

review of Award 1833989 - Annual Project Report

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Cover

Federal Agency and Organization Element to Which Report is Submitted:

4900

Federal Grant or Other Identifying Number Assigned by Agency:

1833989

Project Title:

A Support Ecosystem to Expand Capabilities and Opportunities for STEM Undergraduates Following Hurricane Maria

PD/PI Name:

- **Monica Alfaro, Principal Investigator**
- **Carmen Bellido, Co-Principal Investigator**
- **MERCEDES S FERRER, Co-Principal Investigator**
- **Nayda G Santiago, Co-Principal Investigator**

Recipient Organization:

University of Puerto Rico Mayaguez

Project/Grant Period:

10/01/2018 - 09/30/2022

Reporting Period:

10/01/2020 - 09/30/2021

Submitting Official (if other than PD\PI):

- **Carmen Bellido**
- **Co-Principal Investigator**

Submission Date:

09/30/2021

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)

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Accomplishments

* What are the major goals of the project?

The primary goal in this **EECOS-STEM project** was to provide an ecosystem to increase retention and persistence of STEM-Scholars severely impacted by Hurricane María (**H-Scholars**) in the first place and with the second supplement granted in March of 2020, to a group of STEM-Scholars affected by earthquakes. At the beginning of 2020, they were displaced from their homes by a swarm of earthquakes in the southwest of Puerto Rico (**E-Scholars**).

The three components of this ecosystem are 1) Financial Support, 2) Academic Support, and 3) Socio-Emotional Support.

The Financial Support component selected the participant scholars, granted them scholarships of \$2,500 per semester for a maximum of three years for the H-Scholars, and a maximum of three semesters for the E-Scholars, and monitored their progress and time to degree completion.

The Academic Support Component addressed scholars' core educational needs, familiarized them with opportunities for research, graduate school, and STEM jobs.

The third component, the Socio-Emotional Component, offered participating scholars comprehensive social and emotional service to help them cope with the nature and context of the new or exacerbated challenges they face as the aftermaths of a natural disaster.

It was the first time a project used financial, academic, and socio-emotional support to assist a STEM-Scholar population severely distressed by natural disasters.

This research produces a baseline characterization of the tools that need to be used to provide faster and more effective responses to unexpected hardship situations in the future.

Goal 1: Provides academically talented, low-income UPRM STEM-Scholars severely impacted by Hurricane María (2017) and by the Earthquakes (2020) with the financial, academic, and socio-emotional support needed to expand their academic, personal and professional capabilities in order to complete their program within institutionally established time limits (retention and student success).

Goal 2: Adapts and implements an ecosystem of proven financial, academic, and socio-emotional support strategies as well as to study the effect of that ecosystem on persistence and student success among academically talented, low-income undergraduate UPRM STEM-Scholars.

Goal 3: Contributes to the implementation and sustainability of effective evidence-based co-curricular activities for low-income academically talented undergraduate UPRM STEM-Scholars severely impacted by the two natural disasters, pursuing undergraduate education with the intent to pursue graduate education and entry into the STEM workforce.

* What was accomplished under these goals and objectives (you must provide information for at least one of the 4 categories below)?

Major Activities:

Initially, the **financial support component** proposed to give scholarships to 26 students in the EECOS project. With the consent of the NSF program officer, the scholarship funds were redistributed to assist more applicants. During the first semester of the third year of the project

EECOs, 39 low-income, Hispanic, undergraduate (36) and graduate (3) STEM-Scholars (22 H-Scholars and 17 E-Scholars) received the support of the three components established for this ecosystem. During the second semester of the third year, 36 received the support of the project (22 H-Scholars, and 15 E-Scholars). All the STEM-Scholars selected fulfilled academic progress requirements and GPAs above 2.6 during the academic year 2020-2021. Fourteen STEM-Students graduated during this third year, and now 10 of them are working in the STEM workforce, two are in graduate school, and two are waiting for graduate school's acceptance to continue their studies in STEM fields.

In the third year, the **academic support component** was composed of 9 faculty mentors who gave academic advising and monitored the academic progress of the correspondent STEM Scholars for further involvement in STEM culture. The faculty mentors met virtually and conversed two to three times per semester with each scholar about academic progress in general and the STEM discipline. Mentors advised scholars regarding course selection for the subsequent semesters to assure good progress toward degree completion, taking on a reasonable load to maintain or improve GPA, and acquiring research experience if possible.

