

**WHALIN, JSU
DHS COASTAL RESILIENCE CENTER
EDUCATION PROJECT
YEAR 4 PROGRESS REPORT
July 1, 2018 – June 30, 2019**

Project Title:

PhD in Engineering (Coastal Engineering and Computational Engineering) at an HBCU.

Principal Investigator Name/Institution:

Robert W. Whalin, Ph.D., P.E., D. CE; Professor of Civil Engineering and Education
Director, Coastal Resilience Center of Excellence, Jackson State University (JSU).

Other Partners/Institutions:

US Army Engineer Research and Development Center (ERDC), Vicksburg, MS and Texas
A&M University at Galveston

Short Project Description (“elevator speech”):

This project focuses on strengthening the establishment and institutionalization of the PhD in Engineering (Coastal Engineering and Computational Engineering concentrations) accomplished during years 1 to 3 of this CRC education project. A steady output of MS and PhD Engineering degree graduates with Coastal Engineering or Computational Engineering concentrations focused on coastal natural disasters is projected to be established and to help increase workforce diversity in the greater Homeland Security enterprise.

1. Introduction and project overview:

This project directly addresses the education need for graduate engineering programs focused on coastal natural disasters to provide engineers that can help mitigate the ever-increasing cost of damages, especially those from tropical storms and hurricanes that DHS is confronted with through FEMA missions. Almost no graduate coastal engineering programs are focused on coastal natural disasters and none are located at an HBCU where a large percentage of African American engineers matriculate. Jackson State University has an African American student body exceeding 80% which will directly support the DHS Strategic Plan Goal to Enhance the DHS Workforce, especially the Objective to increase Workforce Diversity and Priority Goal 3 to Enhance Resilience to Disasters. Leverage of federal assets is assured by the Education Partnership Agreement (authorized by Public Law) between the Engineer Research and Development Center and Jackson State University. The Agreement facilitates ERDC providing Adjunct Faculty, student internships and potential use of ERDC experimental and computational facilities for graduate research. An excellent record of DHS End User involvement and transition of graduates to end users continued throughout year four of the Coastal Resilience Center of Excellence. Research staff and graduate students had direct participation in a CRC research project, and in highly relevant hurricane barrier projects nationwide (funded by others) including the Ike Dike concept for protecting Galveston Island and the greater Houston metropolitan area from devastating, albeit low probability, hurricane surges. Coastal Engineering education programs nationwide have been on a decline for the past two decades and United States

leadership in the coastal engineering profession has declined relative to other nations. This project will help ameliorate the trend while increasing the supply of minority coastal and computational graduate level engineers focused on the field of coastal natural disasters.

2. End users:

A list of end-users that participated in this project during Year 4 follows. Their project role is included focusing on facilitating transitions to these end users as appropriate. Discussions were held with each at either the CRC Annual Meeting, at ERDC, at MS Engineering Society Meetings, during classes or on other professional occasions.

Table 1: End-User Involvement

End-User	Agency/Employer	Project Role (Year 4)
	FEMA Region IV	Transition, potential employer
BG (Ret) Robert Crear Chairman, Free Flow Power Development, LLC	Free Flow Power	Collaborator (guest lecturer), Transition (assists with student internships/employment).
Mr. Mark Sanders GIS Specialist	MEMA	Collaborator, Transition (potential employer of graduates)
Branch Chief, MVX	USACE Vicksburg District	Transition (potential employer): Sponsored student Society of American Military Engineers. Discussed engineer government careers, employer of graduates.
Mr. John T. Weeks, PE Vice President	SDW	Transition (potential employer)
Research Engineer	ERDC	Collaborator, research advisor for a PhD student: discussed dissertation research several times during Year 4.
Research Engineer	USACE ERDC	Collaborator, Leveraged Project from TAMUG
Director	ERDC	Transition, signatory for Education Partnership Agreements; had several discussions during Year 4.
Director, Geotechnical and Structures Lab	ERDC	Transition; GSL employs graduates. Held discussions.
Research Engineer	ERDC	Adjunct Professor, graduate courses; served on two graduate committees.
Research Engineer	ERDC	Adjunct Prof., graduate courses; served on two graduate committees.

