HS advancements

· *Provide state of practice resources and tools, for example literature, software (GIS), databases (geospatial), guidelines, case studies, and examples that can be applied in their jobs.*
· *Advance expertise and confidence which help in career development and better opportunities.*
· *Orient and persuade potential professional to follow HS careers.*
· *Provide networking opportunities to engage in team work consultation and collaboration.*
· *Gain hands-on experience on new technologies.*
· *Become educators for other professionals in resilience topics.*

*Ø **Faculty: Scholar professional development***
· *Provide scope of opportunities on Coastal Infrastructure Research to create new knowledge.*
· *Provide resources and expertise to be incorporated into formal curricula.*
· *Expand opportunities to team building and collaboration with scholars in the resiliency of coastal infrastructure.*
· *Advise on funding opportunities and funding agencies.*
· *Create opportunity for publishing.*
· *Expand the scope of expertise.*
· *Expand, update and upgrade existing programs on RCI.*

9. Education Activity and Milestone Progress:

Education Activities and Milestones: Progress to Date

Reporting Period 7/1/16 – 6/30/17			
Education Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
1. Formulate and design content of Certificates for students, professionals, professionals, and other participants.	Dec 2016	100	
2. Offer first course on RCI, first Conference/Workshop, engage invited lecturers	May 2017	100	
3. Identify and participate in first Internship experiences	May 2017	100	
4. Formalize First Educational Partnerships with HS constituents and partners	Dec 2016	100	
Education Milestone			

1. Engage partners on RCI activities (Metric: number of partners participating)	June 2017	100	
2. Create first round of certificates for students, faculty, and professionals (Metric: No. of certificates awarded)	June 2017	100	
3. Allocate students in RCI related internships (Metric: No. of students)	June 2017	100	

10. **Transition Activity and Milestone Progress:**

Transition Activities and Milestones: Progress to Date

Reporting Period 7/1/16 – 6/30/17			
Transition Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
1.Offer course, first local workshop/conference (proceedings, documentation, and certificates by …) **List:** a. Undergraduate Research (INCI 4998): Climate Change Impact on Coastal Communities – Flooding Scenarios in Puerto Rico b. Undergraduate Research: Effect of Climate Change on the Coastal Transportation Infrastructure of Puerto Rico c. Lecture: Coastal Management Program: PR Infrastructure Inventory, Risks and Vulnerability d. Lecture: Hurricanes, Tornadoes, Floods and Other Disasters: A view from Space e. Lecture: Tsunami Inundation Modeling for Risk Based Decision Making to Increase Community Resilience f. Conference: Lessons Learned and Best Practices: Resilience of Coastal Infrastructure	**June , 2017** **August 2016** **Dec. 2016** **Jan. 26 , 2017** **Feb. 23, 2017** **March 7, 2017** **March 8-9, 2017**	100	

g. Coastal Resiliency in Changing Climate	**March 30, 2017**		
2. Seek and expand internship opportunities, identify, select and orient candidate students (Orientations, promotions, divulgation, selection, allocation, etc.)	**June 2017**	100	
Transition Milestone			
1. Provide first round certificates (Metric: Distribution of certificates)	**June 2017**	100	
2. Offer first local workshop/conference (Metric: Distribution of participants/ workshop; contents learned; action list proposed)	**June 2017**	100	