The **Socio-emotional support component** provided participating scholars with a comprehensive social and emotional service to cope with the trauma and the consequent challenges added to their academic careers by a natural disaster. Activities of this component during the third year can be classified into three areas as a) personal development activities, b) referrals to psychological counseling services, and c) Moodle online forum. Evaluation results indicated a high level of satisfaction with EECOS Scholar with these activities (3.55 to 3.84 on a scale of 1 to 4).

a) Personal Development Activities

The personal development activities consisted of 2 online workshops in fall 2020 and 10 online workshops in spring 2021; 1 online meeting in fall 2020 and 1 online meetings in spring 2021; online group and individual counseling meetings continue during fall and spring 2020-2021. The EECOS Scholars completed a needs assessment at the beginning of each semester. Most of the EECOS Scholars reported an increase in anxiety due to situations such as the uncertainty provoked by the COVID- 19 lockdown, changes to online classes (synchronic and asynchronous), and worries about not having the organizational skills to deal with different types of schedules in comparison with presential learning. To address these types of needs, the EECOS counselors offered a series of workshops titled: "Effective techniques to manage stress during pandemic times," "Relax Colegial," "Organization and Effective Management of Virtual Time," "Vocational Exploration," "University Stress Management." The EECOS staff, particularly the mentor professors, were invited to participate in workshops titled "Psychoeducational recommendations to professors, to improve the technology-assisted student learning experience" and "Resources for the University Professor: how to help a student in crisis. "

b) Referrals to Professional Counseling and Psychological Services.

Based on the Beck Anxiety Inventory Scale results of 2020-2021 and faculty mentor referrals, 25 of the 42 Scholars (59%) were referred for socioemotional support. Of those seeking help, seven received psychological treatment for chronic conditions, and they were all continuing treatment from previous years. This year we saw a small decrease in cases actively searching psychological services from 26 scholars the second year to scholars in the project's third year of the EECOS project.

The whole academic year, Scholars were given the option of requesting referrals for services, either via their academic mentors or directly with Dr. Carmen Bellido, the co-Pi of the Socio-emotional Component. The academic mentors were reminded that they could suggest a psychological referral for their Scholars should they consider the assistance beneficial. For this,

the academic mentors followed the procedures established in the "Manual of Procedures for Academic and Socio-Emotional Support for EECOS Scholars." Faculty mentors referred cases to Dr. Magaly Mercado and Dr. Zaida Calderon from the Counseling and Psychological Services Department.

c) Moodle online forum

The Moodle (<https://decep.upr.edu/course/>) online EECOS platform distributed a total of 46 artifacts throughout the third academic year. These artifacts included modules, scales, short readings, and quick reference guides. The platform was used to send announcements and to post monthly activities on the calendar. Artifacts posted were on themes ranging from anxiety management, resilience, development of growth mindset skills, self-help topics, personal finances, time management, study skills, and how to ask for professional help on campus, among others. With the help of the counselors this year, we added new snippets of tips in themes such as "Tips to avoid procrastination," "Effective CV," "Communication in Virtual Times," "Development of Study Itinerary for Finals." The article "The inverted study technique and its impact on your academic performance" was added to the online forum. Fourteen videos for self-help strategies were uploaded. The scholars were asked twice a semester to share a written reflection in the online forum about their self-care strategies and to comment on at least two of their peers' reflections as part of the strategies to promote a sense of belonging.

Specific Objectives:

Specific Objectives of Goal 1:

- 1.1) Provide financial support as a \$2,500 scholarship per semester to enable participants to continue their STEM program.
- 1.2) Provide the framework to expand capabilities through monitoring, tutoring, and academic advising by STEM faculty.
- 1.3) Cultivate and enhance each EECOs-Scholar capabilities and identity as a STEM professional.
- 1.4) Provide a socio-emotional support network to enhance resilience skills, growth mindset, and emotional stability needed to support persistence.