There is a very small number of end-users in FEMA, Corps of Engineers Districts, Emergency Management Agencies and private industry contractors who have engineers with graduate Coastal Engineering education (most especially African American and Hispanic American engineers). This project will help ameliorate this critical deficiency in widespread expertise (over 80% of JSU students are minorities, mostly African American). The immense cost to the taxpayers of rescue and recovery from Hurricane inundation, coastal and estuarine flooding from intensified precipitation events and tsunami inundation drives the need for additional engineers with graduate education focused on coastal natural disasters.

3. Unanticipated Problems:

None. A very good year.

4. Students and recent graduates:

The demographics of students enrolled in Year 4 project core courses for whom I served on their graduate committees Year 4 is shown in Table 1 below:

	Undergraduate	Graduate	
		Full Time	Part Time
Enrolled	0	8	7
Graduated	0	2 PhD	1 MS

Student Demographics for Year 4

The PI advises all students enrolled in Coastal Engineering concentration core courses. He served on the PhD committee of both the PhD Engineering graduates (both Asian) who were in the Transportation Engineering concentration and was Chair of the MS Oral Exam Committee for the MS Engineering graduate (female, African American) who was in the Coastal Engineering concentration.

Former students from Years 1-3 who graduated with a MS Engineering (Coastal Engineering concentration) degree numbered five (two female and two male African American and one Caucasian) and four of the five are employed in the greater homeland security enterprise (two are employed by the US Army Corps of Engineers, two by private industry and we have lost contact with the fifth. Five other former students advised who enrolled in core coastal engineering concentration courses are in academia as post docs (4 Asian PhD) related to the HSE, and a fifth (Asian PhD) is employed by TXDOT specifically to assist during hurricane evacuations. Approximately four additional MS graduates (3 male and 1 female African Americans) are employed in HSE related positions and two were enrolled in homeland security graduate level programs related to resilience during year four.

5. Project Impact:

This project impacted workforce capabilities during year four by graduating an additional MS (coastal engineering concentration student), as scheduled, that was a working professional in

private industry. She was African American. It also added two PhD Engineering graduates, who enrolled in coastal engineering courses, to the greater homeland security academic\ enterprise in post-doctoral teaching and research positions. Two additional MS Engineering graduate students completed a year of graduate studies and are scheduled to graduate in May 2020 (one African American and one Caucasian). Additional, two graduate students were recruited to begin Coastal Engineering concentration studies in Fall 2019. Courses are revised every time taught by adding relevant new literature content. Most commonly from publications in the International Conferences on Coastal Engineering (ICCE), Journal of Coastal Engineering and the ASCE Coastal, Oceans, Ports and Rivers Institute journal. It is a responsibility of all faculty professors to update course content each time taught.

6. Institutionalization:

This education was formally institutionalized by Jackson State University during Year 3 when the PhD Engineering (Coastal Engineering concentration) was approved for award and publication in the graduate catalog. This approval was contained in the Year 3 Annual Report last year. This approval makes the students eligible to compete for graduate assistantship awarded by the universities. The degree program is offered in the Department of Civil and Environmental Engineering where the MS Engineering (Coastal Engineering concentration degree) is housed. The Education Partnership Agreement (EPA) with the U.S. Army Corps of Engineers Engineer Research and Development Center is expected to continue. The EPA facilitates joint research projects with ERDC, facilitates ERDC researchers to teach mutually agreeable graduate courses and facilitates use and or loan of research equipment. The PI led the institutionalization of the PhD program with direct involvement of the Department Chair, Department Curriculum Committees, Associate Dean, College of Science, Engineering, and Technology (CSET); the College Curriculum Committee, the Dean CSET, University Curriculum Committee and the Provost and Vice President for Academic Affairs.

