

FAIK, JCSU
DHS COASTAL RESILIENCE CENTER
EDUCATION PROJECT
YEAR 5 PROGRESS REPORT
July 1, 2019 – June 30, 2020 (Updated 12/15/2020)

I. INTRODUCTION

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

Principal Investigator Name/Institution:

PI, Dr. Ahmed Faik, Chair and Assistant Professor of the Department of Computer Science and Engineering Johnson C. Smith University

Other Partners/Institutions: UNC-Chapel Hill, UNC-Charlotte, and Jackson State University (major partners)

Short Project Description (“elevator speech”):

In this DHS-funded program we aim to emulate the integrative and interdisciplinary nature of real-world problems with our project based courses and summer camps. This program aims at preparing tomorrow’s minority task force in coastal resilience (almost all of JCSU students are minorities) by presenting tailored courses in coastal resilience, applied research experience, knowledge transfer activities, scientific seminars, and summer camps. Project-supported courses are designed to introduce engineering and data analytics to better understand coastal resilience. Summer camps, seminars and undergraduate research projects are powerful tools used to engage all students and all disciplines in addressing coastal resilience issues.

II. PROJECT NARRATIVE:

I. Project overview:

Given the national need to prepare future coastal resilience professionals with educational and research experience, this proposed program supported a critical mission. Most existing coastal resilience related curriculum currently either target graduate programs or vocational education. We developed an undergraduate education framework that meets the needs and standards for excellence in undergraduate education. In addition, we conducted several research projects during the regular semesters as well as during the summer that aimed at engaging the students in coastal resilience-related subjects. The students were introduced to and learnt how to use specialized software (e.g. Tableau and Arc-GIS) and apply them on real-life events.

The project was designed around the following aims:

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

To help reach the above-mentioned goals, we defined the following processes:

- 1) Process 1: Develop four new courses to educate students with demonstrated interests and aptitudes in coastal resilience study;
- 2) Process 2: Design and deploy interdisciplinary coastal resilience seminar series;
- 3) Process 3: Establish and develop Faculty/Student research collaborations in coastal resilience;
- 4) Process 4: Design and offer a 1-week summer research camp to expose and increase the awareness of undergraduate students in coastal resilience study.
- 5) Process 5: Design and offer a 4-week summer research project to expose and increase the awareness of undergraduate students in coastal resilience study.

2. End users:

- In the Fall of 2019 two faculty members with 4 students each conducted two separate DHS CRC related research projects.
- In the Spring of 2020 four faculty members with a total of 12 students conducted four separate DHS CRC related research projects.
- In the Summer of 2020 two faculty members guided 25 students through a 1-week intensive DHS CRC related research projects.
- In addition, during the Summer of 2020 three faculty members with a total of 12 students conducted four separate DHS CRC related research projects.

3. Unanticipated Problems:

We did not manage to get any faculty from the End user's list in our work-plan to give their talks during the Fall 2019 semester. We planned on getting at least a couple during the Spring 2020 semester, but our plans were cut short by the unforeseen circumstance brought by the COVID-19 pandemic.

4. Students and recent graduates:

Given the current circumstances due to the pandemic and the fact that the students have just graduated 2 weeks ago, we do not know yet where our graduates may end up applying for.

Information was collected last semester, Spring 2020, from graduating students and more information will be collected from more graduating students this semester. This information will be reported later in the year.