Specific Objectives of Goal 2:

- 2.1) Study and assess the impact of the ecosystem of financial, academic, and socio-emotional support on persistence (continued enrollment or graduation) and student success (academic progress as defined by institution – 24 credits per year and minimum 2.00 GPA)
- 2.2) Adapt and implement an intervention methodology to foster a growth mindset for research to develop resilience (grit) and learning growth mindset among participants to help them persist in their STEM education and career goals.
- 2.3) Determine the relationship between participants' resilience for persistence characteristics and learning mindset using quantitative and qualitative techniques.

Specific Objectives of Goal 3:

- 3.1) Familiarize EECO Scholars with graduate studies and career opportunities.
- 3.2) Analyze EECO Scholars' perceptions regarding what experiences were highly effective for their STEM learning and how these might be implemented in core courses.
- 3.3) Disseminate project research outcomes at local and national conferences to impact future research and initiatives.

Significant Results:

During the third year and last year of the project EECOs, 42 STEM-Stem-Scholars affected by Hurricane Maria and by the sequence of devastating earthquakes that hit the southwest of the island at the beginning of 2020 continued to receive the support of all the ecosystem components of this project EECOs.

This year, the financial support component selection committee redistributed the scholarships for students who did not complete their baccalaureate on time. During the last semester, five students received the aid of \$1,500 instead of the usual scholarship of \$2,500. With this redistribution, the entire amount of money awarded for scholarships was spent. The socio-emotional screening done during the first year revealed that 68% of the EECOS scholars needed psychological services for high levels of anxiety, depression, and even post-traumatic stress disorders. These socio-emotional factors resulted in taking and completing fewer credits per semester and more time to complete their degrees. In this third year, we have seen a steady improvement in respect to psychological needs, where now is down to 24% using psychological services, and better strategies to cope with stress related to disasters as well as self-reporting growth mindsets skills.

24 H-Scholars were granted scholarships (22 H-Scholars in the first semester and 21 H-Scholars in the second semester). With the second supplement acquired during the second year, the project supported 18 E-Scholars (17 in the first semester and 15 during the second semester).

During this third year, seven students graduated during the first semester and eight during the second semester. The graduates belong to Civil Engineering (1), Chemical Engineering (2),

Industrial Engineering (1), Electrical Engineering (2), Mechanical Engineering (1), Physical Sciences (1), Industrial Biotechnology (2), Industrial Microbiology (1), Biology (3), Agriculture (1), and Nursing (1).

From the first year to this and the third last year of this project, 34 Stem-Scholars have graduated. The project benefited 65 students in total. Among them are 15 Stem-Scholars that received support during the three years. Twenty-seven (27) continue studying, and the vast majority have over 90 credits approved in their respective programs. Three students dropped out of the program, and we know that one of them transferred to a different university and program.

In the academic support component, the EECOS Project included nine STEM professors as mentors for 2020-2021. These mentors monitored H-Scholar's and E-Scholar's academic progress and supported their efforts with tutoring, academic advising, and opportunities for further involvement in STEM culture. The faculty mentors met virtually mainly and regularly converse with their respective scholars about academic progress in general and the STEM discipline. Mentors advise scholars concerning course selection for the subsequent semesters to assure appropriate progress towards degree completion. Provide the students reflections on the importance of keeping a reasonable pace on academic load to keep or improve GPA and motivate the student to acquire research experience, if possible.

The 42 STEM Scholar participating of this project during the third year has received several benefits that show significant results:

- **42 H-Scholars and E-Scholars** were able to continue their careers with the help of financial support and received all the support that was established during the first year.
- The 42 STEM-Scholars had the opportunity to receive emotional support. Among these Scholars, a total of **25 (59%)** were referred to counseling because of emotional distress and 7 of them continued to receive psychological treatment for chronic conditions. This represents a small decrease in the need of psychological services from previous years.
- We created a video documentary showing 6 successful EECOS alumni from the previous 2 years, 4 victims of Hurricane Maria, and 2 victims of earthquakes. The alumni tell their stories of

overcoming the traumas of having lost everything and how the ecosystem of help provided by the EECOS program was instrumental in helping them graduate and achieve their academic dreams without giving up. See the video in <https://youtu.be/4qIPwGID4Mk>

- The 42 Stem-students received academic support through mentoring.
- The 42 Stem-Scholars were invited and assisted in conferences on different subjects. A minimum of two academic conferences in their field was obligatory for each scholar and two activities for the socio-emotional component.
- The 42 STEM-Scholars received advice during enrollment to see what courses they enroll in and thus complete their academic program.
- The 42 received headphones and 29 received snorkel sets that were acquired during the second year of the project for an academic and socio-emotional conference that was planned but due the Covid-19 pandemic was canceled because of the lockdown
- During the third year of Project EECOs, a total of 15 students graduated from their programs and the rest but one has continued on their STEM fields studies.