7. Interactions with research projects:

Year four interactions with research projects were focused mostly on research projects of the JSU CRC group out of necessity. Two of the three active PhD students passed their Qualifying Examinations during year four and are now PhD Candidates, they are both completely involved with their dissertation research and are unable to participate in SUMREX which is more appropriate for undergraduate and early MS students. The third active PhD student is preparing to take her PhD Qualifying Examination near the end of July. Of three active MS students, one is a full time working professional that cannot participate in SUMREX experience, a second is on a summer tour with the Olympic baseball team and the third is a part time working professional who is enrolled in a three semester hour Independent Research course to participate in The Netherlands research experience as part of our research subcontract from Texas A&M University at Galveston. JSU is a partner in their NSF Partnership for International Research and Education (PIRE) entitled Coastal Flood Risk Reduction. The PIRE student group made their two-week research trip to The Netherlands during the last two weeks of May. One of our PhD students spent two weeks during July 2018 collaborating on research with a TAMUG professor who accompanied her on The Netherlands research experience during 2018. The other PhD student attended the ADCIRC users group meeting held at ERDC this year. He is a knowledgeable ADCIRC user and it is an integral part of his dissertation research. This keeps

him abreast of the latest advancements to the ADCIRC Modeling System. ERDC researchers gave a lecture in each of my two courses during the year (one fall, one spring).

Year four was a highly productive year for our graduate students relative to interactions with some of the most outstanding coastal engineering researchers worldwide (Delft Technical University, The Netherlands; Texas A&M University, Galveston; Rice University; Texas A&M University, College Station and the Engineer Research and Development Center).

8. Publications:

An updated list of publications appears below. The first two were published during Year 4 and another publication has been accepted (not listed) for Year 5 at the 11th Texas Hurricane Conference.

- **Whalin, Robert W.**, “A PhD in Engineering Degree: Coastal Engineering Emphasis Area,” Proceedings, 126th ASEE Conference, Tampa Bay, FL, June 2019.
- **Ebersole, Bruce; Richardson, Thomas W.; Whalin, Robert W.**, “Suppression of Hurricane Surge Forerunner and Peak Surge in Galveston and West Bays Achieved with a Western Segment of the Coastal Spine,” 10th Texas Hurricane Conference, University of Houston, Houston, TX; Aug. 3, 2018.
- “NSF-PIRE, Coastal Flood Risk Reduction Program, Authentic Learning and Transformative Education”, Volume 1-2015-2017; Edited by Baukje “Bee” Kothius, Yoonjeong Lee and Samuel Brody, March 2018.
- **Ebersole, Bruce; Richardson, Thomas; and Whalin, Robert, W.**, “Surge Suppression Achieved by Different Coastal Spine (Ike Dike) Alignments”, 9th Texas Hurricane Conference, University of Houston, August 4, 2017, Houston, TX.
- **Whalin RW**, Pang Q, Latham J, Lowe LN. Assessment of a Summer Bridge Program: Seven Years and Counting, 2017 ASEE National Conference Proceedings, Columbus, OH, June 24-28, 2017.
- **Whalin RW**. HBCU Engineering Faculty and Graduates: Implications for Race, Retention and Graduation Linkages, NAAAS & Affiliates 2016 National Conference Proceedings, Baton Rouge, LA, published Oct. 2016.
- **Whalin RW**, Brody SD, and Merrell WJ. The Galveston Bay Region as an International Test Bed for Flood Risk Reduction, 8th Texas Hurricane Conference, University of Houston, Houston, TX, August 5, 2016.
- **Ebersole B, Richardson TW**, and **Whalin RW**. Modeling Coastal Storms: Past, Present and Future, 8th Texas Hurricane Conference, University of Houston, Houston, TX, August 5, 2016
- **Whalin, Robert, W.; Pagan-Trinidad, Ismael;** Villanueva, Evelyn; and Pittman, David, W., “A Quarter Century of Resounding Success for a University/Federal Laboratory Partnership”, ASEE 123rd Annual Conference and Exposition, New Orleans, LA, June 26, 2016.

