

CHEN, JCSU
DHS Coastal Resilience Center
Education Project:
Annual Project Performance Report

Covers reporting period January 1, 2016 – June 30, 2016

1. **Project Title:** Preparing Tomorrow's Minority Task Force in Coastal Resilience through Interdisciplinary Education, Research, and Curriculum Development

2. **Principal Investigator / Institution:** PI, Dr. Hang Chen, Johnson C. Smith University
Other Education Participants/Partners: UNC-Chapel Hill, UNC-Charlotte, and Jackson State University (major partners)

3. **Short Project Description:** We focus on the integrative, interdisciplinary nature of real-world problems and strive to bridge traditional academic programs to develop solutions to coastal resilience and its related problems facing our nation. The proposed program will build an undergraduate education framework to prepare tomorrow's minority task force in coastal resilience (approximately 80% of students are minorities), which presents tailored courses in coastal resilience, applied research experience, knowledge transfer activities, scientific seminars, and summer camps.

4. **Abstract:**

Given the national need to prepare future coastal resilience professionals with educational and research experience, this proposed program supports a critical mission. Most existing coastal resilience related curricula currently either target graduate programs or vocational education. We will develop an undergraduate education framework that meets the needs and standards for excellence in undergraduate education.

The project is designed around the following aims:

 - 1) **Aim 1:** Develop a curriculum to prepare undergraduate students for careers in coastal resilience;
 - 2) **Aim 2:** Create partnerships to conduct applied research in the area of coastal resilience;
 - 3) **Aim 3:** Create ongoing opportunities for the transfer of skills, knowledge, people and ideas between JCSU and the community at large.

To help reach these goals, we define the following objectives:

 - 1) **Objective 1:** Develop four new courses to educate students with demonstrated interests and aptitudes in the area of coastal resilience study;
 - 2) **Objective 2:** Design and deploy an interdisciplinary coastal resilience seminar series;
 - 3) **Objective 3:** Establish and develop Faculty/Student research collaborations in coastal resilience;

- 4) **Objective 4:** Design and offer a summer camp to expose and increase the awareness of undergraduate students in coastal resilience study.

5. **End users:**

End User	Agency/Employer	Project Role
Dr. Rick Luettich	Principal Investigator & Director, the U.S. Department of Homeland Security's Coastal Resilience Center of Excellence UNC-Chapel Hill	External Advisor
Dr. Gavin Smith	Director, the U.S. Department of Homeland Security's Coastal Resilience Center of Excellence UNC-Chapel Hill	Collaborator (guest lecturer); Transition (helps students with internships/employment).
Dr. Robert W. Whalin Thomas Richardson	Jackson State University	Collaborator; Transition (Graduate study pipeline)
Kay Read	IT-oLogy	Transition (helps students with internships/employment).
Dr. Yufeng Wu	<i>University of Missouri-St. Louis</i>	Collaborator (guest lecturer, research project supervisor); Transition (Graduate study pipeline).
Elizabeth Austin	Society for Information Management-Charlotte region Chapter	Transition (helps students with internships/employment).
Dr. Mohamed Shehab	UNC Charlotte	Collaborator (guest lecturer, research projects supervisor); Transition (Graduate study pipeline).
Dr. Bei-Tseng Chu	UNC Charlotte	Transition (Graduate study pipeline).
DHS/FEMA Region IV/Mitigation Risk Analysis Branch Chief	DHS/FEMA	Collaborator (guest speakers); Transition (helps students with internships/employment).
Jeff Stovall Chief Information Officer at City of Charlotte	City of Charlotte	Collaborator (guest speakers); Transition (helps students with internships/employment).

6. **Explanation of Changes:**

None.

7. **Unanticipated Problems:**

None.