5. Project Impact:

The courses incorporated cybersecurity, data mining, machine learning, ArcGIS and bioinformatics.

a) Institutionalization:

Funding Agency	Project Title	Project Director or PI	Project Period	Amount Awarded
UNCC/Defense Intelligent Agency	UNC Charlotte Intelligence Community Center of Academic Excellence	Awatif Amin, Anita Bledsoe-Gardner	09/09/2019 09/08/2024	\$195,651
DOL/University of Cincinnati subaward	The "NEXT" Apprenticeship Program	Terik Tidwell, Ahmed Faik	01/01/2020 07/14/2023	\$261,580
Exxon Mobile/Oxford University's subaward	Worldwide Antimalarial Drug Resistance Network Project	Sabina Otienoburu	01/01/2020 12/31/2020	\$19,809
Department of Education, Office of Post-secondary Education	Minority Science and Engineering Improvement Program (MSIEP): Embedding Active and Experiential Learning and Entrepreneurial Thinking into Computer Science and Engineering Education	Suryadip Chakraborty	10/01/2017 09/30/2020	\$736,286
Department of Education, Office of Postsecondary Education, MSEIP Supplemental Grant	Minority Science and Engineering Improvement Program Capacity Competitiveness Enhancement Model (MSEIP CCEM)	M. Todd Coolbaugh, Sabina Otienoburu, Rosalyn Lang Reid	10/01/2018 09/30/2020	\$197,282

b) Where will project deliverables be maintained?

The project will be maintained in our STEM College

c) Who was involved in planning for institutionalization?

Some of the faculty members of our Computer Science and Engineering department as well as one or two faculty members of the Natural Sciences and Mathematics (NSM) department will be involved in sustaining the project. Mostly the same faculty members who were involved in the project in the past year, plus one or two others.

6. Interactions with research projects:

Location: US Department of Homeland Security Centers of Excellence Summit - George Mason University in Arlington, Virginia.

Time: July 21 – August 1, 2019

Presentation: Building Tornado Resilient Communities.

Presentation: Drone-based MIR Laser Induced Thermal Imaging for Identification of Chemical Substances (presentation at Summit)

Location: American Society of Engineering Educators - Auburn University - Auburn, Alabama.

Time: March 8-10, 2020.

Presentation: National Coastal Hazards Preparedness Evaluation

Location: DHS Coastal Resilience Center of Excellence 5th Annual Meeting. 2019 DHS COE Summit - Chapel Hill, North Carolina.

Time: March 11-13, 2020.

Presentation: An experience in group development

Smith Institute Student Poster Competition - Johnson C. Smith University - Charlotte, North Carolina

Time: May 15, 2020

Presentation: Building Tornado Resilient Communities.

III. EDUCATION ACTIVITIES AND TRANSITION MILESTONES

1. Year 5 Education Activities and Milestone Achievements:

Education Activities and Milestones: Status as of 6/30/2020			
<u>Education Activities</u>	<u>Proposed Completion Date</u>	<u>% Complete</u>	<u>Explanation of why activity/milestone was not completed</u>
Host three seminars each semester.	6/1/2020	100	
Select eight students to conduct research projects.	6/1/2020	100	
Select 20 students to participate in the one-week summer camp focused on Coastal Resilience.	6/30/2020	100	
Select nine students and three faculty to form the summer research teams.	6/30/2020	100	
Dissemination of undergraduate coastal resilience education and research, by attending conferences and publishing. The	6/30/2020	100	

target audience are faculty and students of other education institutions. Faculty and students of other education institutions will benefit from the research, as well as our students who will benefit from the networking during the conferences.			
Create ongoing opportunities for the transfer of skills, knowledge, people and ideas between JCSU and the community at large. By collaborating with other education institutions, local county and companies.	Continuous	100	Looking back at our records, we did have collaboration with the graduate program coordinator at UNC Charlotte. We also had representatives from Wells Fargo, Bank of America and Slalom Consulting (Business management consultant in Charlotte, North Carolina), who gave seminars to our students.
Education Milestones			
Students are registered in the four developed courses. The desired number of students enrollment in each course is 20.	6/1/2020	100	
Eight students complete the spring research course and research project	6/1/2020	100	
20 students complete the one-week summer camp	6/30/2020	100	
Nine students and three faculty members complete four-week summer research projects. The end results are power point presentations and posters that can be presented in conferences.	6/30/2020	100	
Student participants receive external scholarships, fellowships, internships, and training opportunities from DHS enterprise. Estimated one or two in each category.	6/30/2020	0	Did not manage to find external scholarships, fellowships, internships, and training opportunities from DHS enterprise Status remains the same. We will try to collaborate with other Coastal Resilience centers.
We are planning on embedding research projects, which were carried out during the grant period, into the four courses that were developed specifically for this DHS program. By doing so we would have established a process	6/30/2020	100	

that will sustain our achievements during the DHS grant period.			
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2. Year 5 Transition Activities and Milestone Achievements:

Year 5 Transition Activities and Milestones: Status as of 6/30/2020			
<u>Transition Activity</u>	<u>Proposed Completion Date</u>	<u>% Complete</u>	<u>Explanation of why activity/milestone was not completed</u>
Continued enrollment of students in developed courses and research projects. We will be applying to the university and outside agencies to fund the research projects of approximately \$200,000-\$500,000, as described ahead of this table.	6/30/2020	100	
Dissemination of the undergraduate education and research education framework and results. The results will be presented to practitioners in the field through conferences and publications. Other universities will benefit from the information.	6/30/2020	100	
Develop the collaboration with research partners at other academic research institutions by exchanging personnel, as well as collaborating with local companies and the county by exchanging data.	6/30/2020	0	Did not have the opportunity and the time to find the companies to collaborate with. Status remains the same, but we will keep trying.
<u>Transition Milestone</u>			
Graduation of BS students and employment in greater HS enterprise or continued graduate school enrollment. Our total number of department graduates is 10-20 per year, of which we estimate 1-5 students will go into HS employment or graduate school.	6/30/2020	0	Some graduates we were unable to track. Students who we were able to track we were unable to find HS employment for. Status remains the same, but we will try to track students who graduated in May 2020, as well as students who will be graduating in May 2021.
conference presentation and publications of the project results. Estimate 3-5 presentations/publications.	6/30/2020	100	
Students present research finding at one or two regional and national conferences.	6/30/2020	100	

We are in the process of getting connected with potential employers who are in the field of HSE-STEM domain. We also plan to invite more experts and recruiters in this field to give their presentations in our seminar courses. The experts and recruiters are expected to introduce our students to potential research and job opportunities.	6/30/2020	0	Did not manage to get connected with potential employers due to time conflicts and limited time. In year 6 we plan to collaborate with UNC Chapel Hill faculty experts in HSE-STEM domain to interact and share their experience with our students for potential research and job opportunities.
We are planning on contacting our graduates who participated in this DHS program to keep track of their career pathways.	6/30/2020	0	Have not managed to contact 2019 graduates. Status remain the same and efforts will continue to be made.

3. Annual Courses and Enrollments

Annual Courses and Enrollments

Courses Developed and Taught by Johnson C Smith University under Project DHS CRC						
<u>Course</u>		<u>YEAR</u>				
<u>Number</u>	<u>Title</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>	<u>YR 5</u>
CSC432	Course Title: <u>Data Mining</u>					
	Status: Developed (D); Revised (R); and/or Taught (T)	D, T	T	R, T	R, T	T
	Offering: Elective (E), Concentration (C), Minor (M)	E	E	E	E	E
	Number of students enrolled	12	8	10	10	7
CSE439 A	Course Title: <u>Introduction to Geographic Information System (GIS)</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>	<u>YR 5</u>
	Status: Developed (D); Revised (R); and/or Taught (T)	-	-	D, T	R, T	T
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	E	E
	Number of students enrolled	-	-	10	10	18
CSE439 B	Course Title: <u>Risk Analysis and Management</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR4</u>	<u>YR 5</u>
	Status: Developed (D); Revised (R); and/or Taught (T)		D, T			
	Offering: Elective (E), Concentration (C), Minor (M)	E	E	E	E	E
	Number of students enrolled		10			
CSC210	Course Title: <u>Career Prep I</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>	<u>YR 5</u>
	Status: Developed (D); Revised (R); and/or Taught (T)		D	T	R, T	T