9. Year 4 Education Activities and Milestone Achievements:

Year 4 Education Activities and Milestones: Status as of 6/30/2019

Reporting Period 7/1/2018 – 6/30/2019			
Education Activities	Proposed Completion Date	% Complete	Explanation of why activity/milestone was not completed
Enroll students in Coastal Engineering concentration of MS and PhD Engineering Degree Program	Continuous	100%	---
Advise MS/PhD Coastal Engineering concentration students. PI is the advisor, Records, including course enrollment and graduation information, are kept by PI.	Continuous	100%	---
Schedule PhD Qualifying Exam	Continuous	100%	---
Administer PhD Qualifying Exam	Continuous	100%	---
Education Milestones		100%	---
Enroll at least two students in Coastal Engineering concentration of PhD Engineering degree program	6/30/2019	100%	---
Schedule 1 or 2 PhD Qualifying Exams (Coastal Engineering concentration)	1/30/2019	100%	---
Administer 1 or 2 PhD Qualifying Exams (Coastal Engineering concentration)	6/30/2019	100%	---
At least one student complete minimum required PhD courses (non-research) in the Coastal Engineering concentration	6/30/2019	100%	---
Award at least one MS Engineering Degree with a Coastal Engineering concentration and track plans post-graduation.	5/30/2019	100%	---

10. Year 4 Transition Activities and Milestone Achievements:

Year 4 Transition Activities and Milestones: Status as of 6/30/2019

Reporting Period 7/1/2018 – 6/30/2019			
Transition Activity	Proposed Completion Date	% Complete	Explanation of why activity/milestone was not completed
Coordinate inclusion of Approved Coastal Engineering concentration for PhD Engineering Degree in JSU Graduate Catalog	12/2018	100%	---
Advise MS and PhD Coastal Engineering Concentration students. PI is the primary advisor for Coastal Engineering Concentration students and maintains records.	Continuous	Continuous	---
Transition Milestone			
JSU online Graduate Catalog contains PhD Engineering degree (Coastal Engineering concentration)	12/2018	100%	---
Award at least one MS Engineering degree (Coastal Engineering concentration) and track placement post-graduation.	5/2019	100%	---

11. Tables:

The following Tables enumerate core courses and elective courses taught through Year 4, their enrollment and performance metrics.

Core Courses (Coastal Engineering Concentration)	
CIV 520	Advanced Engineering Analysis
CIV 538	Coastal Structure
CIV 539	Advanced Coastal Engineering Design
CIV 631	Linear Theory of Ocean Waves
CIV 632	Tides and Long Waves
CIV 636	Spectral Wave Analysis
CIV 637	Advanced Design for Breakwater Rehabilitation
CIV 698	Independent Study (4 Separate Courses)
CIV 899	Dissertation Research

Elective Courses	
CIV 535	Pavement Design
CIV 542	Advanced Design of Concrete Structures
CIV 544	Advanced Design of Steel Structures
CIV 544	Advanced Design of Hydraulic Structures
CIV 550	Engineering Hydrology
CIV 561	Chemistry for Environmental Engineering
CIV 567	Environmental Remediation
CIV 568	Land Disposal of Waste
CIV 574	Engineering Hydrogeology
CIV 640	Finite Element Method
CIV 642	Pre-Stressed Concrete Design
CIV 661	Biological Processes in Wastewater Engineering
CIV 675	Earth Dams and Slopes
CIV 899	Dissertation Research

“PhD in Engineering (Coastal Engineering and Computational Engineering) at an HBCU”					
Core and Elective Courses					
#CIV631	Course Title: <u>Linear Theory of Ocean Waves</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	T	T	--	--
	Offering: Elective (E), Concentration (C), Minor (M)	C	C	--	--
	Number of Students Enrolled	6	5	--	--
#CIV637	Course Title: <u>Advanced Design for Breakwater Rehabilitation</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	T	--	T	--
	Offering: Elective (E), Concentration (C), Minor (M)	C	--	C	--
	Number of Students Enrolled	3	--	7	--
#CIV642	Course Title: <u>Pre-Stressed Concrete Design</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	T	--	--	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	E	--	--	E
	Number of Students Enrolled	4	--	--	5
#CIV698	Course Title: <u>Independent Study (4 separate courses)</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	T/R (4 courses)	T/R (4 courses)	T/R (3 courses)	T/R (1 course)
	Offering: Elective (E), Concentration (C), Minor (M)	C	C	C	C
	Number of Students Enrolled	1 each	1 each	1 each	1 each
#CIV538	Course title: <u>Coastal Structures</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	--	T	--	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	--	C	--	C
	Number of Students Enrolled	--	6	--	8
#CIV636	Course title: <u>Spectral Wave Analysis</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	--	T	T/R	--
	Offering: Elective (E), Concentration (C), Minor (M)	--	C	C	--
	Number of Students Enrolled	--	5	5	--
#CIV539	Course title: <u>Advanced Coastal Engineering Design</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	--	T	--	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	--	C	--	C
	Number of Students Enrolled	--	6	--	7
#CIV520	Course title: <u>Advanced Engineering Analysis</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	--	T	T/R	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	--	C	C	C
	Number of Students Enrolled	--	9	4	7
#CIV535	Course Title: <u>Pavement Design</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR 4</u>