Key outcomes or Other achievements:

Key outcome: By the end of the third year of the EECOS project, 65 students benefited from the project, of which 61 (94%) have been retained in STEM careers.

One of the significant key outcomes and achievements of this project during the third year was the opportunity to continue giving support to all the STEM-Scholars that were severely affected by hurricane María and the earthquake events that gravely affected their lives. To see that 15 of them were able to graduate and 24 continue in their STEM path is very meaningful.

EECOs project gave support in 2020-2021 to 42 students of both groups H-Scholars and E-Scholars. It extended the scholarships and the academic and socio-emotional components for a more extended period than the one established at first. This economic support was essential for scholars to continue their education after disastrous natural events that affected their families' financial stability.

The academic component has also contributed to academic achievements. A total of fifteen (15) Stem-Scholars graduated, and all of them are now working or in graduate school. In general, the rest of the Stem-Scholars have shown academic progress and are completing their degrees. EECOs' mentors actively promoted research and Coop-practices and provided information on summer internships and graduate school. However, there were setbacks with the current situation with the COVID-19 pandemic lockdown that prevented some from having these experiences.

The success of the Socio-emotional Component Activities during Y1 lead to an expansion of professional development activities in the second and third years. From one activity per semester the first year, it was increased to more activities adding the Counseling and Psychological Services Department activities per semester during the second and third years. Topics (such as personal finances, graduate school preparation, stress management, Coop-programs,) that the EECOS Scholars requested in the need's assessment. However, some planned face-to-face bonding and belonging sense builder activities had to be canceled.

On the other hand, changes were made in the model to provide professional counseling and psychological therapy services for students we identified as needing or requesting it. In year one and the fall semester 2019, referrals were coordinated with these three institutional offices: The Department of Counseling and Psychological Services, the Psychological Counseling at the Medical Services Department, and the Title 5 RUMboEX Psychological Services Office. After evaluating the student's experiences, since the spring semester of year 2, and with the funds made possible by the supplemental, the Scholars were referred to the professional counselor - Dr. Magaly Mercado, and the psychologist Dr. Zaida Calderon from the Department of Counseling and Psychological Services. EECOS has welcomed the two professionals as part of our team so that the scholars approach them much more freely when they need them. This change has proven to be efficient, making accessing help less cumbersome, more coherent, and organic for Scholars.

* What opportunities for training and professional development has the project provided?

The EECOS project provided the 42 STEM-Scholars with the opportunity to receive training and professional development through an array of activities and the mentorship relation with their respective academic mentor.

- The 42 STEM-Scholars were invited and assisted to a substantial number of virtual conferences on different subjects related to their academic field. These activities were promoted by the different mentors and announced periodically through emails
- The 42 STEM-Scholars received academic mentoring about the importance of research in their careers that resulted in 25% of Scholars taking a research course even the limitations with the pandemic.
- The 42 STEM-Scholars received advice during enrollment to see what courses they enroll in and thus complete their academic program.

The Academic and Socioemotional Support Component provided personal development activities consisting of 2 virtual workshops in fall 2020 and 10 in spring 2021. See titles and resources of the Personal Development Activities follows:

1. **Relax Colegial**, October 15, 2020, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM.
2. **Effective techniques to manage stress during pandemic times**, October 22, 2020, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM
3. **Resources for the University Professor: how to help a student in crisis**. March 30, 2021, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM
4. **Evolution of Life on Earth** by Dr. Matias Cafaro, April 13, 2021, Professor Department of Biology, UPRM
5. **Professional Success Throughout Academic Decision Making** April 15, 2021. Dr. Carlos Rios-Velazquez, Professor Department of Biology, UPRM
6. **All you need to know about the COOP-Programs**. March 25, 2021. Dr. Carlos Muñoz, Professor Department of Biology, UPRM
7. **Hurricane María After Three Years**. April 8, 2021. Professor Ruperto Chaparro, Sea-Grant Program Director, UPRM.
8. **Vocational Exploration** April 23, 2021, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM
9. **University Stress Management** April 25, 2021, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM
10. **Psychoeducational recommendations to professors to improve the technology-assisted student learning experience**. April 15, 2021, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM
11. **Organization and Effective Management of Virtual Time**, May 4, 2021, Dr. Magaly Mercado, Clinical Counselor EECOS UPRM & HOSA Colegial
12. **Group Counseling Activities and Virtual Support Groups** – (Ongoing Online via Google Meet). EECO Scholars participated in these optional activities directed by the Professional Counselor, Dr. Magaly Mercado provided a safe space to vent and share copings strategies. This activity was in collaboration with the Department of Counseling and Psychological Services of UPRM.