Offering: Elective (E), Concentration (C), Minor (M)				C	C	C
Number of students enrolled				16	30	32
CSC211	Course Title: Career Prep II	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>	<u>YR 5</u>
	Status: Developed (D); Revised (R); and/or Taught (T)		D	T	R, T	T
Offering: Elective (E), Concentration (C), Minor (M)				C	C	C
Number of students enrolled				19	30	20
#	Course Title: Introduction to Network Science	<u>YR 1</u>	<u>YR 2</u>	<u>YR3</u>	<u>YR 4</u>	<u>YR 5</u>
	Status: Developed (D); Revised (R); and/or Taught (T)				D	T
Offering: Elective (E), Concentration (C), Minor (M)					E	E
Number of students enrolled						13

IV. PUBLICATIONS AND METRICS

1. Publications:

a) Publications

- Ying Bai & **Hang Chen**, “Build an Optimal Evacuation Contraflow Model for Natural Disasters by Using Fuzzy Inference System”, to be appeared on Proceedings of the 2018 IEEE International Conference on Fuzzy System, July 8-13, Rio de Janeiro, Brazil, 2018.
- Cody Byrd, Jean-Marie Nshimiyimana, Ehije Idehenre, **Hang Chen** (Faculty Advisor), “Data Analysis of Haiti’s Resiliency Post-2010 Earthquake”. Presented at the 2017 Emerging Researchers National (ERN) Conference in Science, Technology, Engineering and Mathematics (STEM).
- NyJae Dickerson, Adonis Tillman, Desmond Taylor, Awatif Amin (Faculty Advisor) “Using Data Mining to analyze Natural Disasters at 10 countries”. Presented at the 2017 Emerging Researchers National (ERN) Conference in Science, Technology, Engineering and Mathematics (STEM).

2. Performance Metrics

Faik: Performance Metrics:

<u>Metric</u>	<u>Year 1</u> (1/1/16 – 6/30/16)	<u>Year 2</u> (7/1/16 – 6/30/17)	<u>Year 3</u> (7/1/17 – 6/30/18)	<u>Year 4</u> (7/1/18 – 6/30/19)	<u>Year 5</u> (7/1/19 – 6/30/20)
HS-related internships (number)	1	1	0	0	0
Undergraduates provided tuition/fee support (number)	0	0	0	0	0
Undergraduate students provided stipends (number)	37	47	40	51	57
Graduate students provided tuition/fee support (number)	0	0	0	0	0
Graduate students provided stipends (number)	0	0	0	0	0
Undergraduates who received HS-related degrees (number)	9	20	7	12	18
Students who participated CDC Research					
Graduate students who received HS-related degrees (number)	0	0	0	0	0
Certificates awarded (number)	0	0	0	0	0
Graduates who obtained HS-related employment (number)	3	0	0	0	0
Lectures/presentations/seminars at Center partners (number)	0	0	0	0	4
DHS MSI Summer Research Teams hosted (number)	0	0	0	0	0
Journal articles submitted (number)	1	1	1	0	0
Journal articles published (number)	0	0	1	11	0
Conference presentations made (number)	0	2	0	2	4
Other presentations, interviews, etc. (number)	0	0	0	0	0
Trademarks/copyrights filed (number)	0	0	0	0	0
Requests for assistance/advice from DHS agencies (number)	0	0	0	0	0
Requests for assistance/advice from other agencies or governments (number)	0	0	0	0	0
Dollar amount of external funding	\$267,417	\$887,917	\$2,031,917	\$987,736	
Total milestones for reporting period (number)	7	6	0	7	6
Accomplished fully (number)	4	6	0	5	5
Accomplished partially (number)	3	0	0	0	0
Not accomplished (number)	0	0	0	2	1