11. **Interactions with research projects:**

a. **SUMREX** participation has been successful for 2016 and 2017. This year opportunities were communicated by researchers from two institutions. Oregon State University (Dr. Dan Cox and Dr. John van de Lindt – two opportunities), and University of Central Florida/Louisiana State University (Dr. Stephen Medeiros/Dr. Scott Hagen- one opportunity). These initiatives were coordinated with Researchers during CRC meetings. Advertisements were posted including all requirements at the university. Interested students presented their credentials and we evaluated if students qualified. Students who qualified were advised to apply and referred directly to Research PI's for their evaluation. Two students were admitted at OSU (working at the O.H. Hinsdale Wave Research Laboratory (HWRL)) and one student was admitted to UCF/LSU (working on the ADCIRC model (setup and parameterization) and how to run simulations on a high-performance computing cluster). Last year SUMREX students were Kevin Cueto and Diego Delgado at OSU and Felix Santiago at UCF/LSU. Felix has now been admitted to study his PhD at LSU starting in January 2018, thanks in part to being awarded an NSF Graduate Fellowship to pursue the PhD, and to his research at UCF, LSU, and at UPRM with Dr. Walter Silva. The students selected for SUMREX this year are Peter Rivera and Hector Colón to attend OSU and Diego Delgado will attend UCF/LSU. All are currently in the middle of the internship.

b. **ReTALK** program at UPRM by CRC researchers was initiated with the visit of Dr. Dan Cox of OSU in March of 2017. Dr. Cox gave lectures at UPRM and at San Juan Professional Engineers Association. In Mayagüez, he also met with students and professors. Both his presentations were well attended. Other talks at UPRM given by distinguished researchers were offered by Mr. Ernesto Díaz, president of PR Climate Change Council and Director of the PR Coastal Zone Management Program at the Department of Natural and Environmental Resources Agency, by Mr. Ron Eguchi, president of ImageCat in California who was invited by the Earthquake Engineering Institute UPRM student chapter, and by Mr. José Sanchez, director of the Coastal and Hydraulic Laboratory of the US ARMY Corps of Engineers in Vicksburg, MISS.

c. **Conference Lessons Learned and Best Practices: Resilience of Coastal Infrastructure** was a 2 day conference held in San Juan organized by our project with the cooperation of the Sea Grant Program, Engineers Association, Dept. of Natural and Environmental Resources, and the sponsorship of the US Army Corps of Engineers, who provided travel expenses for 9 researchers who shared their expertise with local researchers from UPRM and Dr. Cox from OSU.

12. **Publications:**

a. Digital proceedings of Conference **"Lessons Learned and Best Practices: Resilience of Coastal Infrastructure"** , organized by the project, can be found in the link http://engineering.uprm.edu/inci/?page_id=3522

The following two presentations were given by Dr. Ricardo López at the World Engineering Conference on Disaster Risk Reduction. More information at http://www.wfeo.org/events/world-engineering-conference-disaster-risk-reduction-wecdrr-2016/

b. Ismael Pagán-Trinidad, Ricardo López-Rodríguez, Agustín Rullán, Oscar Perales-Pérez, John Fernández-Van Cleve, "THE ROLE OF UNIVERSITIES ON DISASTER RISK REDUCTION IN THE COMMUNITY: UPRM CASE STUDY", World Engineering Conference on Disaster Risk Reduction, Peruvian Association of Professional Engineers, Lima Perú, December 5-6, 2016.
c. López-Rodríguez, Ricardo R., Pagán-Trinidad, Ismael, "Structural Vulnerability to Natural Hazards in Puerto Rico", World Engineering Conference on Disaster Risk Reduction, Peruvian Association of Professional Engineers, Lima Perú, December 5-6, 2016.