The meetings coordinated by the Socio-Emotional component had the dual purpose of collecting information (forms and surveys) and offering brief details on topics necessary for their personal development, sense of social belonging, and academic success.

1) Socio-emotional Component Support 3rd Year Kick-Off Meeting; September 22, 2020, with 95% of the H-Scholars attended online via BigBlueButton on the Moodle EECOS page. The scholars that could not participate were invited to a second meeting on September 24, 2020, to reach 100% participation and compliance on the required forms. During this Socio-emotional Component Support meeting, the EECOS Scholars participated in a social ice-breaker activity, and the importance of self-talk to foster a growth mindset was discussed. They completed three Google Forms and one Padlet to collect ideas for future activities and as a need assessment. The forms: 1) Post-test survey on Mindset (to test the growth of implicit theories of intelligence and the effect of mental attributions to effort and grit on behavior); 2) Grit Scale 3) Meeting satisfaction evaluation form. Evaluation results indicated a high level of satisfaction by EECOS Scholars with the meeting (3.55 on a scale of 1 to 4).

2) Socio-emotional Component Support for New EECOS' E-Scholars Virtual Meeting; (Online via BigBlueButton on the Moodle EECOS page) April 24, 2021. 99% of the E-Scholars attended. The

objective for this virtual meeting was to inspire a sense of hope as well as a sense of belonging through a virtual greet-and-meet. During the online meeting, the process to request socio-emotional and psychological services was reminded and explained. The most significant event of the meeting was the presentation of the EECOS Alumni video documentary and the open discussion following it. The video documentary presents the stories of anguish and triumph of 6 alumni who lost everything during Hurricane Maria or the earthquakes of 2020. In very inspirational words, they give thanks to the ecosystem of help received from the EECOS project. After all the hardships, they all managed to graduate, and half of them entered graduate schools while the other three were already working in STEM careers. (See the video in <https://youtu.be/4qIPwGID4Mk>) The floor was opened for discussion, and EECOS Scholars participated lively by sharing their own stories of hardship and success. It was a very moving and hopeful activity that garnered an excellent evaluation from the attendees. (3.85 on a scale of 1 to 4).

3) As the faculty mentors had the most continuous contact with the Scholars, they discovered earlier when one of their mentees needed socio-emotional help or was in crisis. The requested training in working with students in crisis that the Department of Counseling and Psychology provided in the workshop was titled: "Resources for the University Professor: how to help a student in crisis. "

*** Have the results been disseminated to communities of interest? If so, please provide details.**

Bellido, C., Alfaro, M., Delgado, B., y Orengo, M. (2021). *Proyecto EECOS STEM; Ayudando a retener y fortalecer a nuestros estudiantes STEM víctimas de desastres naturales en Puerto Rico. [EECOS STEM project; Helping to retain and strengthen our STEM students who were victims of natural disasters in Puerto Rico.]* Impacto Educativo Vol.2 p.27-30.

A virtual presentation and publication of the results of the EECOS project under the title *Championing Hispanic Student Success following Natural Disasters in Puerto Rico* López del Puerto, C., & Bellido, C. M., & Suarez, O. M., & Alfaro, M., & Jimenez, M. A. (2021, July), Paper presented at 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. 10.18260/1-2—36790.