	Status: Developed (D), Revised (R), and/or Taught (T)	-	T	-	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	-	E	-	E
	Number of Students Enrolled	-	8	-	8
#CIV542	Course Title: <u>Advanced Design of Concrete Structures</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR3</u>	<u>YR 4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)	-	T	--	--
	Offering: Elective (E), Concentration (C), Minor (M)	-	E	-	--
	Number of Students Enrolled	-	9	-	--
CIV544	Course Title: <u>Advanced Design of Steel Structures</u>	<u>YR 1</u>	<u>YR 2</u>	<u>YR 3</u>	<u>YR4</u>
	Status: Developed (D), Revised (R), and/or Taught (T)		T	--	T
	Offering: Elective (E), Concentration (C), Minor (M)	-	E	--	E
	Number of Students Enrolled	-	8	--	6
CIV544	Course Title: <u>Advanced Design of Hydraulic Structures</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	T	-	T
	Offering: Elective (E), Concentration (C), Minor (M)	-	E	-	E
	Number of Students Enrolled	-	9	-	5
CIV632	Course Title: <u>Tides and Long Waves</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T/R	-
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	C	-
	Number of Students Enrolled	-	-	10	-
CIV550	Course Title: <u>Engineering Hydrology</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T	-
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	-
	Number of Students Enrolled	-	-	10	-
CIV661	Course Title: <u>Biological Processes in Wastewater Engineering</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T	T
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	E
	Number of Students Enrolled	-	-	9	6
CIV561	Course Title: <u>Chemistry for Environmental Engineering</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T	-
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	-
	Number of Students Enrolled	-	-	6	-
CIV567	Course Title: <u>Environmental Remediation</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T	-
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	-
	Number of Students Enrolled	-	-	7	-

CIV675	Course Title: <u>Earth Dams and Slopes</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	T	-
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	E	-
	Number of Students Enrolled	-	-	9	-
CIV568	Course Title: <u>Land Disposal of Waste</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	-	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	-	E
	Number of Students Enrolled	-	-	-	7
CIV574	Course Title: <u>Engineering Hydrogeology</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	-	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	-	E
	Number of Students Enrolled	-	-	-	8
CIV640	Course Title: <u>Finite Element Method</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	T	-	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	-	E	-	E
	Number of Students Enrolled	-	6	-	7
CIV681	Course Title: <u>Excavation Support Systems and Retaining Structures</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	-	T
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	-	E
	Number of Students Enrolled	-	-	-	6
CIV899	Course Title: <u>Dissertation Research</u>	YR 1	YR 2	YR 3	YR 4
	Status: Developed (D), Revised (R), and/or Taught (T)	-	-	-	T/R
	Offering: Elective (E), Concentration (C), Minor (M)	-	-	-	C
	Number of Students Enrolled	-	-	-	1
TOTALS		17	69	70	82

Table: Performance Metrics:

WHALIN: Performance Metrics

Metric	Year 1 (1/1/16 – 6/30/16)	Year 2 (7/1/16 – 6/30/17)	Year 3 (7/1/17- 6/30/18)	Year 4 (7/1/18- 6/30/19)
HS-related internships (number)	5	4	3	3
Undergraduates provided tuition/fee support (number)	1	0	0	0
Undergraduate students provided stipends (number)	0	0	0	0
Graduate students provided tuition/fee support (number)	4	7	10	4
Graduate students provided stipends (number)	2	6	6	3
Undergraduates who received HS-related degrees (number)	2	3	3	3
Graduate students who received HS-related degrees (number)	0	4	4	5
Certificates awarded (number)	0	0	0	0
Graduates who obtained HS-related employment (number)	1	2	3	4
Lectures/presentations/seminars at Center partners (number)	1	1	1	1
DHS MSI Summer Research Teams hosted (number)	0	0	0	0
Journal articles submitted (number) <i>(includes peer-reviewed conference proceedings)</i>	2	0	0	0
Journal articles published (number) <i>(includes peer-reviewed conference proceedings)</i>	2	4	0	0
Conference presentations made (number)	2	4	3	2
Other presentations, interviews, etc. (number)	5	3	5	3
Trademarks/copyrights filed (number)	0	0	0	0
Requests for assistance/advice from DHS agencies (number)	0	4	2	2
Requests for assistance/advice from other agencies or governments (number)	0	3	2	2
Dollar amount of external funding			\$941,825 (YRs 1-3)	\$424,854 Year 4
Total milestones for reporting period (number)	3	4	3	7
Accomplished fully (number)	2	3	3	7
Accomplished partially (number)	1	0	0	0
Not accomplished (number)	0	1	0	0

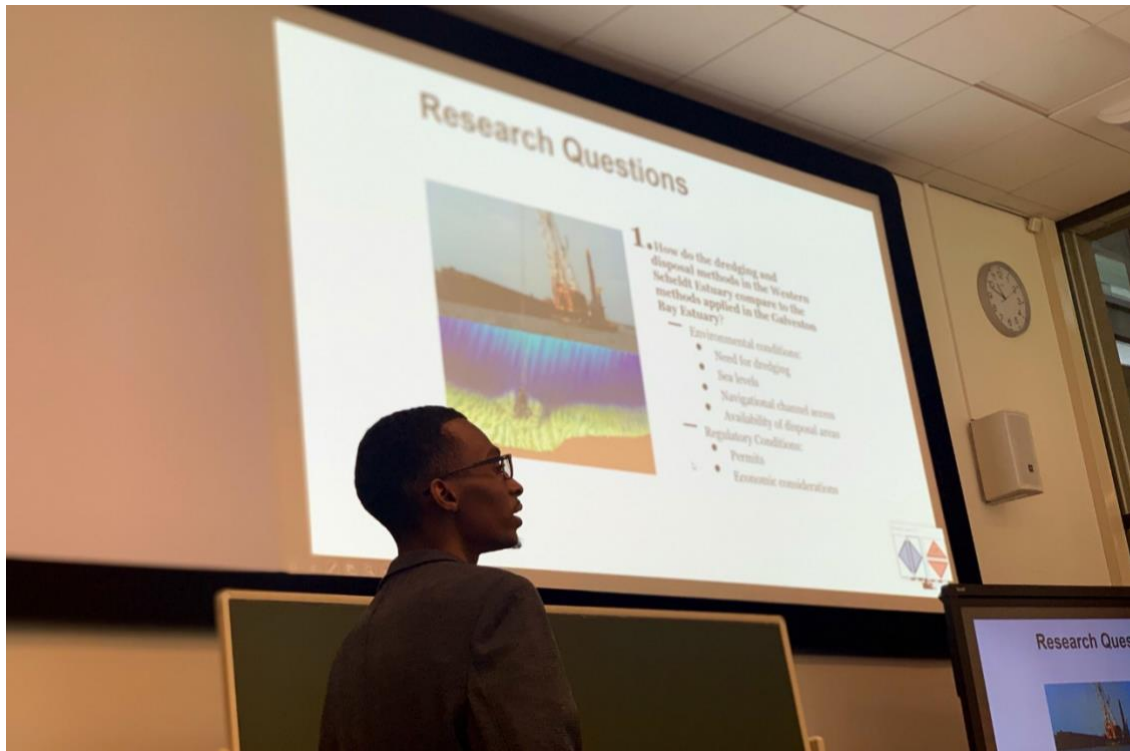


US students (14) on 2019 PIRE trip



JSU student & colleague at Netherlands Flood Control Structure

Western Scheldt Case Study Team



Mr. Akil Mohammad: Making Research Presentation in Netherlands



Half US PIRE Team on the North Sea