13. **Tables:**

Table 1: Documenting CRC Education Project Courses and Enrollments

Courses Developed and Taught by **University of Puerto Rico at Mayaguez** under Project **Education for Improving Resiliency of Coastal Infrastructure (RCI)**						
Course		Developed (D), Revised (R), and/or Taught (T), by Project Year				
Number	Title	1	2	3	4	5
INCI6XXX INCI5XXX	***"Rehabilitation of Coastal Structures (under development)"***- Guevara Dual codes for undergraduates and graduates		D			
	Offering: Elective (E), Concentration (C), Minor (M)	E	E			
	Enrollment	-				
INCI6XXX INCI5XXX	***"Reliability of Coastal Infrastructures (under development)"***- Saffar Dual codes for undergraduates and graduates		D			
	Offering: Elective (E), Concentration (C), Minor (M)	E	E			
	Enrollment	-	-			
INCI6995	CE Special Problems (Graduate): ● ***"A Novel Boussinesq -Type Numerical Wave Model Development" - IPT*** ● ***"Stochastic Simulation of Tropical Cyclones for the Quantification of Uncertainty Associated with Storm Recurrence and Intensity: Phase II" - IPT*** ● ***"Analysis of a Ring Levee Breach Using Adaptive Hydraulic" - IPT*** ● ***"US Army Improved Ribbon Bridge" - IPT*** ● ***Feasibility of Using the Weather Research and Forecasting Model (WRF) as forcing to the Advanced Circulation Model (ADCIRC) - IPT***	T T T	T T T T			
	Offering: Elective (E), Concentration (C), Minor (M)	E	E			
	Enrollment	3	1			
INCI5996	CE Special Problems (Project) ● ***"Impact of Projected Sea Water Rise on Coastal Infrastructures"*** ● ***"Ship Simulation Study"- IPT*** ● ***Utilities and Building Inventory For Resiliency Analyses at the Mayagüez***	T	T T			

	Municipality Coastal Zone - Dr. Ricardo Ramos ●					
Offering: Elective (E), Concentration (C), Minor (M)		E	E			
Enrollment		1	4			
INCI6066	***MS-Thesis*** ● ***Structural Effects of Tsunami Loads on Coastal Infrastructure, by Kevin Cueto*** ● ***Computation of Gradually Varied Flow in Channel Networks with Hydraulic Structures by Felix Santiago*** ● ***Cost Analysis of the alternatives to Restore by Francisco Villafañe***		D D T			
INCI6065	***MS-Project*** ● ***Structural Analysis of Common Coastal Structures found on the West Coast of Puerto Rico using FEMA P-646 by Jorge Romeu***		D			
INCI8999	***PhD Dissertation*** ● ***Resistencia a Cargas de Tsunami de Estructuras Críticas en el Norte de Puerto Rico (Resistance to Tsunami Loads of Critical Structures in the North of PR) by Johnny Rosario***		D			
Offering: Elective (E), Concentration (C), Minor (M)			R			
Enrollment			3			

Table 2: Documenting External Funding and Leveraged Support

External Funding			
Title	PI	Total Amount	Source
Stochastic Simulation of Tropical Cyclones for Quantification of Uncertainty Associated with Storm Recurrence and Intensity	Ismael Pagán Trinidad	$22K Summer-Fall 2016	CHL-ERDC-US ARMY Corps of Engineers
Hydro Model Validation and Surge/Wave Grid Development - Puerto Rico and Virgin Islands	Juan Gonzalez	$36K Fall 2016 - Spring 2017	CHL-ERDC-US ARMY Corps of Engineers
Leveraged Support			
Description			Estimated Annual Value