Bellido, C., López del Puerto, C., Montalvo, R. D., Alfaro, M., Delgado, B. & Orengo, M. (July 2021) *Asegurar la Retención y Graduación de Estudiantes Universitarios Después de Desastres Naturales en Puerto Rico. [Ensure the Retention and Graduation of University Students After Natural Disasters in Puerto Rico.]* XXVIII Congreso Internacional de Aprendizaje Virtual. Universidad Jaquelónica Cracovia, Polonia

*** What do you plan to do during the next reporting period to accomplish the goals?**

This third year was the last year of the project EECOs and will be disseminated in at least two more venues during the no-cost extension period if approved.

It will create a protocol for the administration with the directions of addressing the aftermaths of natural events.

Supporting Files

Filename	Description
(Download)	EECOS NSF Annual Report Table of Progress Report Sep 30 2021.pdf
	EECOS Evaluation Report by

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Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers

View all journal publications currently available in the [NSF Public Access Repository](#) for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all journal publications recorded to date that are associated with this award.

Licenses

Other Conference Presentations / Papers

- Bellido, C., López del Puerto, C., Montalvo, R. D., Alfaro, M., Delgado, B. & Orengo, M (2021). *Asegurar la Retención y Graduación de Estudiantes Universitarios Después de Desastres Naturales en Puerto Rico. [Ensure the Retention and Graduation of University Students After Natural Disasters in Puerto Rico.]*. XXVIII Congreso Internacional de Aprendizaje Virtual.. Virtual Conference. Status = PUBLISHED; Acknowledgement of Federal Support = Yes
- López del Puerto, C., & Bellido, C. M., & Suarez, O. M., & Alfaro, M., & Jimenez, M. A. (2021). *Championing Hispanic Student Success following Natural Disasters in Puerto Rico*. 2021 ASEE Virtual Annual Conference. Virtual Conference. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Other Products

- *Audio or Video Products.*
Video Documentary – Voices of Success EECOS Testimonials
See the video in <https://youtu.be/4qIPwGID4Mk>)

Other Publications

- Bellido, C., Alfaro, M., Delgado, B., y Orengo, M. (2021). *Proyecto EECOS STEM; Ayudando a retener y fortalecer a nuestros estudiantes STEM víctimas de desastres naturales en Puerto Rico. [EECOS STEM project; Helping to retain and strengthen our STEM students who were victims of natural disasters in Puerto Rico.]*. Magazine of the UPRM Teacher Preparation Program titled Impacto Educativo. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Patent Applications

Technologies or Techniques

Thesis/Dissertations

Websites or Other Internet Sites

Participants/Organizations

What individuals have worked on the project?

Alfaro, Monica	PD/PI	1
Bellido, Carmen	Co PD/PI	1
FERRER, MERCEDES	Co PD/PI	1
Santiago, Nayda	Co PD/PI	1

Full details of individuals who have worked on the project:

Monica Alfaro

Email: monica.alfaro@upr.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Work with the campus financial aid and institutional research offices to develop an EECOS Scholar application form for talented, low income UPRM STEM students severely impacted by Hurricane María and by the earthquake events of 2020. •Designate the application evaluation committee (including PI, CoPi, Institutional Planning Office (OPIMI) director, Student Ombudsman (OSEIRUM) director, and Financial Aid Office director. •Develop and adopt guidelines to ensure confidentiality evaluation. Evaluate EECOS scholarship applications, award scholarships, name, and recognize recipients as EECOS Scholars. •Assign EECOS scholars to mentors. •Schedule, plan, and direct monthly meetings with all EECOS project personal. •Requisition materials. •Process scholarships. •Analyze results. •Prepare project report. •Attend annual meeting. Contribution to the Project as mentor: •Schedule, plan, and hold two meetings per semester with EECOS Scholars.

Funding Support: NSF EECOS-STEM #1833989

Change in active other support: No

International Collaboration: No

International Travel: No

Carmen Bellido

Email: carmen.bellido@upr.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Develop and maintain the closed EECOS Moodle online learning community to share resources with EECOS scholars to help them develop their resilience and learning growth mindset in order to meet day-to-day academic and non-academic challenges. •Conduct an online forum for exchanging day-to-day progress, successes, and challenges among the EECOS Scholars. •Create an EECOS Moodle page and a CiViCRM platform to facilitate data gathering. •Create a procedural manual for EECOS Academic and Socio-emotional support. •Plan and deliver two seminars for the socio-emotional component. •Maintain constant communication with EECOS Mentors and Scholars regarding Scholars' needs, academic as well as socio-emotional.