8. **Project Outcomes:**

There are numerous jobs in the DHS enterprise available for qualified candidates who majored in Computer Science and Engineering. Nearly 70% of graduates with a master's degree in computer science are international students. Due to the fact that candidates must be U.S. citizens to fulfill federal government jobs, many employers are facing a serious shortage of computer science and engineering professionals. Moreover, according to the data reported by the Computing Research Association, only 4.5% of all new recipients of bachelor's degrees in computer science or computer engineering are African American. It is critical to recruit and retain more underrepresented minority students into the STEM pipeline

All DHS end users who hire engineers, regardless of degree level, need engineers to have as much knowledge of coastal natural disasters as possible. However, most existing coastal resilience related curricula either target graduate programs or vocational education. No other computer science and engineering undergraduate program in the U.S. offers courses which focus on natural disaster resilience.

The education program we propose meets the needs and standards for excellence in undergraduate education. The curriculum and research experience will provide students a solid knowledge foundation and skills to conduct coastal resilience research. JCSU is an HBCU with an approximately 80% minority population. Studies suggest that building partnerships between research-intensive universities and undergraduate-focused, minority-serving institutions can go beyond merely supplying the pipeline. We work with partner ins to identify gaps in the undergraduate training of coastal resilience for DHS and other agencies to ensure their success in graduate school and future careers.

Year 1 (January 1, 2016 to June 30, 2016) Outcome highlights:

1. Eight students conducted coastal resilience undergraduate research in spring 2016 semester.
2. Twenty students participated in coastal resilience one-week summer camp (May 9 to 13, 2016).
3. Nine students conducted four-week summer undergraduate research. (May 16 to June 11).
4. Nine students who participated in DHS CRC research graduated in May 2016. Two students were awarded scholarships to attend graduate programs at University of Cincinnati and University of North Carolina, Charlotte.
5. Graduates placements include: Army National Guard 35T military Intelligence Systems Maintainer/Integrator, FBI, US Department of Justice, United Technologies Corporation.

9. **Education Activity and Milestone Progress:**

Education Activities and Milestones: Progress to Date

Reporting Period 1/1/2016 – 6/30/2016			
Education Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
Develop one new course.	04/30/2016	100%	
Host Three Seminars.	04/30/2016	100%	Completed by 05/11
Select eight students to conduct research projects	01/30/2016	100%	
Design a one-week summer camp focused on Coastal Resilience	05/01/2016	100%	
Select nine students and three faculty to form the summer research teams.	05/01/2016	100%	
Education Milestone			
New course will be offered for fall semester.	05/01/2016	100%	
Eight students completed the spring research project.	05/01/2016	100%	
Twenty Students complete the one-week summer camp.	05/30/2016	100%	
Nine students complete the four-week summer research projects.	06/30/2016	100%	

10. Transition Activity and Milestone Progress:

Transition Activities and Milestones: Progress to Date

Reporting Period 1/1/2016 – 6/30/2016			
Transition Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
The students who participated in the research projects will be available for employment in the greater Homeland Security enterprise.	06/30/2016	100%	
Dissemination of the undergraduate education and research education framework and results.	06/30/2017	On schedule	
Develop the collaboration with research partners.	06/30/2017	On schedule	
Transition Milestone			
Graduates are employed in greater HS enterprise or continued graduate school enrollment	06/30/2017	On schedule	
Conference presentation and publications of the project results.	06/30/2017	On schedule	
Students present research finding at regional and national conferences.	06/30/2017	On schedule	

11. Interactions with research projects:

1. Worked with the CRC Education Director and the Transition Director to place students in the CRC SUMREX programs. Since we started the process in February, most of our high potential computer science and engineering students had secured their summer internships. We will plan the selection process earlier in Year 2.
2. Worked with the CRC Director to connect with end users and research partners. We will invite research partners to give seminars in fall 2016-2017 semester.