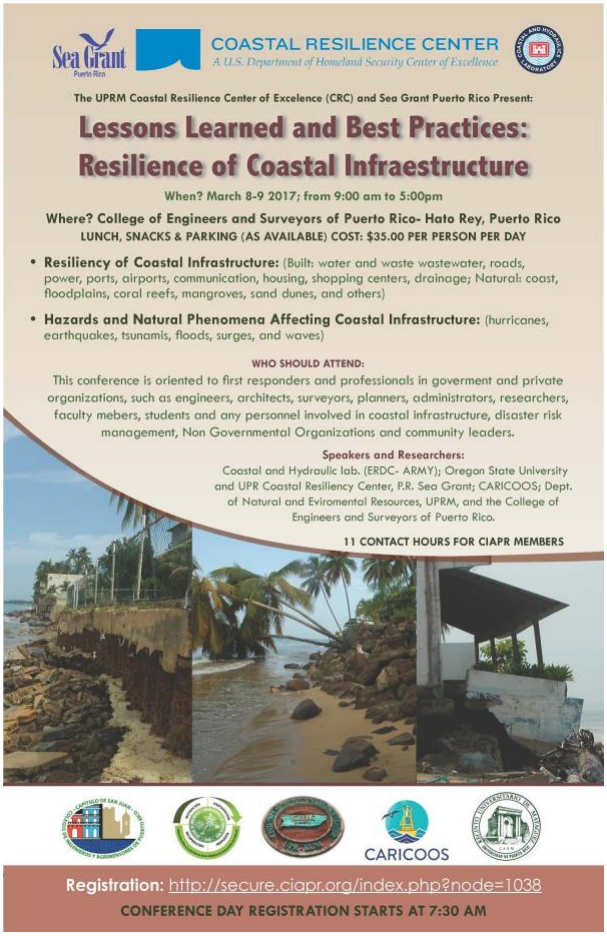
UPRM Release Load - 2 CE Researchers worked on CRC project (Pagán 6 crs. ; López 6 crs)	$55,000
Venue and promotion for the "Lessons Learned and Best Practices in Resiliency of Coastal Infrastructure" at PR CIAPR, Hato Rey Puerto Rico	$1,000
ERDC support to participant speakers at "Lessons Learned and Best Practices Conference in Puerto Rico"	$45,000
Sea Grant Program Collaboration - Promotional materials, arts, announcements	$2,000
Transportation Technology Transfer Program -Promotion	$500
Dr. Dan Cox - Oregon State University - RETALK Program	$1,000
UPRM Release Load - 3 CE Faculties worked on CRC research and teaching topics (Guevara-1 cr. ; Saffar-4 crs ; Ramos - 2 crs, Colucci - 2 crs	$40,000
Coastal Hydraulic Lab (ERDC) speaker on National Coastal Research and Development Speaker	$2,000
PR Climate Change Change Speaker -3 hours	$500

14. **Metrics:**

Metric	**Year 1** (1/1/16 – 6/30/16)	**Year 2** (7/1/16 – 6/30/17)
HS-related internships (number)	10	16 [1]
Undergraduates provided tuition/fee support (number)		1
Undergraduate students provided stipends (number)		2
Graduate students provided tuition/fee support (number)	5	9[2]
Graduate students provided stipends (number)	6	9[2]
Undergraduates who received HS-related degrees (number)		N/A
Graduate students who received HS-related degrees (number)		n/A
Certificates awarded (number)		245
Graduates who obtained HS-related employment (number)		2
Lectures/presentations/seminars at Center partners (number)		0
DHS MSI Summer Research Teams hosted (number)		N/A
Journal articles submitted (number)	1	0
Journal articles published (number)	1	0
Conference presentations made (number)	2	31
Other presentations, interviews, etc. (number)	2	8
Trademarks/copyrights filed (number)		0
Requests for assistance/advice from DHS agencies (number)		
Requests for assistance/advice from other Federal agencies or state/local governments (number)	5	
Total milestones for reporting period (number)		2
Accomplished fully (number)	2	2
Accomplished partially (number)		N/A
Not accomplished (number)		N/A

Some Pictures of Project Activities

Oregon State SUMREX Participation (June -July 2016): Kevin Cueto and Diego Delgado