Funding Support: NSF EECOS-STEM #1833989

Change in active other support: No

International Collaboration: No

International Travel: No

MERCEDES S FERRER

Email: mercedes.ferrer@upr.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Work with the campus financial aid and institutional research offices to develop an EECOS Scholar application form for talented, low income undergraduate UPRM STEM students severely impacted by Hurricane María and by the Earthquake events of 2020. Assure that the application form covered the applicant's STEM talent and potential as well as the personal/family impact of Hurricane María. •Provide potential EECOS Scholars with a thorough orientation of the opportunity, requirements, and responsibilities as well as technical assistance with the application process. •Develop EECOS Scholarship application guidelines to ensure confidentiality and equitable evaluation. •Provide the other members of the EECOS Scholarship evaluation committee: the PI, CoPi, Student Ombudsman (OSEIRUM) director, and Financial Aid Office director with applicant data. •Serve on the EECOS Scholarship evaluation committee.

Funding Support: NSF EECOS-STEM #1833989

Change in active other support: No

International Collaboration: No

International Travel: No

Nayda G Santiago

Email: naydag.santiago@upr.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Schedule, plan, and hold two meetings per semester with EECOS Scholars. •Determine the academic needs of assigned EECOS scholars and refer to appropriate campus services for tutoring as well as provide academic mentoring. •Ask Dr. Bellido to refer scholars to the appropriate campus office to address socio-emotional needs revealed during mentor scholar meetings. •Acquaint assigned scholars with ongoing campus research related to their STEM field via existing seminars, conferences, and other professional activities. •File report on assigned scholars' academic progress, seminar or conference attendance, work and study plans, and developing interests. •Report my perception of the effectiveness of the academic component. •Evaluate the performance of assigned scholars and their compliance with required project components.

Funding Support: NSF EECOS-STEM #1833989

Change in active other support: No

International Collaboration: No

International Travel: No

What other organizations have been involved as partners?

Nothing to report.

Were other collaborators or contacts involved? If so, please provide details.

Evaluator: Bernadette Delgado

Evaluation instruments for EECOS project strategies and implementations.

- Report project results & products to assure all data are de-identified, ensuring personal information is kept anonymous and confidential in accordance with the APA ethical research standards.

- Collect, analyze, report data, and collaborate in the writing of asked reports.

Mentors: Martha L. López, PhD, Lourdes Medina, PhD, Moises Orengo, PhD, José Fernando Vega, PhD, Jonathan Muñoz, PhD, Mercedes Ferrer, Ing. and Matias Cafaro, PhD.

- Schedule, plan, and hold 2 meetings per semester with EECOS Scholars.
- Determine the academic needs of assigned EECOS scholars, refer to appropriate services for tutoring, socioemotional support, and provide academic mentoring.
- Acquaint scholars with ongoing campus research related to their STEM fields via seminars, conferences, and other professional activities.
- File report on assigned scholars' academic progress, seminar or conference attendance, work & study plans, & developing interests.
- Evaluate the performance of assigned scholars and their compliance with the required project components.

Socioemotional Support Services: Professional counselor Dr. Magaly Mercado and the psychologist Dr. Zaida Calderon from the Department of Counseling and Psychological Services. All socioemotional support referrals are directed to both of them to assess and to provide professional counseling or psychological services as needed.

Administrative Assistance: Grisell Botti. Collaboration with clerical tasks including requisition of materials and preparation of all forms related to EECOS scholarships, institutional processing of forms, signatures, personnel, and accounting.

Collaboration of Institutional UPRM Offices - Economic Assistance Officer, Dept Counseling & Psychological Services, Psychological Counseling-Medical Services Dep. RUMboEX Psychology Services

Statistician: Diana D. Vargas: Statistic Advisor and Administrative Assistant for the CiviCR Platform.

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Impacts

What is the impact on the development of the principal discipline(s) of the project?