12. Publications:

Ying Bai, Hang Chen, "Build a Real Time Optimal Evacuation Contraflow Model for Natural Disasters by Using a Fuzzy Inference System," 2016 IEEE Symposium

Series on Computational Intelligence (IEEE SSCI 2016). (Submitted on May 20th, 2016)

Ying Bai, Hang Chen, "Build a Real Time Optimal Evacuation Contraflow Model for Natural Disasters by Using a Fuzzy Inference System," Natural Hazards Review. (Submitted on June 13rd, 2016)

Students completed their research projects in summer 2016. Abstracts will be submitted in fall 2016 to 2017 National Undergraduate Research Conference.

Cody Byrd, Jean-Marie Nshimiyimana, Ehije Idehenre, Hang Chen (Faculty Advisor), "Data Analysis of Haiti's Resiliency Post-2010 Earthquake".

Shania Knight, Christian Fair, Ramoya Grandison, Ying Bai (Faculty Advisor) "Using Fuzzy Inference System to Build Real Time Optimal Evacuation Contraflow Model".

NyJae Dickerson, Adonis Tillman, Desmond Taylor, Awatif Amin (Faculty Advisor) "Using Data Mining to analyze Natural Disasters at 10 countries".

14. CRC Performance Metrics:

CRC Performance Metrics			
Metric	Research	Education	Center
Courses/certificates developed, taught, and/or modified		See Table	
Enrollments in Center-supported courses/certificates			
HS-related internships (number)		1	
Undergraduates provided tuition/fee support (number)		0	
Undergraduate students provided stipends (number)		37	
Graduate students provided tuition/fee support (number)		0	
Graduate students provided stipends (number)		0	
Undergraduates who received HS-related degrees		9	
Graduate students who received HS-related degrees		0	
Certificates awarded (number)		0	
Graduates who obtained HS-related employment		3	
SUMREX program students hosted (number)			
Lectures/presentations/seminars at Center partners		0	
DHS MSI Summer Research Teams hosted (number)		0	
Journal articles submitted (number)		1	
Journal articles published (number)		0	
Conference presentations made (number)		0	
Other presentations, interviews, etc. (number)		0	
Patent applications filed (number)			
Patents awarded (number)			

Trademarks/copyrights filed (number)		0	
Requests for assistance/advice from DHS agencies		0	
Requests for assistance/advice from other Federal		0	
Total milestones for reporting period (number)		7	
Accomplished fully (number)		4	
Accomplished partially (number)		3	
Not accomplished (number)		0	
Product/s delivered to end-user/s (description and	See Table		
External funding received	See Table		
Leveraged support			
Articles on Center-related work published on website			
Coverage in media, blogs (number)			
Social media followers (number)			
Posts to social media accounts (number)			
Events hosted (number)			
Website hits (number)			

Table for Documenting CRC Education Project Courses and Enrollments

Courses Developed by Johnson C. Smith University under Project Preparing Tomorrow's Minority Task Force in						
Course		Developed (D), Revised (R), and/or Taught				
Number	Title	1	2	3	4	5
CSE439	Technology in Emergency Management	D				
	Offering: Elective (E), Concentration (C), Minor (M)	-				
	Enrollment	-				
	Community Resilience Summer Camp	D	T			
	Offering: Elective (E), Concentration (C), Minor (M)	-	N/A			
	Enrollment	-	20			

Table for Documenting External Funding and Leveraged Support

External Funding			
Title	PI	Total Amount	Source
STEM Innovation Center	Carter, Ronald L.(President of JCSU)	\$1.655 Million. We utilized the fund (\$4,500) to support 5 faculty to develop community resilience seminars.	Kenan Charitable Trust
Carolina Cyber Defense Scholarship	Hang Chen	\$262,917 We utilized the fund to support undergraduate tuition and travel.	NSF

Leveraged Support			
Description			Estimated
Reduced indirect cost of 8% (DHS negotiated rate of 34.4%)			\$20,188
In-kind faculty time to supervise Summer Research for 4-weeks (\$3,000			\$25,000