Announcement of Conference

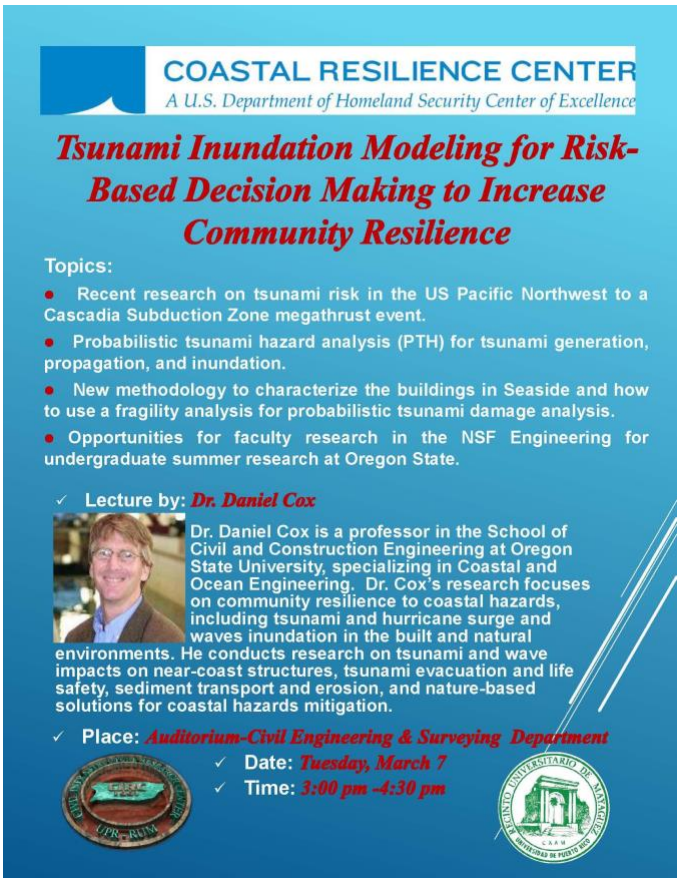
Lessons Learned and Best Practices: Resilience of Coastal Infrastructure March 7-8, 2017

Participants Photos: Conference Lessons Learned and Best Practices: Resilience of Coastal Infrastructure March 8-9, 2017

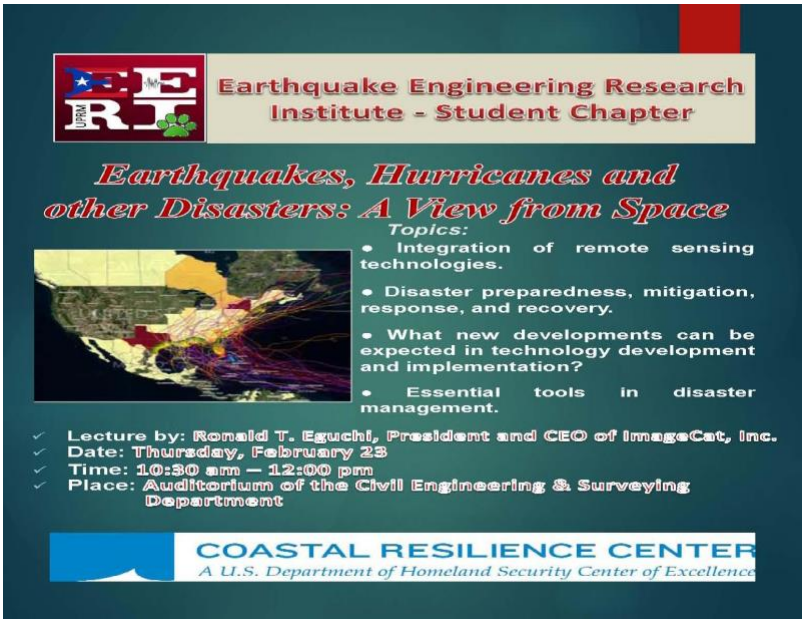
Participants from the ERDC- US Army Corp of Engineers at the

Conference Lessons Learned and Best Practices: Resilience of Coastal Infrastructure March 8-9, 2017

Agmus 2016 Summer Students Research Symposium Sponsored by NSF and Others where four of the students who participated in the 2016 ERDC Research Internship (in Coastal and Hydraulic Laboratory) at ERDC presented their Research work



Flyer Dan Cox Seminar



Flyer Ron Eguchi Seminar

Sample of UPRM Capstone Project – Coastal urban development

Figure 5 - Ocean-view terraces at front of structure.

Figure 3 - Front of lot will include other amenities and family and friends oriented activities.