This project is in the third and last year and its greatest achievement is its impact on the 65 STEM scholars selected so far. These STEM-Scholars were on the verge of withdrawal from the university because of the ongoing economical and emotional stress produced by two severe natural disasters. These EECOS scholars are STEM majors and the near-term impact on their respective disciplines will be their graduation. As expected, EECOS has made progress verifying the value of socio-emotional support in addition to economic support to enable students to persist after a catastrophic event. Participant grit development was planned as a cornerstone of the recovery process and grit is becoming a characteristic of those participants. The Scholars themselves have stated their appreciation for academic counseling and rate it of high value. In conclusion, creating an ecosystem that involves economic, academic, and socio-emotional support has proven effective. Fifteen STEM-Scholars graduated during the third year, and the remaining have progressed in their respective programs.

EECOS has facilitated the interaction of many university units pursuing the same objective, ensuring that students receive all the support needed to complete their studies. Several communication channels have been established between the offices that handle different aspects of the project, from the economic one, through the staff of professors who are being trained to work with these situations, to the departments that manage the counseling and psychological services. Additional personnel was added during this year because of the high demand after the Earthquakes.

One of the most notable achievements has been the fact that the STEM students that were accepted look forward to their meetings with mentors and consult more frequently different aspects of their academic or socio-emotional issues. All EECOS Scholars frequently express sincere gratitude for the counseling received. During the spring semester, they expressed a little discontent because several of the activities planned were canceled due to the pandemic.

What is the impact on other disciplines?

The same ecosystem proposed in this study could include students from all careers, STEM and non-STEM. It could be adapted for use at other institutions to contribute to the resilience and sustainability of emergency protocols for future events. The goal is to create a protocol that can be used as an instrument where the benefits have already been demonstrated.

At the same time, the ecosystem of this project has prepared not only mentors but also the STEM-Scholars to develop protocols that can be used in the future anywhere. They have observed that a combination of different strategies can create a positive synergistic effect in any society that may suffer impacts from natural events or any other type.

What is the impact on the development of human resources?

This project involves professors, students, counselors, and other collaborators in creating a plan that will serve as a framework of the strategies to follow in case of catastrophic events that could displace students from attending the university. These strategies will be shared with academic entities on the island and with the community in general. They will remain a solid base to continue improving over time, but most importantly, to create an action protocol for this kind of emergency.

What was the impact on teaching and educational experiences?

Nothing to report.

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

Nothing to report.

What is the impact on information resources that form infrastructure?

One of the main reasons for this project was to help those students that were severely impacted by Hurricane Maria and by earthquake events deal with multiple aspects of their studies, careers, and lives. In this process, this project provides a case study of a platform and tools (an ecosystem) that can be used to respond to the needs of promising university students after a catastrophic event. EECOS is employing what is expected to be effective strategies and will document the effectiveness of the same for a group of talented STEM students.

Further EECOS will use internal formative evaluation to modify the structure and tools seeking to improve their effectiveness and document the modification process, the modifications implemented, and their relative effectiveness for future use.

What is the impact on technology transfer?

It is the first time that Puerto Rico worked at the university level with a project that involves rescuing students severely affected by catastrophic events and providing them with a combination of strategies necessary to help them finish their careers. This project was able to give support to 65 STEM Scholars and achieved a 96% of success between graduation and retention, using strategies that could be used in any other educational center as well as in any company or governmental entity. The development of protocols that improve the human condition in all its aspects after catastrophic events would greatly benefit all parties and recovery would be achieved faster.

What is the impact on society beyond science and technology?

The main impact on society beyond science technology will be a documented trial of an ecosystem for assisting students facing similar challenges.

We hope that this project will become a key study that can be used in all institutions to ensure the professional future of students affected by calamitous events, natural or otherwise. This study provided useful tools and guidelines that can form part of emergency protocols to be used by higher learning institutions to offer timely assistance as well as provide a framework for better decision-making in the planning and implementation of resilient/sustainable actions.

What percentage of the award's budget was spent in a foreign country?

Nothing to report.

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Changes/Problems

Changes in approach and reason for change

During the second semester of the third year, five students received a minor scholarship, but it was an extension of this financial help established from the beginning.

Two students abandoned their careers.

Actual or Anticipated problems or delays and actions or plans to resolve them

During the second year, a field trip to the sea was planned, which would be composed of an academic and socio-emotional part, and for this trip, snorkeling sets were acquired, and this trip could not be given during the third year due to the Covid-19 restrictions. Everyone's equipment was delivered in a drive-through event during the first semester of the third year.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.

Change in primary performance site location

Nothing to report.

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Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

Nothing to report.